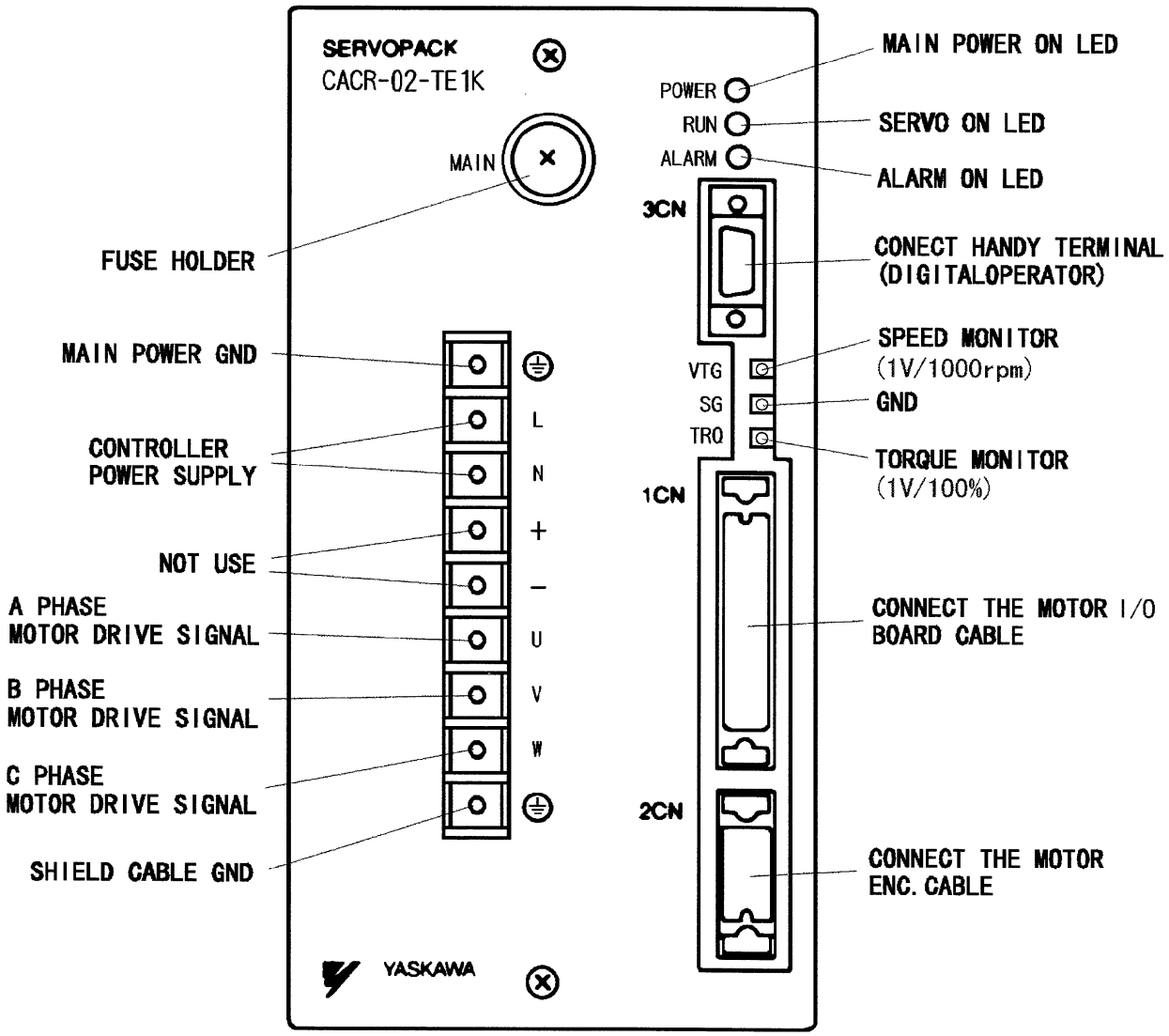
2-7 COAT & DEV Spin Motor Driver (YASKAWA SPIN MORTOR DRIVER)

2-7-1 External Appearance and Parts Name



2-7-2 Input / Output Signal Connector Terminals and Nomenclature

CN1 Terminal Input / Output Signal Table

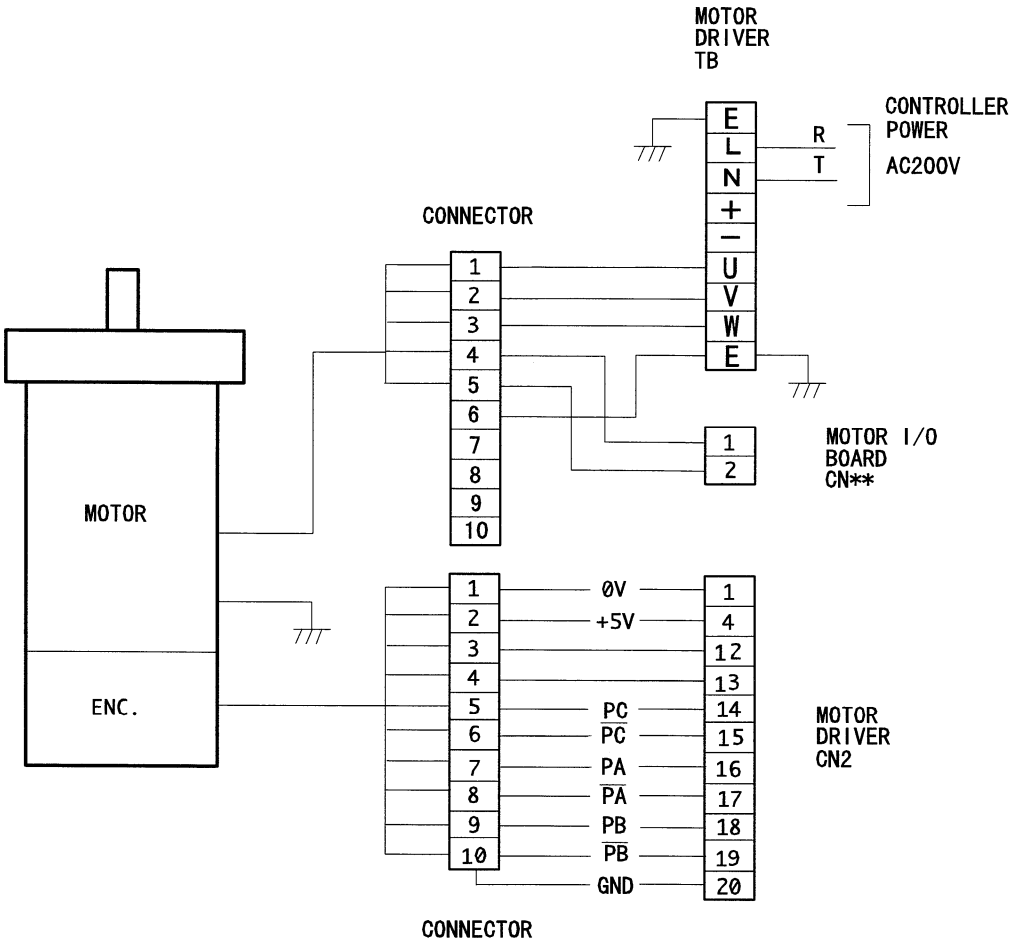
CN.NO	Signal Name	Description	CN.NO	Signal Name	Description
1	+24VIN	External power input	19	BMON	B phase output (not reverse)
2	S-ON*	Servo ON signal input	20	BMON	B phase output (reverse)
3	CW	Opposite rotation command pulse input (not reverse)	21	CMON	C phase output (not reverse)
4	CW	Opposite rotation command pulse input (reverse)	22	CMON	C phase output (reverse)
5	CCW	Normal rotation command pulse input (not reverse)	23	Unused	
6	CCW	Normal rotation command pulse input (reverse)	24	Unused	
7	Unused		25	Unused	
8	ARST*	Alarm reset input	26	Unused	
9	Unused		27	Unused	
10	CLR*	Clear deflection counter input	28	Unused	
11	Unused		29	Unused	
12	P-CON*	Proportional control signal input	30	Unused	
13	ALM+	Alarm output	31	Unused	
14	ALM-	Alarm output	32	Unused	
15	COIN+*	End-of-positioning signal output	33	Unused	
16	COIN-*	End-of-positioning signal output	34	Unused	
17	AMON	A phase output (not reverse)	35	Unused	
18	AMON*	A phase output (reverse)	36	FG	Frame ground

CN2 Terminal Input / Output Signal Table

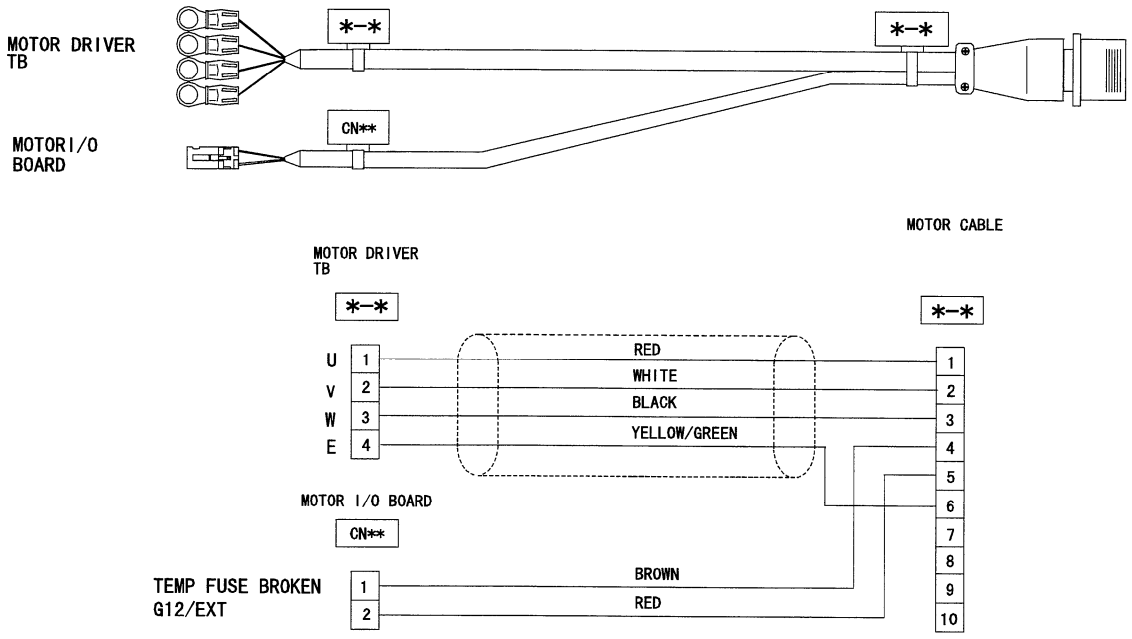
CN.NO	Signal Name	Description	CN.NO	Signal Name	Description
1	PG0V	PG power OV	11	Unused	
2	PG0V	PG power OV	12	Unused	
3	PG0V	PG power OV	13	Unused	
4	PG5V	PG power +5V	14	PC	PG input C phase (not reverse)
5	PG5V	PG power +5V	15	PC	PG input C phase (reverse)
6	PG5V	PG power +5V	16	PA	PG input A phase (not reverse)
7	Unused		17	PA	PG input A phase (reverse)
8	Unused		18	PB	PG input B phase (not reverse)
9	Unused		19	PB	PG input B phase (reverse)
10	Unused		20	Unused	

2-7-3 Connector Pin Assignment

1) Connection diagram



2) SPIN MOTOR TERMINAL CABLE (Common Section)

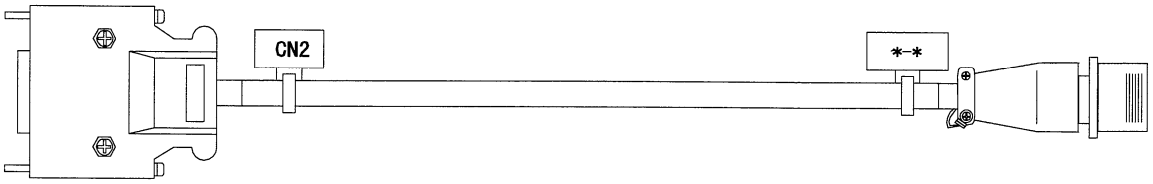


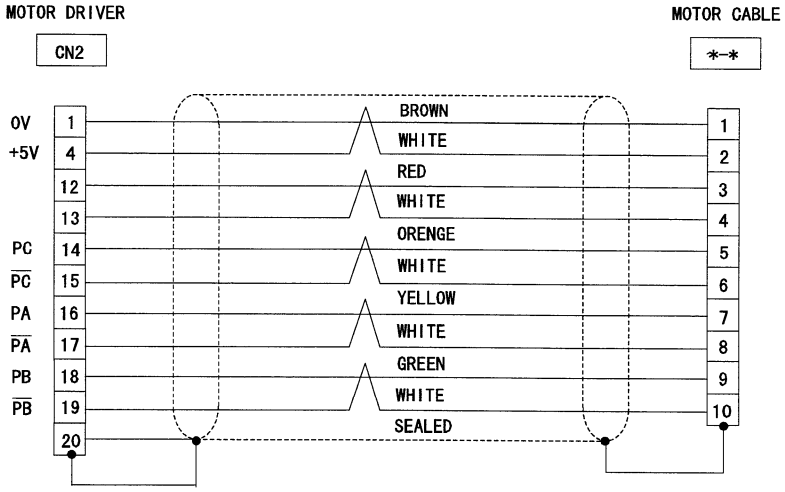
The *-* designation of the motor driver TB shows the block number and module number. These are connected to the 1, 2, 3, and 4 motor driver terminal blocks.

The CN** designation of the motor I/O board shows that spinner 1 is connected to CN33, spinner 2 to CN32, spinner 3 to CN31, and spinner 4 to CN34.

The *-* designation of the motor cable shows the block number and module number. These are connected to the 1, 2, 3, and 4 spin motor cables.

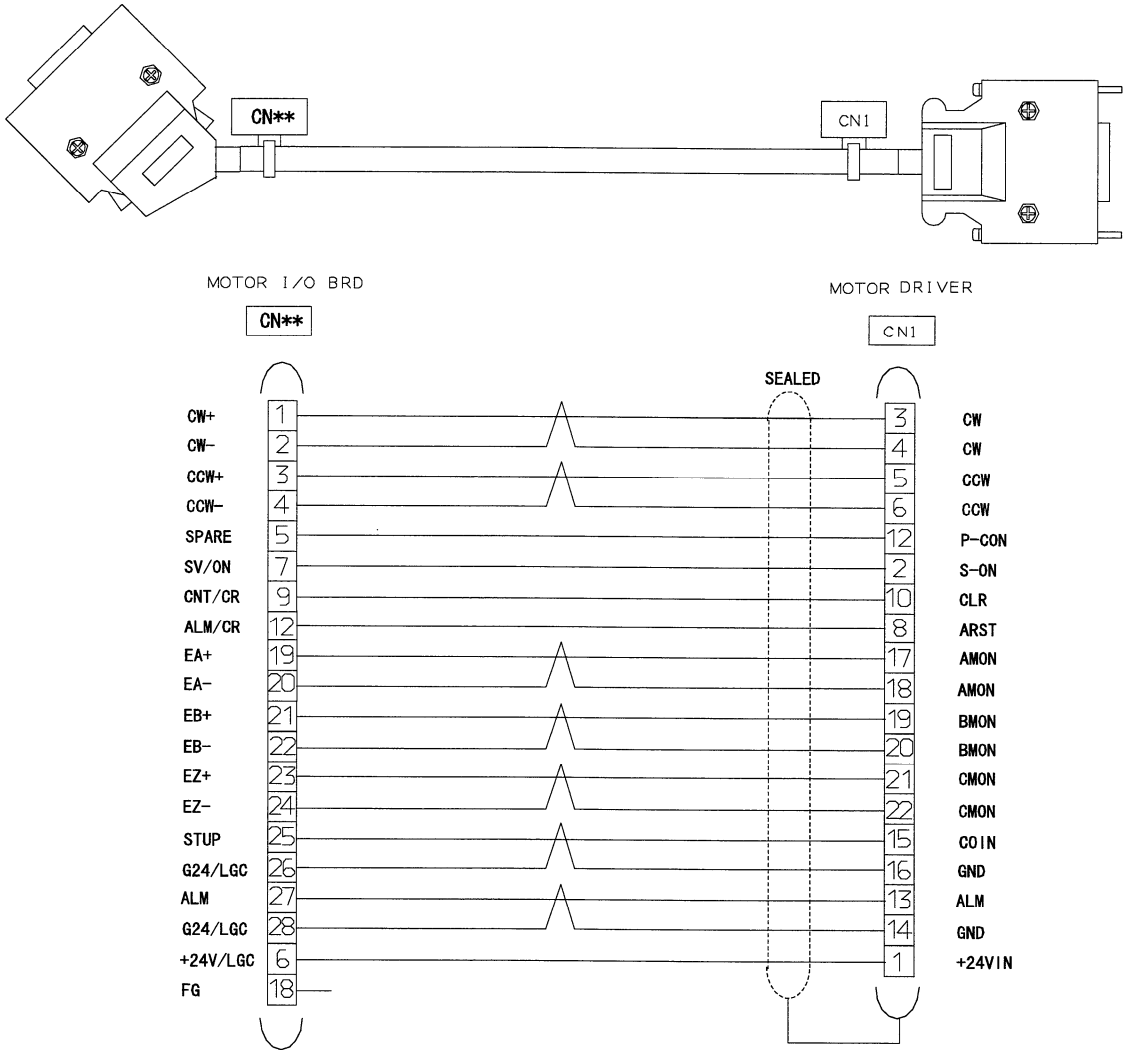
3) SPIN MOTOR ENCODER CABLE (Common Section)





The *-* designation of the motor cable shows the block number and module number. These are connected to the 1, 2, 3, and 4 spin motor encoder cable.

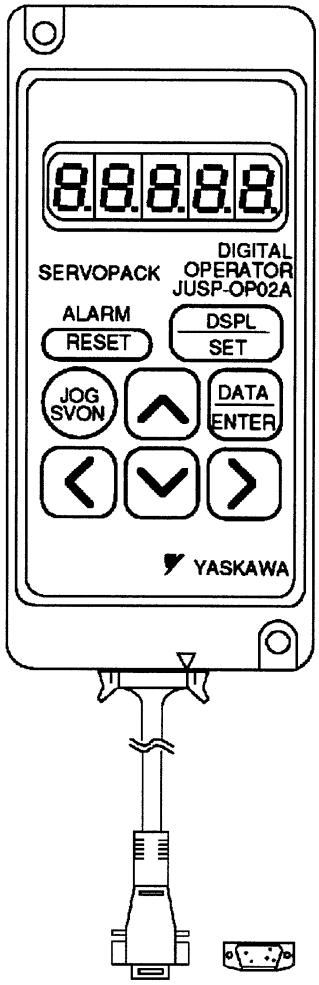
4) SPIN MOTOR I/F CABLE (Common Section)



The CN** designation of the motor I/O board shows that spinner 1 is connected to CN17, spinner 2 to CN18, spinner 3 to CN19, and spinner 4 to CN20.

2-7-4 Digital Operator (Handy Terminal)

1) External Appearance



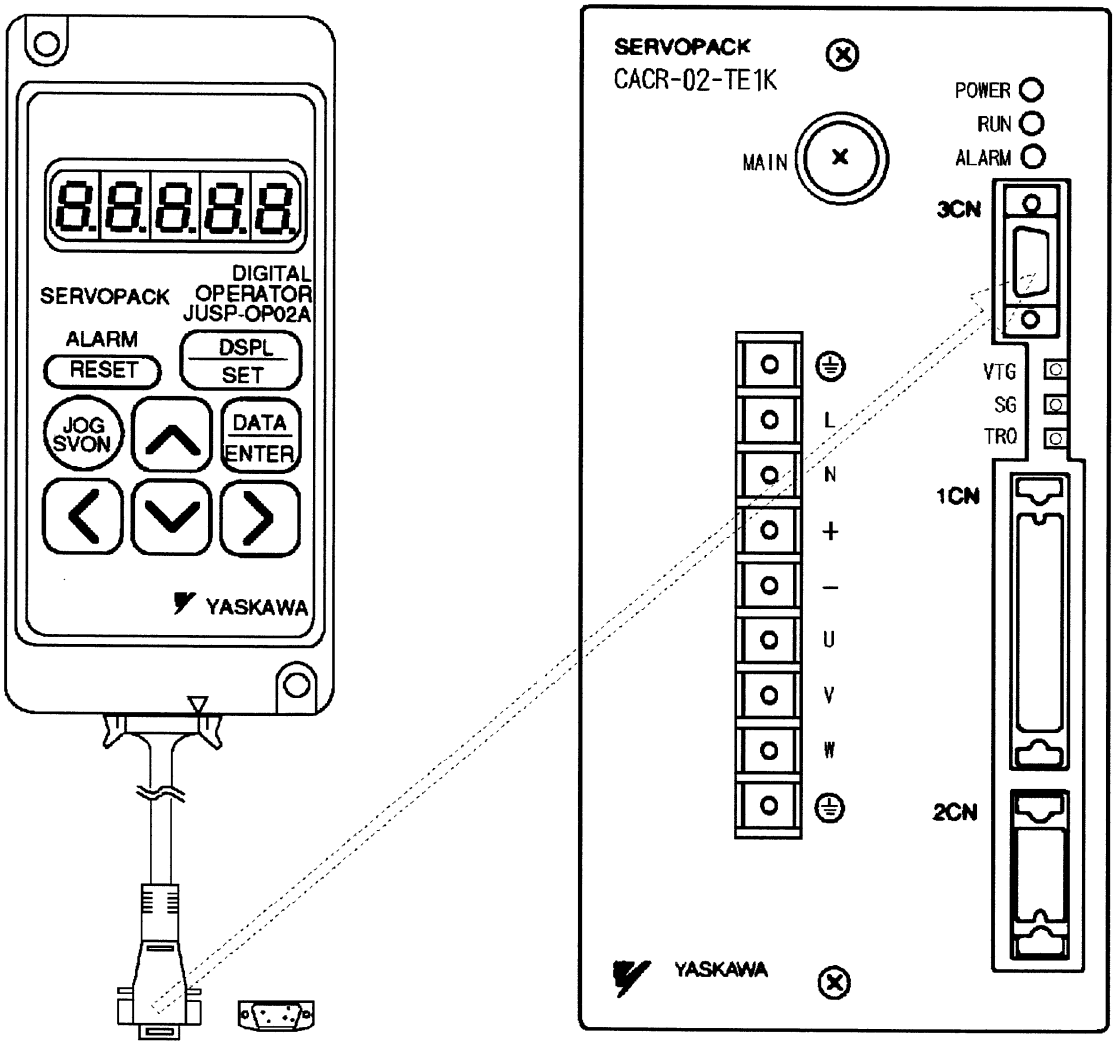
Part No.: 040-001562-1

This chapter explains the convenient functions and basic operation of the digital operator.

The unit enables easy operation of the motor and setting of various parameters.

Actually operating the digital operator while reading through this chapter may help in learning the unit's functions.

2) Digital Operator Connection



Use of the convenient "JUSP-0P02A-1" digital operator is possible.

Use the attached cable to connect the unit to the CN3 pin connector of the motor driver.

When the power is on, disconnecting the digital operator does not interfere with the motor driver operation.

2-7-5 Operation of the Digital Operator

1) Resetting the Servo Alarm

It is possible to reset the servo alarm by using the digital operator.

It is not necessary to reset this, however, when the control power is turned off for the servo alarm.

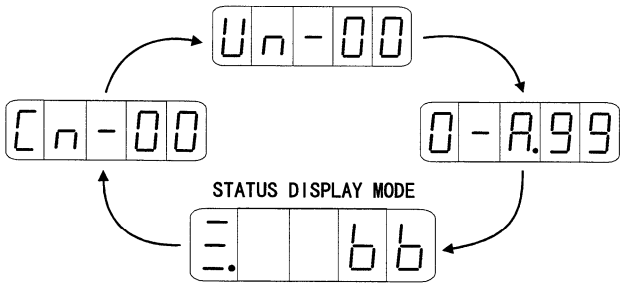
When an alarm has occurred, reset the alarm after attending to the cause of the alarm. Refer to corrective action methods when an alarm occurs.

Press the ALARM / RESET key.

2) Operation of the Status Display Mode

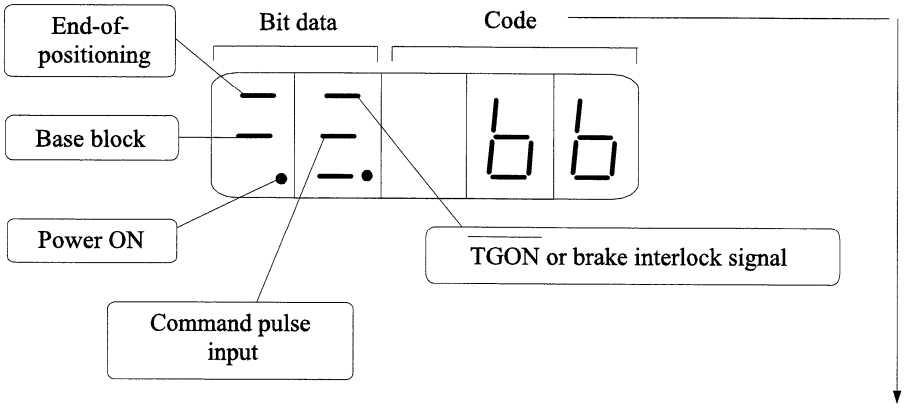
1. In the Status Display Mode, the motor driver condition is displayed by bit data and codes.
2. Select the Status Display Mode in the following way.

Press the DSPL / SET key to choose the Status Display Mode.



3. When the power is turned on, the Status Display Mode will be in operation.

4. Display information in this mode is as shown below. (Note that display information will differ by speed/torque control and position control.)
   This device uses position control.



Bit Data	Description
Power ON	Lamp on indicates that the Servopack input power is on. Lamp off indicates power is off.
Base block	Lamp on during base block. Lamp off when servo on.
End-of-positioning Do not change setting data.	Lamp on when deflection between command position and actual motor position is smaller than the specified value. Lamp off when deflection is greater than specified value. Specified value: set by Cn-1B
Do not change setting data.	Lamp on when motor rpm is greater than specified value. Lamp off when rpm is smaller than specified value. Specified value: set by Cn-0B (standard is 10 rpm)
TGON or brake interlock signal (Select with E bit of Cn-01.)	Lamp on when the brake interlock signal releases the brake in the "1CN-27, 28 'Closed' / 1CN-27 at level 'L'" condition. Lamp off when the brake is set in the "1CN-27, 28 'Open' / 1CN-27 at level 'H'" condition.
Command pulse input	Lamp on when the command pulse is being input. Lamp off when the pulse is not being input.

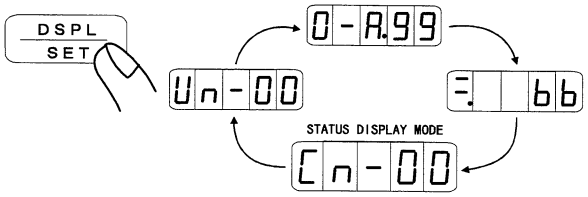
Code	Status
bb	In base block. Servo off.
run	Operating. Servo on.
Pot	Normal rotation prohibited. ICN-42 (P-OT) off. See Cn-01 bit 2.
not	Reverse rotation prohibited. ICN-43 (N-OT) off. See Cn-01 bit 3.
A.00	Alarm status. Displays alarm number. See alarm information.
A.02	
2	

3) Using Setup Mode (Memory Switch Setup Cn-01, Cn-02)

Allows setting of needed functions by turning bits on or off with the memory switch.

In the following example, memory switch bit "4" of user parameter "Cn-01" is turned on.

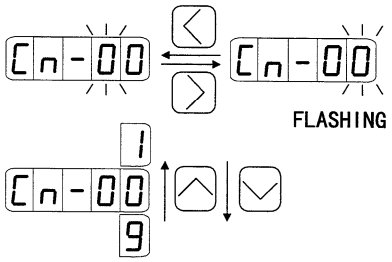
1. Press the DSPL / SET key, then select "Setup Mode".



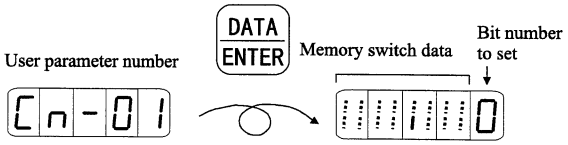
2. Choose the user parameter number to be set.

Use the ◁ and ▷ keys to activate the digit to be set.

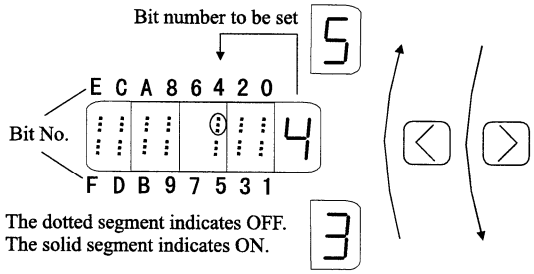
Use the △ and ▽ keys to change the number.



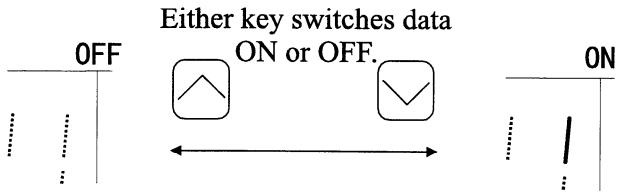
3. Press the DATA / ENTER key to display the data for the memory switch parameter selected in step 2.



4. Use the ◁ and ▷ keys to select the bit number to be set.

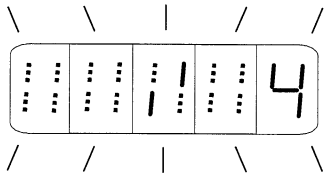


5. Press the ▲ or ▼ key to turn ON or OFF the memory switch data for the bit number to be set.



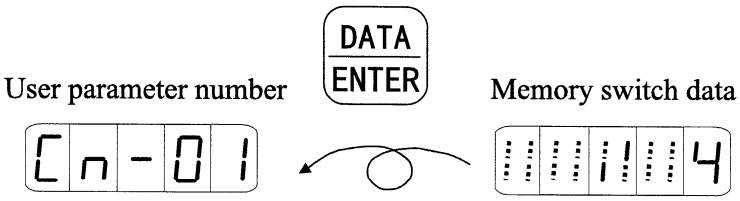
6. Repeat steps 4 and 5 as needed.

7. Press the DATA/ENTER key to set the data in the memory.



The data set in the memory will flash.

8. Pressing the DATA/ENTER key again will return the display to the user parameter number.



* Selection with the memory switch uses not numerical values but bits to choose functions.

Select needed functions by using the 16 bits (0 to 9 and A to F) to turn functions ON (the bit is lit) or OFF (the bit is not lit).

4)User Parameter Table

1. The Servopack is equipped with many functions. It is possible to select specific functions from among these, and each has "User Parameters" for making fine adjustments. The table below presents the user parameters.

2. There are two types of user parameters.

(1) Memory Switch Cn-01,Cn-02	Selects functions by turning one bit ON or OFF.
(2)Parameter Settings from Cn-03	Selects values for functions such as torque control and speed loop gain.

3. See "Using Setup Mode" for instructions on setting the user parameters.

⚠WARNING

User parameters are already set at shipment. Do not change them, or it might cause motor malfunction.

For Position Control

User Parameter Table (memory switch setting) - Part 1

	User Parameter Number	Bit Number	Settings					Factory Setting
Input Signal Active/Inactive	Cn-01	0	0 0/0 Use servo on input. (S.ON)		1 0/1 Don't use servo on input. (S.ON) Servo on is normal condition.			0
		1	Standby (Do not make settings.)					0
		2	0 Use normal rotation prohibited input. (P.OT)		1 Don't use normal rotation prohibited input. (P.OT) Normal rotation is the common condition. Long.			0
		3	0 Use reverse rotation prohibited input. (N.OT)		1 Don't use normal rotation prohibited input. (N.OT) Reverse rotation is the common condition.			0
——		4*3	0 Use the TGON signal as the revolution detection output.		1 Use the TGON signal as the torque limit detection output.			0
——		5	0 Hold alarm status after sudden stop recovery.		1 Automatically eliminate alarm status after sudden stop recovery.			0
Emergency Stop Sequence Selection		6	0 During alarm, let dynamic brake (DB) stop the motor.		1 During alarm, let motor run freely.			0
		7	0 During alarm, cancel dynamic brake (DB) after DB stops motor.		1 During alarm, do not cancel dynamic brake (DB) after DB stops motor.			1
		8	0 At time of over travel (P.OT, N.OT), follow bit 6 for stop method.		1 At time of over travel (P.OT, N.OT), let Cn-06 torque decelerate and stop the motor.			0
		9	0 At time of over travel (P.OT, N.OT), after letting Cn-06 torque decelerate and stop the motor, turn servo off.		1 At time of over travel (P.OT, N.OT), after letting Cn-06 torque decelerate and stop the motor, apply zero clamp.			0
Servo Off Action Selection		A	0 During servo off, clear the deflection pulse.		1 During servo off, don't clear the deflection pulse.			0
Mode Switch Selection		B	0 Mode switch function active. Follow Cn-01 bits D and C.		1 No mode switch function active.			0
		D×C	0 · 0 Make internal torque command a condition. (level setting: Cn-OC)	0 · 1 Make speed command a condition. (level setting: Cn-OD)	1 · 0 Make acceleration a condition. (level setting: Cn-OE)	1 · 1 Make deflection pulse a condition. (level setting: Cn-OF)		6/8 inch 1·1 12 inch 0.0
TGON Signal Switching		E	0 Use incremental encoder.		1 Use absolute encoder.			0
Internal Speed Selection*1		F	0 Receive the stop always pulse when both the P.-CL and N.-CL contact signals are OFF.		1 Receive the pulse signal when both the P.-CL and N.-CL contact signals are OFF, and make INHIBIT function effective.			0
INHIBIT Function			0 Always receive the pulse command.		1 Make the INHIBIT function effective.			
Rotation Direction Selection	Cn-02	0	0 Make the CCW direction normal rotation. (reverse rotation mode)		1 Make the CCW direction normal rotation.			1
Origin Malfunction Action Selection		1	0 Perform origin malfunction detection. (when using absolute encoder)		1 Do not perform origin malfunction detection.			0
Internal Setting Speed Selection		2	0 Do not use internal setting speed selection function.		1 Use internal setting speed selection function.			0
Command Pulse Configuration Selection		5.4.3	0 · 0 · 0 sign + pulse	0 · 0 · 1 CW + CCW	0 · 1 · 0 A phase + B phase (1 relay)	0 · 1 · 1 A phase + B phase (2 relay)	1 · 0 · 0 A phase + B phase (4 relay)	(5 • 4 • 3) 0 · 0 · 1
Standby		7×6	Standby (Do not make settings.)					0
Motor Selection		8	0 SGM type motor		1 SGMP type motor			0

User Parameter Table (memory switch setting) - Part 2

	User Parameter Number	Bit Number	Settings		Factory Setting
Standby	Cn-02	9	Standby (Do not make settings.)		0
Deflection Counter Clear Signal		A	0	1	0
			Set the clear status by the H level of the deflection counter clear signal.	Set clear by the increase of the deflection counter clear signal.	
Speed/Torque and Position Control Mode Selection		B*5	0	1	1
			Integration time parameter setting in 1ms units.	Integration time parameter setting in 0.01ms units.	
Torque Command Filter Degree		C	0	1	0
			Torque command filter degree is 1.	Torque command filter degree is 2.	
Command Pulse Logic		D	0	1	0
			Do not reverse the logic of the command pulse.	Reverse the logic of the command pulse.	
Position Deflection Monitor Level		E	0	1	0
			E/0 Display monitor mode position deflection Un-01 by [X1 command units].	E/1 Display monitor mode position deflection Un-01 by [X100 command units].	
Command Pulse Filter		F	0	1	0
			F/0 Line driver (command pulse maximum frequency: 450kpps)	F/0 Open collector (command pulse maximum frequency: 200kpps)	

⚠ CAUTION

After changes have been made for Cn-01 or Cn-02 of the memory switch, turning the power off and on one time will make the new setting effective.

For Position Control

User Parameter Table (parameter setting)

Type	User Parameter Number	Code	Name	Unit	Factory Setting 6 inch	Factory Setting 8 inch	Factory Setting 12 inch
Gain Parameters	Cn-04*2	LOOPHZ	Speed Loop Gain	Hz	190	307	190
	Cn-05*2	PITIME	Speed Loop Integration Time	0.01ms	4000	4000	3000
	Cn-1A*2	POSGN	Position Loop Gain	1/S	130	120	35
	Cn-1C	BIASLV	Bias	r/min	0	0	0
	Cn-1D	FFGN	Feed Forward	%	0	0	0
	Cn-26	ACCTME	Position Command Acceleration/Deceleration Time	100 μs	0	0	0
	Cn-27	FFFILT	Feed Forward Command Filter	100 μs	0	0	0
Torque Parameters	Cn-06	EMGTRQ	Emergency Stop Torque	%	1053	1053	400
	Cn-08	TLMTF	Normal Rotation Torque Limit	%	1053	1053	444
	Cn-09	TLMTR	Reverse Rotation Torque Limit	%	1053	1053	444
	Cn-17	TRQFIL	Torque Command Filter Time	100 μs	4	24	30
	Cn-18	CLMIF	Normal Rotation External Torque Limit	%	100	100	100
	Cn-19	CLMIR	Reverse Rotation External Torque Limit	%	100	100	100
Sequence Parameters	Cn-0B	TGONLV	Revolution Detection Level	r/min	10	10	20
	Cn-12	BRKTIM	Brake Command to SVOFF Lag Time	10ms	0	0	0
	Cn-15	BRKSPD	Speed Level of Brake Command Output	r/min	100	100	100
	Cn-16	BRKWAI	SVOFF to Brake Command Wait Time	10ms	50	50	50
	Cn-1B	COINLV	End-of-positioning Width	command units	7	7	7
Pulse Parameters	Cn-0A*1	PGRAT	Encoder Pulse Demultiplication Ratio	P/R	1000	1000	1000
	Cn-11*1	PULSNO	Encoder Pulse Number	P/R	2000	2000	2000
	Cn-24*3	RATB	Electronic Gear Ratio (numerator)		8000	8000	8000
	Cn-25*3	RATA	Electronic Gear Ratio (denominator)		2500	2500	2500
Other Parameters	Cn-07	ACCSFTTME	Soft Start Time (acceleration)	10ms	0	0	0
	Cn-0C	TRQMSW	Mode Switch (torque command)	%	200	200	100
	Cn-0D	REFMSW	Mode Switch (speed command)	r/min	0	0	0
	Cn-0E	ACCMSW	Mode Switch (acceleration command)	10(r/min)/S	0	0	0
	Cn-0F	ERPMSW	Mode Switch (deflection pulse)	command units	1	1	1
	Cn-10	JOGSPD	JOG Speed	r/min	500	500	500
	Cn-1E*1	OVERLV	Overflow	×256 command units	1024	1024	1024
	Cn-1F	SPEED1	Stop position Loop Gain	r/min	200	200	20
	Cn-20	SPEED2	Stop speed Loop Gain	r/min	450	450	100
	Cn-21	SPEED3	Stop position Loop integrate time	r/min	8000	8000	3500

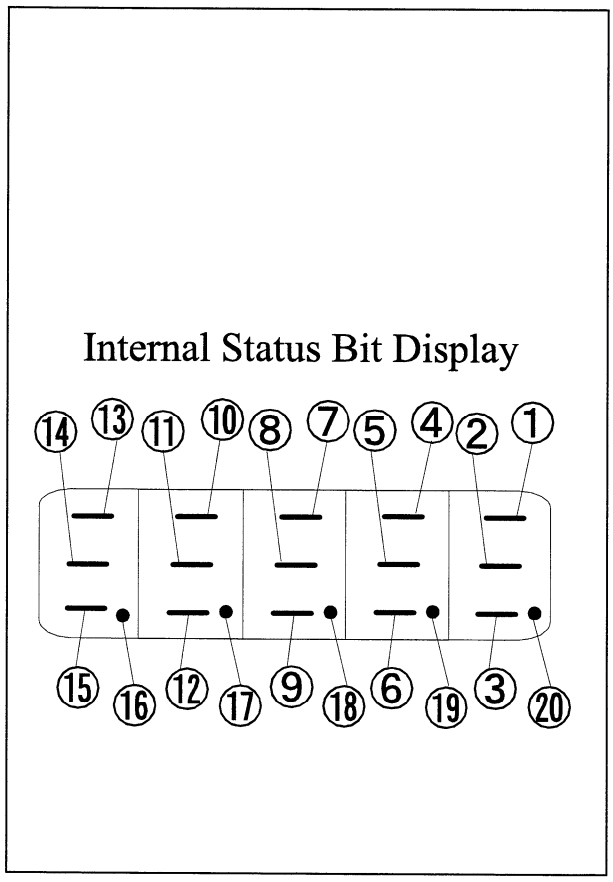
* 1 After this setting is changed, turning the power off and on one time will make the new setting effective.

* 2 This setting is made automatically by the autotuning function. (Use prohibited)

* 3 Electronic Gear Ratios Cn-24 and Cn-25 require the following limitation: $0.01 \leq \frac{B(Cn\text{-}24)}{A(Cn\text{-}25)} \leq 100.$

* 4 The Overflow level Cn-1E is factory-set at 1 for full-closed specification.

5) Monitor Mode Display Information (position control)



Monitor Types

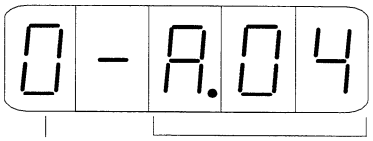
Monitor No.	Monitor Display Information
Un-00	Actual motor rotational speed Unit: r/min
Un-02	Internal torque command Unit: % (for rated torque)
Un-03	Pulse number from motor U phase edge Unit: pulse
Un-04	Electrical angle Unit: 1/10 degrees
Un-05	Internal status bit display
Un-06	Internal status bit display

Internal Status Bit Display

Monitor Number	Bit Number	Description	Related I/O Signal, User Parameter
Un-05	(1)	Servo alarm	1CN-31 (ALM)
	(2)	Dynamic brake ON	
	(3)	Reverse rotation mode	Cn-02 bit 0, 2CN-7 (DIR)
	(4)	Motor turning, or brake interlock signal	1CN-27 (*TG-ON), status display mode
	(5)	End-of-positioning	1CN-25 (*COIN), status display mode
	(6)	Mode switch ON	
	(7)	Normal rotation torque control on, or internally set speed setting on	1CN-45 (*P-CL)
	(8)	Reverse rotation torque control on, or internally set speed setting on	1CN-46 (*N-CL)
	(9)	Motor power on	
	(10)	A phase	2CN-33(PA), 2CN-34(*PA)
	(11)	B phase	2CN-35(PB), 2CN-36(*PB)
	(12)	C phase	2CN-19(PC), 2CN-20(*PC)
	(13)	U phase	with incremental encoder use only
	(14)	V phase	with incremental encoder use only
	(15)	W phase	with incremental encoder use only
	(16)	Servo ON	1CN-40 (*S-ON), Cn-01 bit 0
	(17)	P movement input, or rotation direction input	1CN-41 (*P-CON)
	(18)	Normal rotation prohibited input	1CN-42 (P-OT), Cn-01 bit 2
	(19)	Reverse rotation prohibited input	1CN-43 (N-OT), Cn-01 bit 3
	(20)	(unused)	
Un-06	(1)	Input command pulse	1CN-7 (PULS), 1CN-8 (*PULS)
	(2)	Input pulse code	1CN-11 (SIGN), 1CN-12 (*SIGN)
	(3)	Deflection counter clear input	1CN-15 (CLR), 1CN-14 (*CLR)
	(4)-(12)	(unused)	
	(13)	Full-closed A phase	4CN-2 (FA), 4CN-3 (*FA)
	(14)	Full-closed B phase	4CN-4 (FB), 4CN-5 (*FB)
	(15)	Full-closed C phase	4CN-6 (FC), 4CN-7 (*FC)
	(16)-(20)	(unused)	

6) Operation of Alarm Trace Back Mode

The Alarm Trace Back Mode can display at maximum last 10 alarms that have occurred. Because you can confirm the time and nature of a particular error, it facilitates quick troubleshooting.



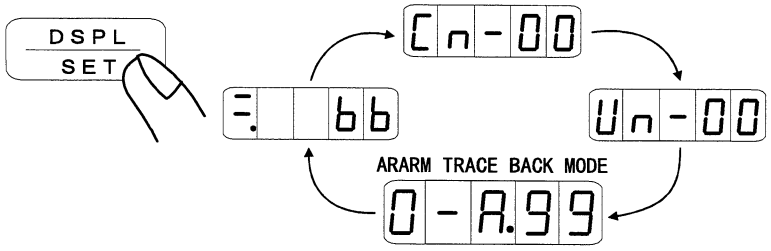
Alarm Number
The larger the number, the older the alarm data.

Alarm Information
See the Alarm Table.

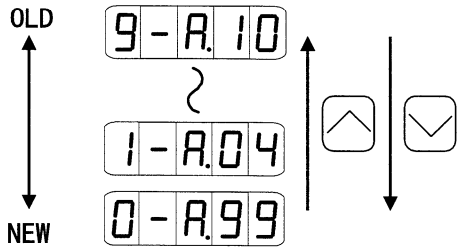
7) Using the Alarm Trace Back Mode

1. Use the procedures explained below to obtain information about alarms that have occurred.

Press the DSPL SET key, then select the Alarm Trace Back Mode.



2. Using the ▲ and ▼ keys will display higher or lower alarm numbers, with the information about the alarms also displayed. The higher the number on the left, the older the alarm.



* The alarm trace back data is not eliminated by the alarm reset or even by the turning off of the servopack power. (No interference with operation.)

Delete the data by using Clear in the Alarm Trace Back Mode.

See item 9) of this section.

3. Causes of Alarm Displays and Corrective Actions

1) When an adverse condition is revealed by the alarm display (A.__), check the table below for the cause, then take appropriate corrective actions. The display of "A.99" is not, however, an alarm.

2) If the adverse condition cannot be resolved by inspection and corrective action, contact our service department immediately.

Alarm Display and Corrective Actions Table (1/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

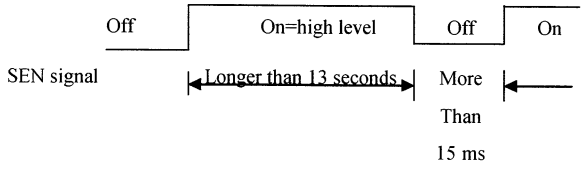
Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.00 Absolute value data error	• Came on when control power was turned on. · Cn-0 Cn-01 · Cn-01 bit=1	· The absolute encoder's power is being supplied by a source other than Servopack.	· Use the Servopack encoder power supply.
		· Problem with the absolute encoder wiring. (Such as PA, PB, RESET, SEN signal [for speed control].)	· Check the connections to the absolute encoder and repair if necessary.
	· Came on when SEN signal was turned on	· The absolute encoder malfunctioned.	· With Cn-01 bit=0, turn the SEN signal off, then turn it back on. (*1) · With Cn-01 bit=1, turn the Servopack power off, then turn the control power back on.
		· While using the incremental encoder, user parameter settings became corrupted and Cn-1 bit E was set to 1.	· Set Cn-1 bit E to 0.
		· The absolute encoder broke down.	· Replace the motor.
		· The printed-circuit board (1PWB) condition is poor.	· Replace the Servopack.

*1 Alarm A.00 will reset when the power is turned off. Do not use the usual alarm reset. method.

[ ] : Since incremental encoders are used, the alarm does not apply to the shaded part.

*1 Caution about restarting the SEN signal

When turning on the SEN signal after having turned it off for some reason, do so after connecting the high level for 1.3 seconds, as shown below.



Alarm Display and Corrective Actions Table (2/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.02 User parameter breakdown	• Indicator Lamp Activation	• Power went off while the parameters were being written. The next time power is turned on, an alarm will occur.	• Replace the Servopack.
		• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.
A.04 User parameter setting error	• Came on when control power was turned on.	• A value outside the setting range for user parameters was previously set or loaded.	• If you do not know how to repair a user parameter that is within the setting range, reload the correct user parameter.
		• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.
A.10 Power overload	• Came on during motor operation.	• Wiring between Servopack and the motor was grounded.	• Check and repair the wiring.
		• The Servopack temperature range of 55°C was exceeded.	• Bring the Servopack temperature back under the 55°C range. (Caution) The alarm cannot be reset until the temperatures of power transistor modules falls below 90°C..
	• Came on when main circuit power was turned on.	• The motor's U, V, W phases were grounded.	• Replace the motor.
		• The printed-circuit board (1PWB) condition is poor. • Power transistor is poor.	• Replace the Servopack.
	• Came on when servo on signal (S.ON) turned on	• The power feedback circuit, power transistor, DB relay, or printed-circuit board is poor.	• Replace the Servopack.
A.31 Position deflection pulse overflow (only for position control)	• Came on during motor operation.	• There is a problem with the motor wiring.	• Check and repair the wiring. (Check whether A, B, C phases are proper for the 2CN connectors.)
	• Overflow occurred at high speed revolution	• Check and repair the wiring. (Check whether A, B, C phases are proper for the 2CN connectors.)	
		• Servopack adjustment is poor.	Do not change setting data.
	• Command pulse was entering or feedback pulse won't return.	• The load of the motor has become too great.	• Lower the load torque and inertia. If this is not possible, replace the motor with one that has a larger capacity.
	• Movement is normal, but long commands result in overflow.	• The frequency of the position command pulse is too high.	• Let the command pulse frequency slow up or slow down. • Turn on the smoothing function. • Reconsider the electronic gear ratios.
	• Came on when power was turned on	• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.
A.40 Voltage overload	• Came on during motor operation.	• The load inertia became larger and the motor rpm became too high.	• Reconsider the operating conditions. • Use external regeneration resistance or a regeneration unit.
	• Occurs when motor is decelerating	• The load has surpassed the regenerative capacity of the device.	• Reconsider the operating conditions.
	• Occurred during nor-mal motor operation.	• Motor rpm has become too high.	• Use with a lower motor rpm.
	• Came on when main circuit power was turned on.	• The Servopack has broken down.	• Replace the Servopack.
		• The power source voltage has become too high.	• Set the power source voltage to normal values.
	• Came on when control power was turned on.	• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.

Alarm Display and Corrective Actions Table (3/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.51 Excess Speed	• Came on when servo on signal (S.ON) was turned on. High speed revolutions occur when entering command input. Detects alarms at 110% of maximum speed. • Came on when control power was turned on.	• There is a problem with the motor wiring. • There is a problem with the encoder wiring (such as with wire breakage, short circuits, or power supply).	• Check and repair the wiring. (Check whether A, B, C phases are proper for the 2CN connectors.)
		• Power for the incremental encoder is being provided by a source other than the Servopack.	• Use the encoder power of the Servopack.
		• Noise is present in the encoder wiring.	• Separate the encoder wiring from the main circuit.
		• The pulse number of the user parameter encoder is not set correctly.	• Set a proper pulse number for user parameter Cn-11.
		• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.
A.70 Overload	• Came on when servo on signal (S.ON) was turned on. • Come on when speed command input is entered Motor does not rotate. Came on during normal operation. • Came on when control power was turned on.	• There is a motor wiring problem or leakage.	• Check the wiring and also check for proper connection of the connectors at the motor.
		• There is an encoder wiring problem or leakage.	• Check the wiring and also check for proper connection of the connectors at the encoder.
		• The load is exceeding the rated torque by a large margin.	• Lower the load torque and inertia. If this is not possible, replace the motor with one that has a larger capacity.
		• Power for the incremental encoder is being provided by a source other than the Servopack.	• Use the encoder power of the Servopack.
		• The printed-circuit board (1PWB) condition is poor.	• Replace the Servopack.

Alarm Display and Corrective Actions Table (4/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.C1 Uncontrolled Servo	• Came on when control power was turned on. User parameter Cn-01 bit 0=0 • Came on 1 to 3 seconds after power was User parameter Cn-01 bit 0=1 • Came on when servo on signal (S.ON) was turned on. • Came on when speed command input was entered.	· There is a problem with the motor wiring.	· Check the wiring and also check for proper connection of the connectors at the motor.
		· There is a problem with the encoder wiring.	· Check the wiring and also check for proper connection of the connectors at the encoder.
		· The incremental encoder's power is being supplied by a source other than Servopack.	· Use the Servopack encoder power supply.
		· The condition of the encoder is poor.	· Replace the servomotor.
		· The printed-circuit board (1PWB) condition is poor.	· Replace the Servopack.
A.C2 Encoder Phase Detection Error	• Came on during motor operation.	· Noise is present in the encoder wiring.	· Separate the encoder wiring from the main circuit.
		· There is an encoder wiring problem or poor connection contact.	· Check the wiring and also check for proper connection of the connectors at the encoder.
		· The condition of the encoder is poor.	· Replace the servomotor.
A.C3 Encoder A Phase or B Phase Wiring Problem A.C6 External PG A Phase or B Phase Wiring Problem (only at full-closed specification)	• Came on when control power was turned on. User parameter Cn-01 bit 0=0 • Came on 1 to 3 seconds after control power was turned on. User parameter Cn-01 bit 0=1 • Came on when servo on signal (S.ON) was turned on. • Came on during motor operation.	· There is an encoder wiring problem or poor connection contact.	· Check the wiring and also check for proper connection of the connectors at the encoder.
		· Noise is present in the encoder wiring.	· Separate the encoder wiring from the main circuit.
		· The condition of the encoder is poor.	· Replace the servomotor.
		· The printed circuit board (1PWB) condition is poor.	· Replace the Servopack.

Alarm Display and Corrective Actions Table (5/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.C4 Encoder C Phase Wiring Problem A.C7 External PG C Phase Wiring Problem (with full-closed specification)	• Came on when the main circuit User parameter Cn-01 bit 0=0 • Came on 1 to 3 seconds after main circuit power was turned on User parameter Cn-01 bit 0=1 • Came on when servo on signal (S.ON) was turned on • Came on during motor operation.	· There is an encoder wiring problem or poor connection contact.	· Check the wiring and also check for proper connection of the connectors at the encoder.
		· Noise is present in the encoder wiring.	· Separate the encoder wiring from the main circuit.
		· The condition of the encoder is poor.	· Replace the servomotor.
		· The printed circuit board (1PWB) condition is poor.	· Replace the Servopack.
A.C5 Incremental Encoder Initial Pulse Malfunction	• Came on when control power was turned on. • Came on 1 to 3 seconds after control power was turned on. • Came on during motor operation.	· Noise is present in the encoder wiring.	· Separate the encoder wiring from the main circuit.
		· There is an encoder wiring problem or poor connection contact.	· Check the wiring and also check for proper connection of the connectors at the encoder.
		· The condition of the encoder is poor.	· Replace the servomotor.
		· The absolute encoder is being used.	· Set user parameter Cn-02 bit 9=1 and Cn-11 (encoder pulse number), then turn off the power and turn it back on.
		· The printed-circuit board (1PWB) condition is poor.	· Replace the Servopack.
CPF00 Digital Operator Communications Error 1 (Caution) This alarm will not be saved in the memory of the Alarm Trace Back function.	• Came on when control power was turned on. However, the digital operator was connected before power for Servopack was turned on • Came on when the digital operator was connected to the Servopack, after control power was turned on	· The condition of the cable between the digital operator and the Servopack is poor, or the connector contacts are poor.	· Check the contact condition of the connectors. · Replace the cable.
		· Malfunctioned due to exterior noise.	· Keep the digital operator or cable away from the source of the noise.
		· The condition of the digital operator is poor.	· Replace the digital operator.
		· The condition of the Servopack is poor.	· Replace the Servopack.
CPF01 Digital Operator Communications Error 2 (Caution) This alarm will not be saved in the memory of the Alarm Trace Back function.	• Came on during operation.	· The condition of the cable between the digital operator and the Servopack is poor, or the connector contacts are poor.	· Check the contact condition of the connectors. · Replace the cable.
		· Malfunctioned due to exterior noise.	· Keep the digital operator or cable away from the source of the noise.
		· The condition of the digital operator is poor.	· Replace the digital operator.
		· The condition of the Servopack is poor.	· Replace the Servopack.

Alarm Display and Corrective Actions Table (6/6)

The solid line indicates a probable situation, while the dotted line indicates a less probable situation.

Digital Operator Display and Alarm Name	Indicator Lamp Activation	Cause	Action
A.99	· This is not an alarm. This display indicates normal operating conditions.	———	———

Other Problems and Corrective Actions

1) If the alarm display will not appear due to a poor condition that has developed, check for the cause in the table below, and respond with the corresponding corrective action. For actions listed in the shaded areas, turn off the servo system power, and perform those procedures with the power off.

2) If these checks and corrective actions do not correct the problem, contact our service department immediately.

Problems and Corrective Actions Table (1/2)

(When there is no alarm display.)

Problem	Cause	Factors to Check	Action
(1)The motor does not start	(1)The power is not turned on.	Check the voltage between L1 and L2 and between L and N.	Correct the power activation circuit.
	(2)The connectors are loose.	Check the terminals of the connectors (1CN and 2CN).	Firmly install loose connections.
	(3)The exterior wiring of the connector (1CN) is wrong.	Check the external wiring of 1CN.	Refer to the connections diagram and correct the wiring.
	(4)The motor or encoder wiring has become disconnected.		Connect the wiring.
	(5)The motor has become overloaded.	Try operating without a load.	Lighten the load or replace the motor with a stronger one.
	(6)The speed/position command is not being input.	Check the input pin (1CN).	Properly input the speed/position command.
	(7)The "S-ON" input is off.	Cn-01 bit 0 is set to 0.	Turn on the "S-ON" input.
	(8)The setting for the "P-CON" function is wrong.	Refer to the manual.	Check the manual and set the function to match the objective.
	(9)The command pulse mode selection is wrong.	Refer to the manual.	Properly select the user parameters "Cn 02 bits 3,4, and 5."
	(10)The type of encoder being used is different form the setting of the user parameters.	Is it an incremental encoder? Is it an absolute encoder?	Set user parameter "Cn 01 bit E" so that it matches the type of encoder being used.
	(11)"P-OT, N-OT" input is off.	Cn-01 bits 2 and 3 are set to 0.	Turn on the "P-OT, N-OT" input signal.
	(12)"CLR" input is on.	Check the configuration of "Deflection Counter Clear Input."	Turn "CLR" input off.
	(13)"SEN" input is off.	With the absolute encoder, Cn 01 bit 1 is set to 0.	Turn on "SEN" input.
(2)The motor moves for a second, then it doesn't move at all.	(1)The pulse number of the encoder being used is different from the user parameter that is set.	2000 pulse/ rotation	Set user parameter "Cn 11" to match the pulse number of the encoder being used.
	(2)The motor or encoder wiring is wrong.		Correct the wiring.
(3)During operation, the motor suddenly stops, then it won't move.	(1)An alarm occurred while the Alarm Reset signal (ALM-RST) was on.		After correcting the cause of the alarm, turn the alarm reset signal on and then off.

Problems and Corrective Actions Table (2/2)

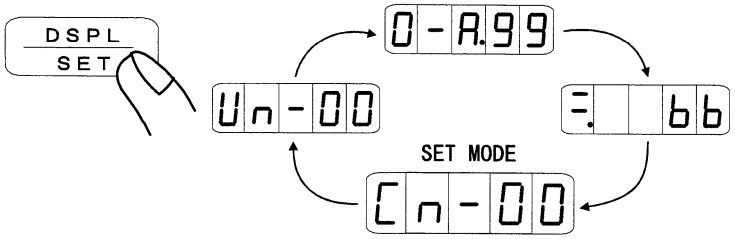
(When there is no alarm display.)

Problem	Cause	Factors to Check	Action
(4)Motor revolution is unstable.	(1)The wiring connections to the motor are poor.	Inspect the power wires (U, V, W phase) and the encoder connector connections.	Correct looseness of attaching hardware of the terminals and connectors.
(5)The motor vibrates at frequencies around 200 to 400Hz.	(1)The speed loop gain is too high.		Do not change setting data.
	(2)The wires of the speed/position command input are too long.		Make the command input wires as short as possible, and make the impedance less than 100 Ω.
	(3)The wires of the speed/position command input are bundled with the power cord.		Separate the command input wires from the power cord by at least 30 cm.
(6)Revolution overshoot at starting and stopping times is large.	(1)The speed loop gain is too high.		Do not change setting data.
(7)The motor is overheating.	(1)The surrounding temperature is too high.	Measure the motor temperature.	Lower the surrounding temperature to below 40°C.
	(2)The surface of the motor is dirty.	Visually inspect the surfaces.	Clean dirt and oil off of the motor surface.
	(3)The motor has become overloaded.	Try operating without a load.	Lighten the load or replace the motor with a stronger one.
(8)An unusual sound is occurring.	(1)The mechanical installation of the motor is poor.	Are the motor's installation fasteners loose?	Tighten the installation screws.
		Are the couplings centered?	Align the centers of the couplings.
		Are the couplings unbalanced?	Correct the balance of the couplings.
	(2)There is a malfunction with the bearings.	Inspect for noise and vibrations around the bearings.	If there is a malfunction, contact our service department.
	(3)The vibration source is in the companion equipment.	Has there been any change, damage or foreign objects intrusion for the immobile components of the equipment?	If there has been one of these problems, contact our service department.
(9)The motor turns even though the speed command is "0" volts.	(1)There is an offset (slippage) of the speed command voltage.		Follow instructions for "Command Offset Adjustment." Refer to the manual.

8) Method of Operation via Digital Operator

By operation of just the digital operator, it is possible to use the Servopack to easily perform operational checks of the motor. This makes it possible to quickly confirm basic functioning of equipment when setting it up or making test runs, without having to connect control devices.

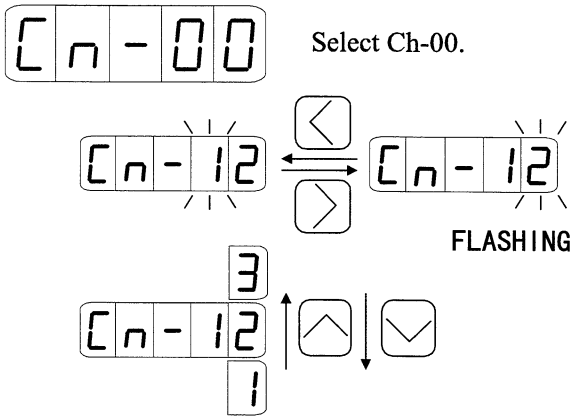
1. Press the DSPL SET key, then select Set Mode.



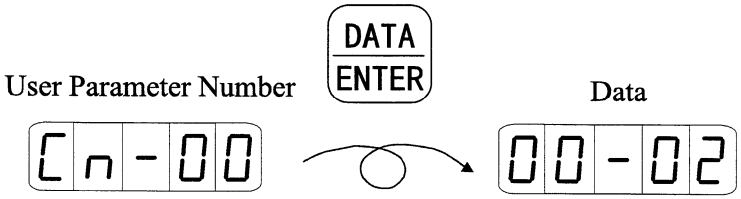
2. Select user parameter Cn-00. When power is turned on, Cn-00 is already chosen.

Use the ◁ and ▷ keys to select the digit to be set.

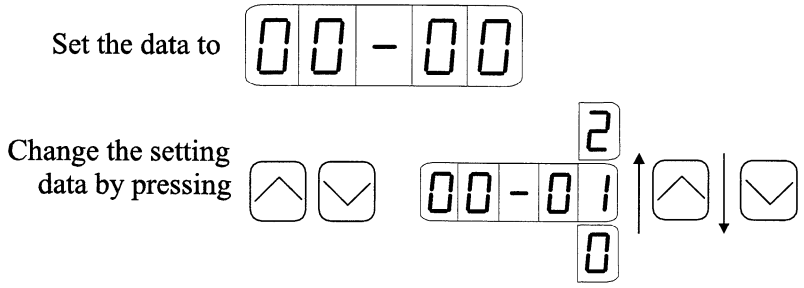
Use the △ and ▽ keys to change the number.



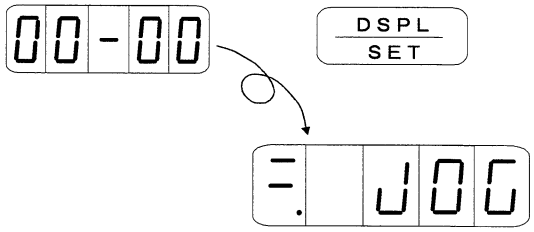
3. Press the DATA ENTER key to display the current data for the Cn-00 user parameter.



4. Use the ^ and v keys to change the data to "00". This value of "00" will now be preset whenever the power is turned on.



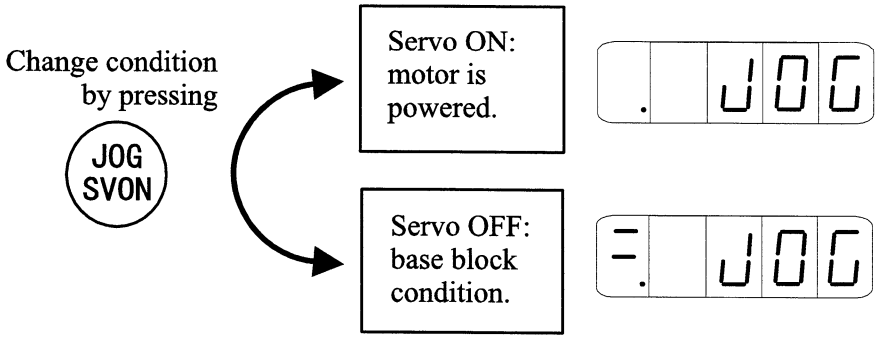
5. Press the DSPL / SET key to enter the mode for operation by digital operator. In this configuration, it is possible to operate the equipment via the digital operator.



Operation via digital operator mode display

6. Switch between Servo ON and Servo OFF.

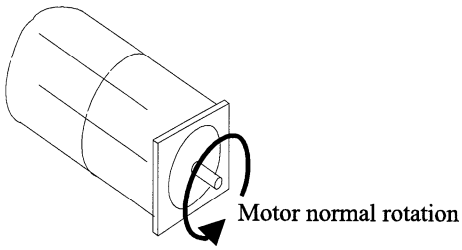
Press the JOG SVON key, then ensure that the servo ON (motor powered) condition is selected.



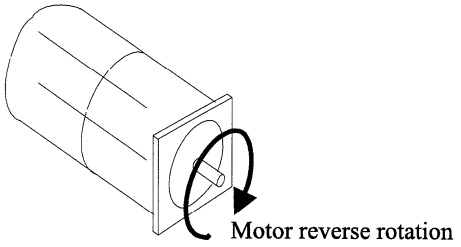
7. Activate normal rotation or reverse rotation of motor.

Press the ∧ and ∨ keys to operate the motor. (Hold down continuously.)

Normal rotation engages while ∧ is pressed.



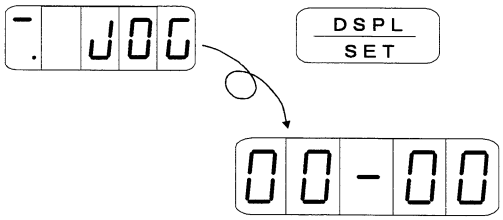
Reverse rotation engages while ∨ is pressed.



8. Pressing the DSPL SET key again will return to the 00-00

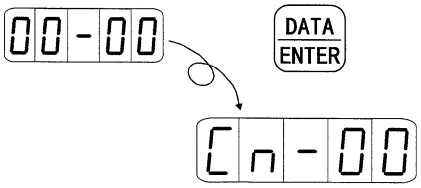
This will result in the Servo OFF condition (motor not powered).

(Servo OFF can also be input by pressing the JOG SVON key.)



9. Pressing the DATA ENTER key will return the display to the Set Mode function.

This will terminate the operation via digital operator mode.

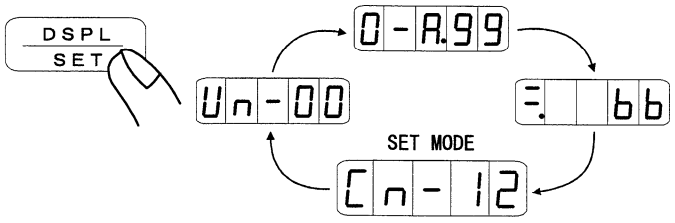


SET MODE DISPLAY

9) Alarm Trace Back Data Clear

Use this function to clear the record of alarms being stored in the Servopack. Performing this operation will set all the alarm entries back to "A.99". The "A.99" code is not an alarm. Refer to the operational instructions for the alarm trace back mode.

1. Press DSPL SET key, then select the Set Mode.

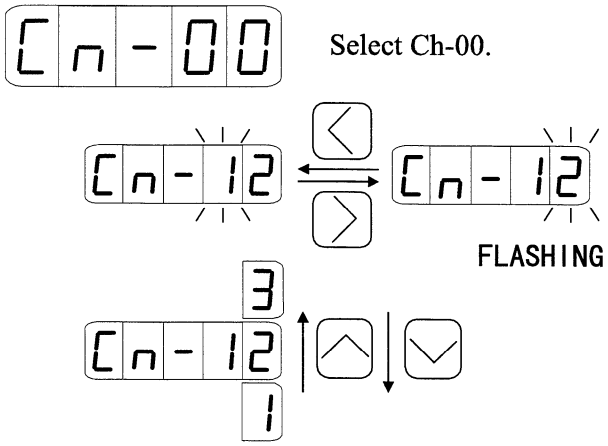


2. Select user parameter Cn-00. When power is turned on, Cn-00 is already chosen.

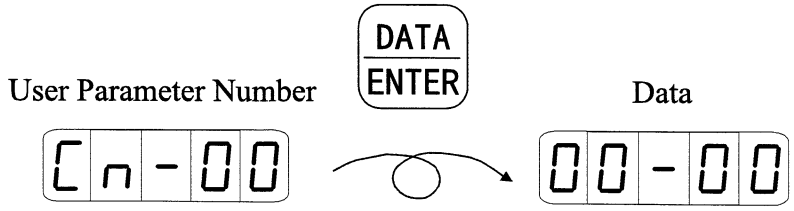
Use and keys to select the digit to be set.

Use and keys to change the number.

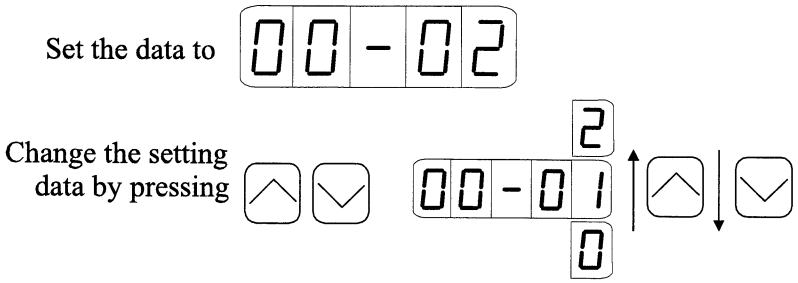
Select Cn-00.



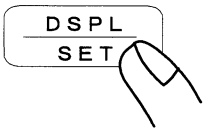
3. Press DATA ENTER key to display the current data for the user parameter.



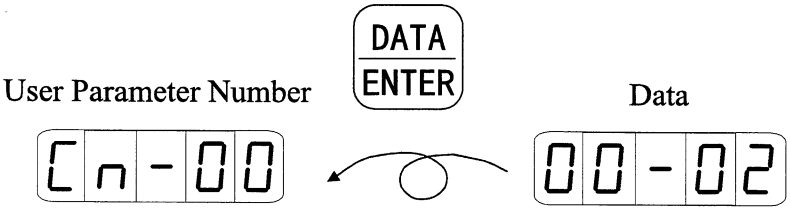
4. Use  and  keys to change the data number to "02".



5. Pressing the  key will clear the alarm trace back data.



6. Pressing the  key will return the display to the Set Mode function.

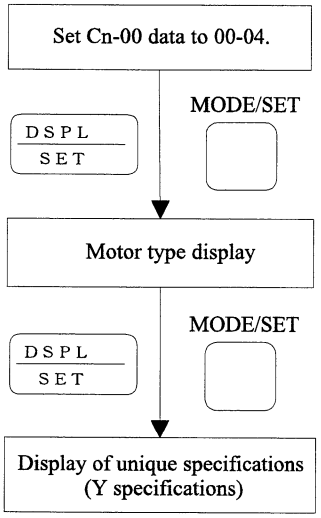


10) Confirming the Motor Type

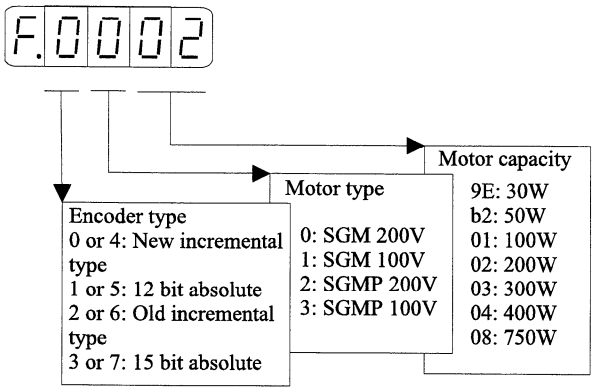
Setting the data of the Cn-00 user parameter to 00-04 will activate the Motor Type Confirmation Mode.

Because this is a maintenance mode, it is not normally needed by the end user.

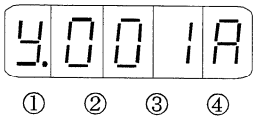
Opetation Method



Motor Type Display



Display of Unique Specifications (Y specifications)



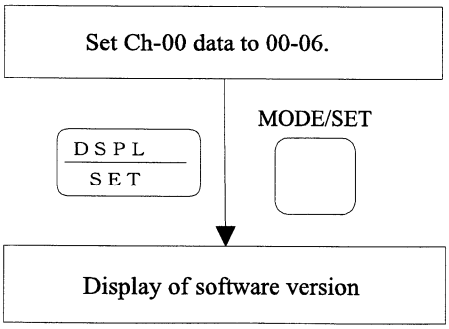
$① \times 16^3 + ② \times 16^2 + ③ \times 16 + ④$ = Unique specification (Y specification number)

2-7-5-2 Confirmation of Software Version

Setting the data of the Cn-00 user parameter to 00-06 will activate the Software Version Confirmation Mode.

Because this is a maintenance mode, it is not normally needed by the end user.

Operation Method



Display of Software version