Setting station guide

AC Servo Driver

GPX2／GPR2-B4 Series

This is a summarized document about a main body setting station and a setting console.
Please utilize as needed.

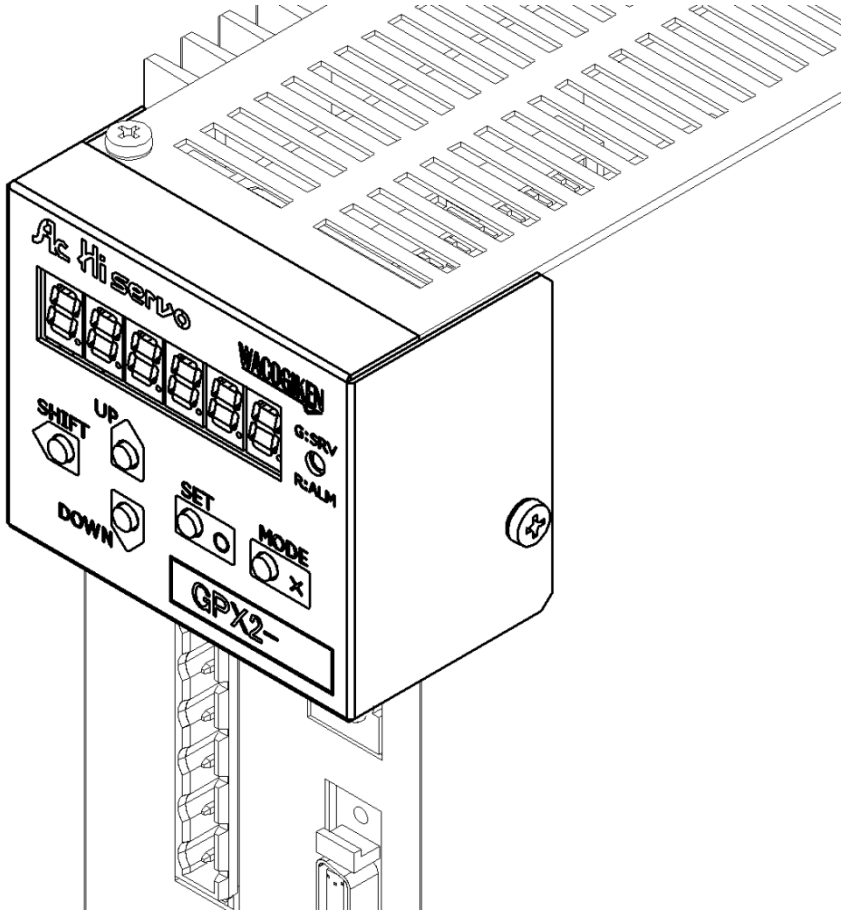

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Table of contents

1 To begin with

Main body setting station and a setting console has CPU and by communicating with CPU of Driver main body, it makes possible to operate a setting station.
By using this Setting station, you can do following things without doing tool software operation from PC.

- Monitoring a driving situation like motor feed back speed and torque.
- Motor trial run by manual operation.
- Contents confirmation of user parameter and setting change.
- Parameter writing on a driver.
- Reference of occurring alarm contents and history.

As a power of the Setting station and Setting console is supplied from a driver, it is not necessary to arrange an external power supply.

When you use a Setting console, please switch ON a driver control power supply only after connected to a Connector.

◎Target driver of main body setting station

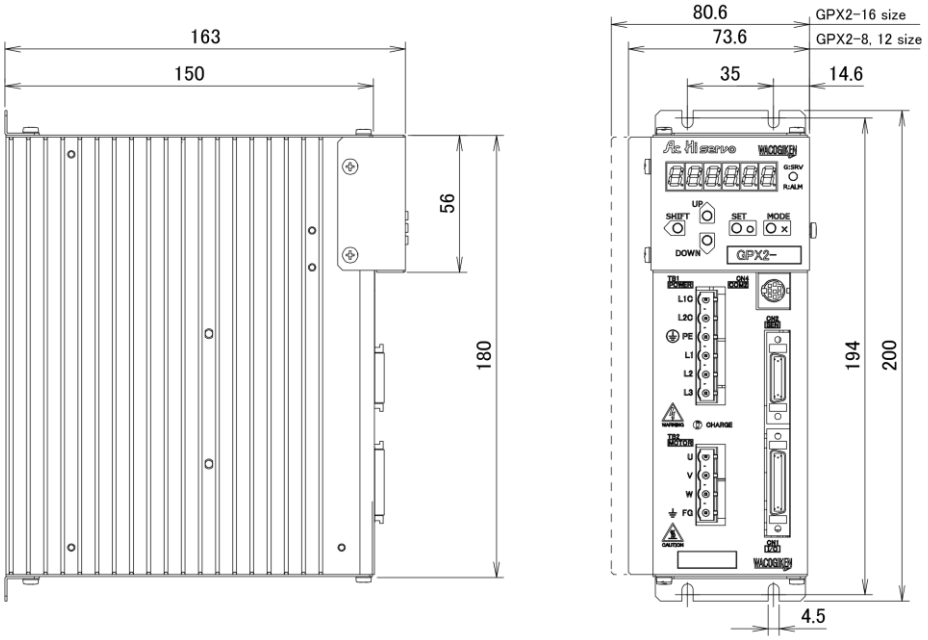
Option model	Driver model	Remarks
GP2 - STX	GPX2 - 8 to 16	Small capacity type
GP2 - STY	GPX2 - 24 and 40	Medium capacity type
—	~~GPX2 - 60 and 80~~	Big capacity type is out of object
GP2 - STE	GPR2 - 24B4 to 80B4	Battery power supply applicable type
	GPR2 - 8 to 40	Resolver specification (OEM model)
	GPE2 - 8 to 40	Encoder specification (OEM model)

◎Target driver of setting console

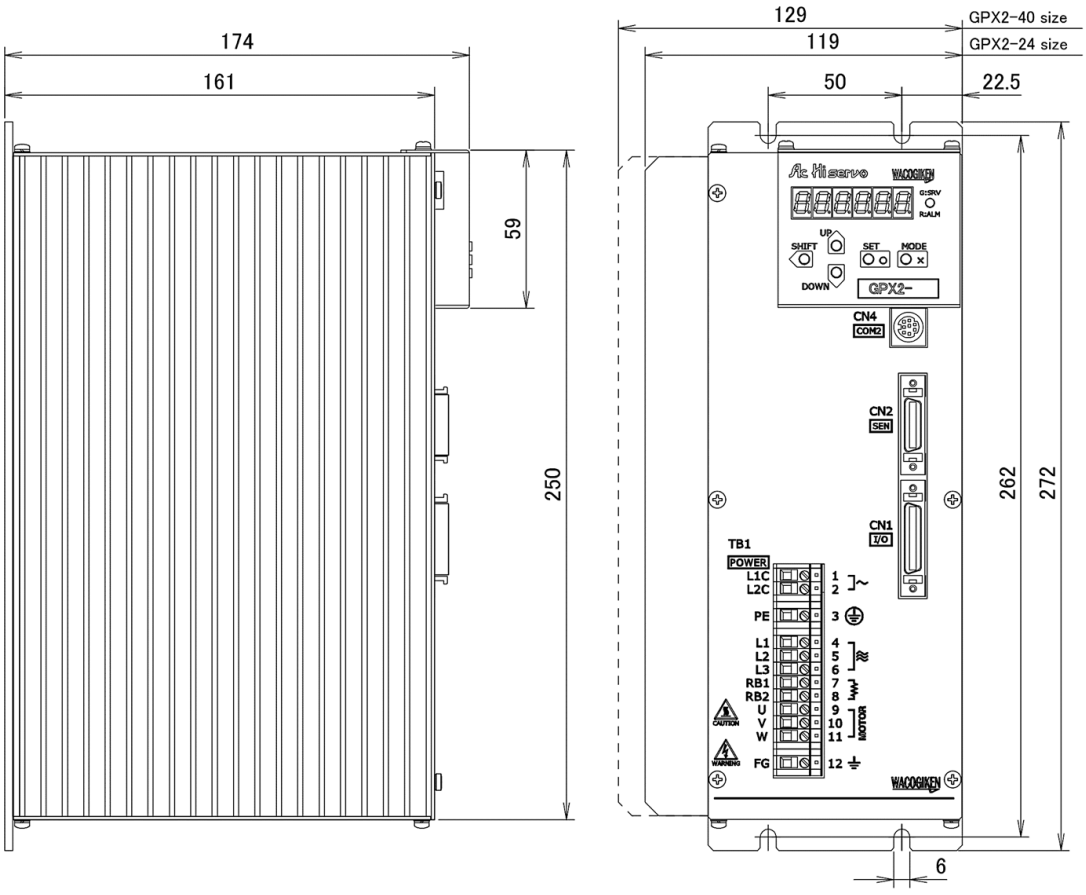
Option model	Driver model	Remarks
GP2 - CNS	GPX2 - 8 to 16	All models compatible
	GPX2 - 24 and 40	
	GPX2 - 60 and 80	
	GPR2 - 24B4 to 80B4	
	GPR2 - 8 to 40	
	GPE2 - 8 to 40	

1-1. Product dimensions

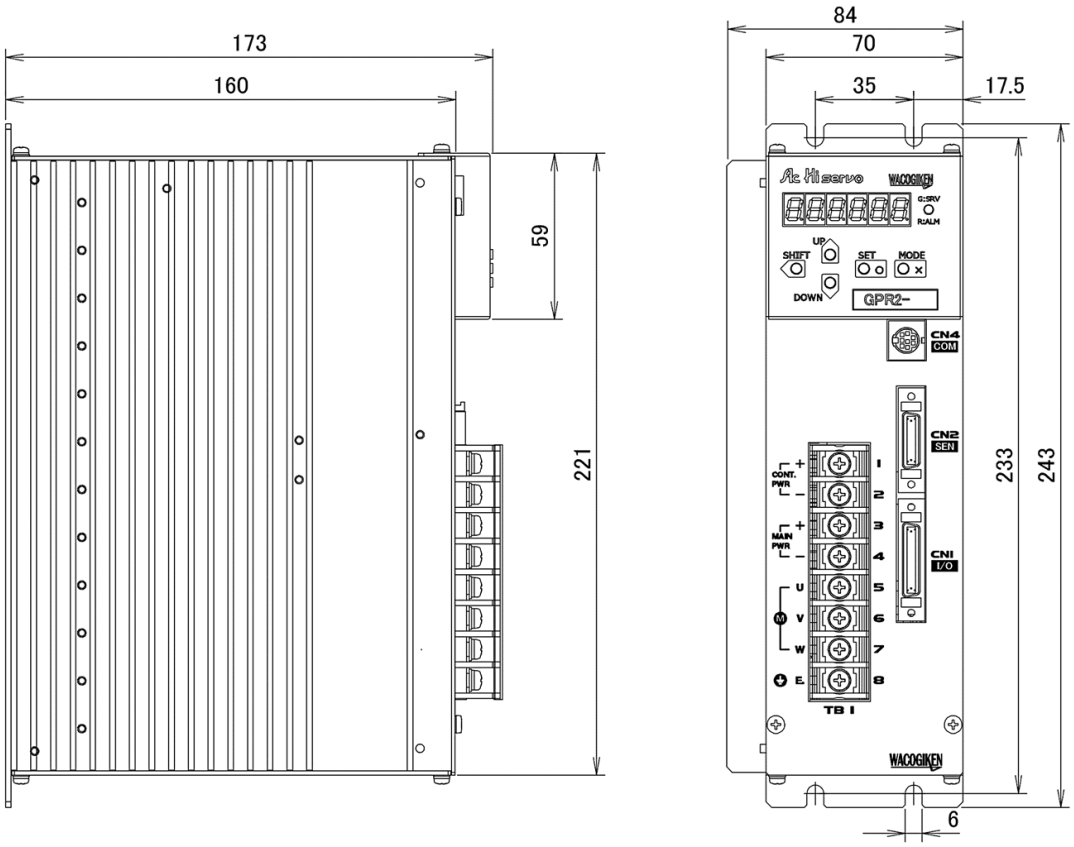
◎Driver (GPX2 - 8 to 16) dimensions when attached to the main body setting station (GP2 - STX).



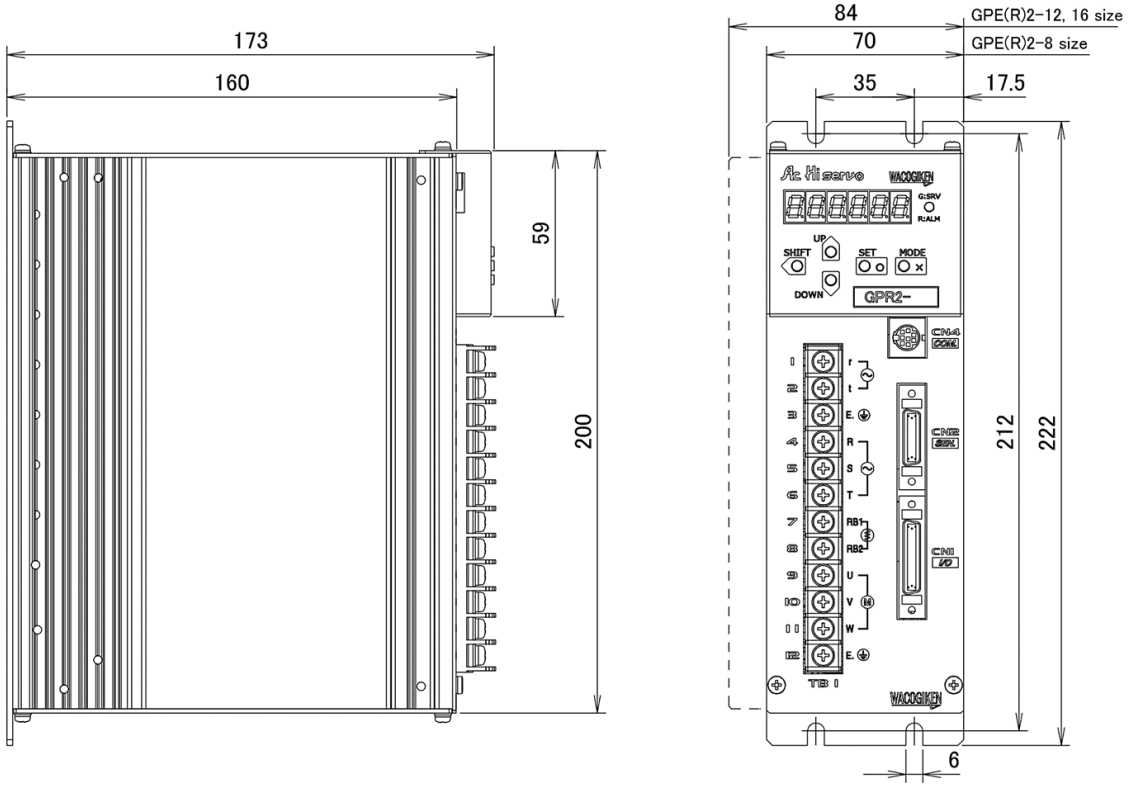
◎Driver (GPX2 - 24 and 40) dimensions when attached to the main body setting station (GP2 - STY).



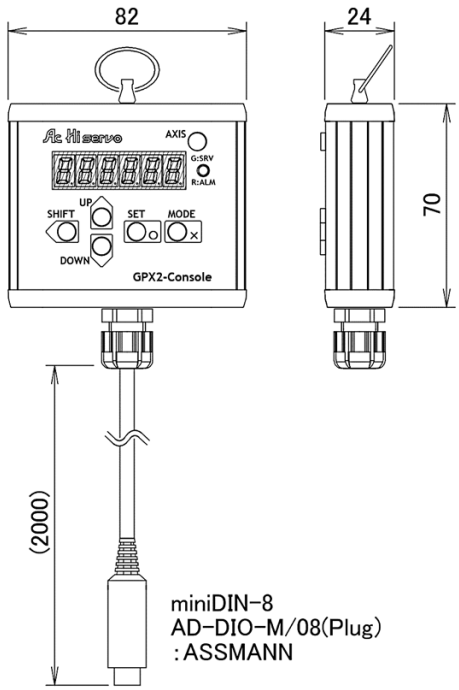
◎Driver (GPR2 - 24B4 to 80B4) dimensions when attached to the main body setting station (GP2 - STE).

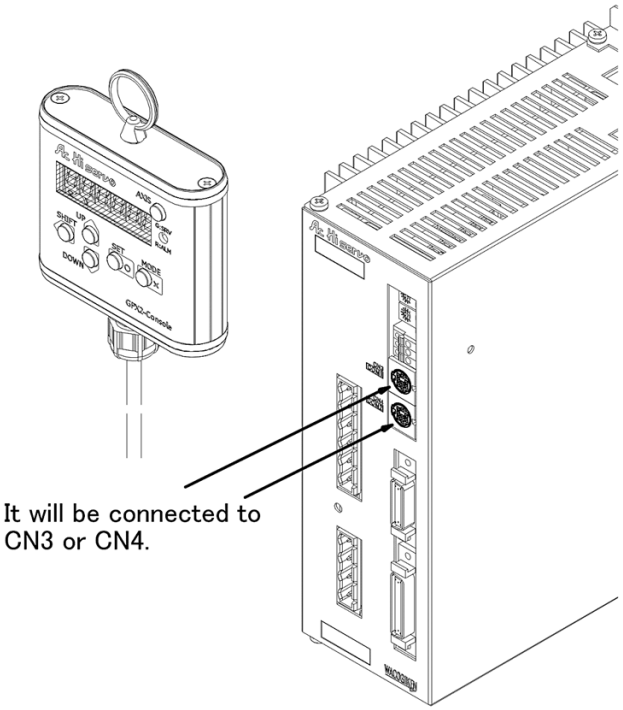


◎Driver (GPE2／GPR2 - 8 to 16) dimensions when attached to the main body setting station (GP2 - STE).



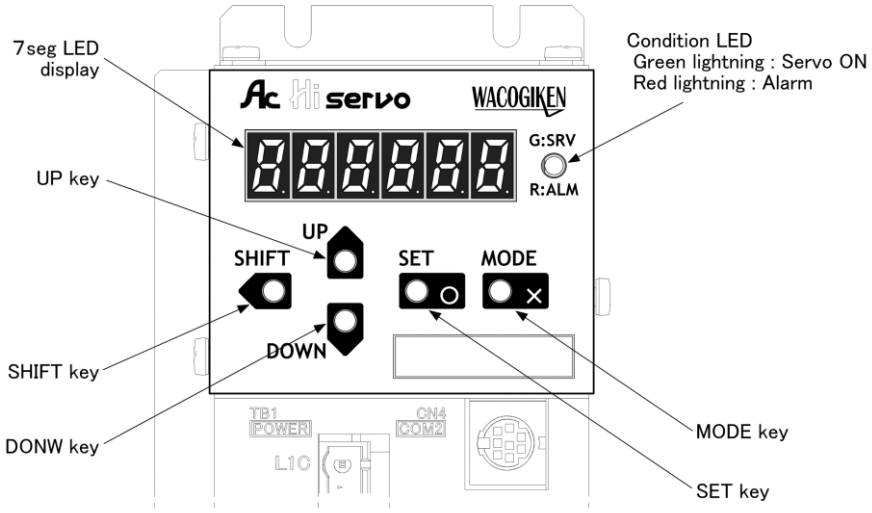
◎A setting console dimensions (GP2 - CNS).



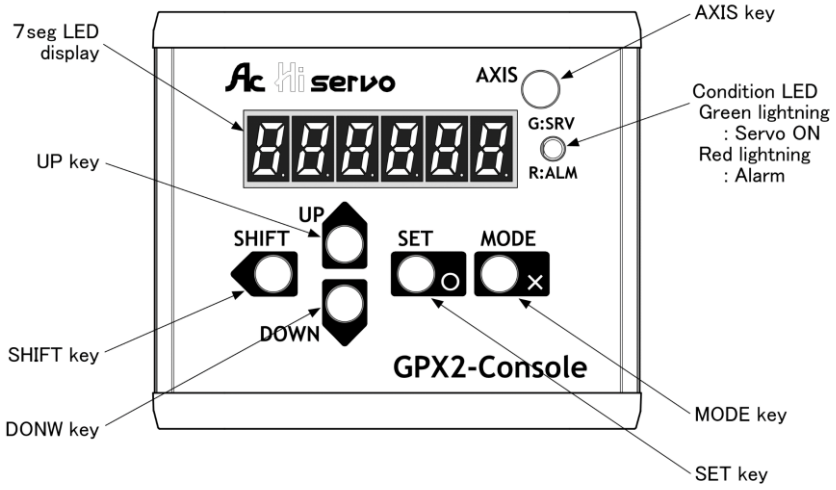


1-2. Name of each part

◎Setting station (GP2 - STX, GP2 - STY, GP2 - STE)



◎Setting console (GP2 - CNS)

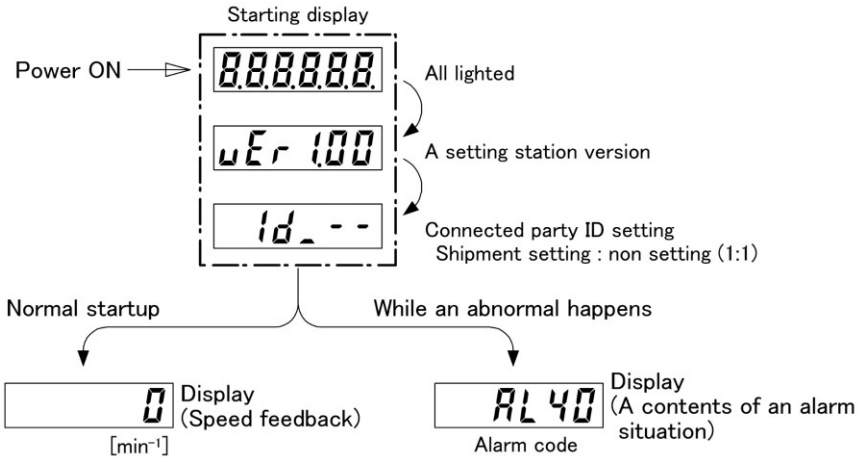


※A setting console is added a [AXIS] key.

2 Setting station operation

2-1. Startup

A setting station and a setting console displays starting displays by following sequence at a time power supply startup.
Later, changing over to situation display in compliance with driver conditions, a setting station operation becomes valid.

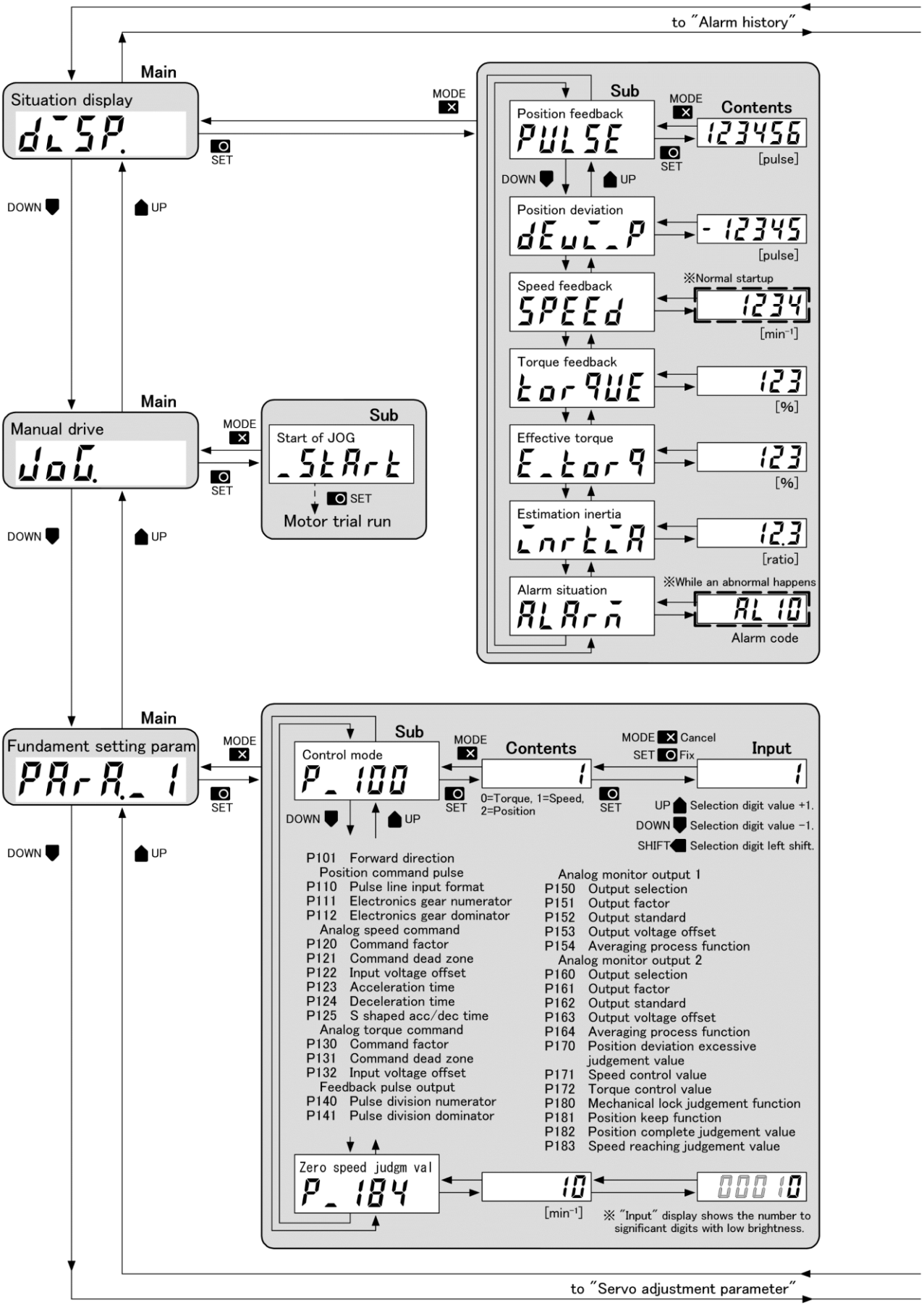


Display at time of starting

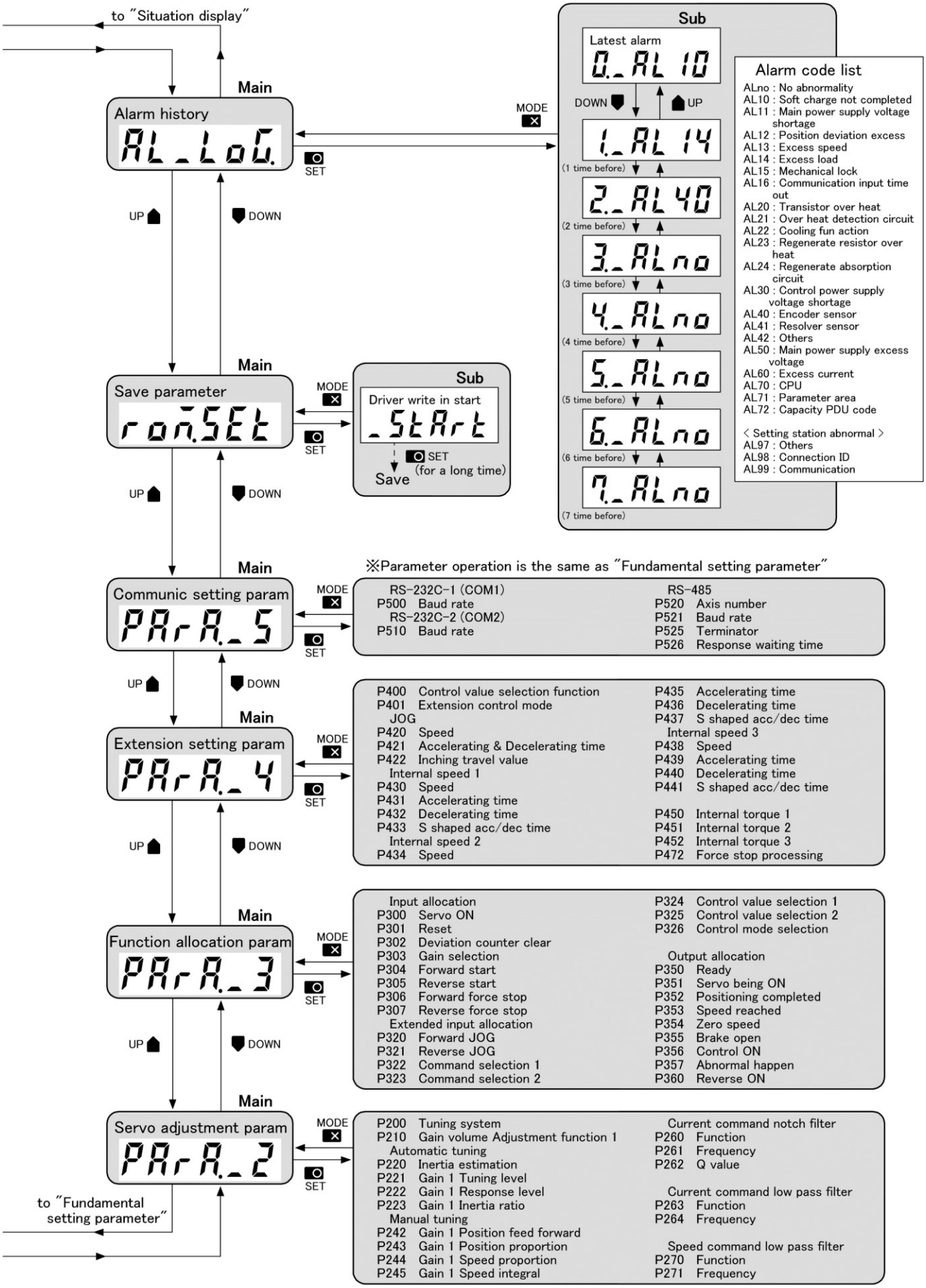
An operation starting point at time of startup, it content of the speed feedback (SPEEd) or alarm situation (ALArn).
At first, push [MODE] key 2 times, go back to main situation display (dISP).
Later by [UP], [DOWN] keys, select item and by pushing [SET] key, you can change to each function. (As for each function, please refer item 3 to 7).

Main manu		Function
dISP	Situation display	Situation monitor like motor speed feedback, torque and alarm contents.
JoG	Manual drive	Motor trial run by manual operation.
PArA_1	Fundamental setting parameter	Parameter concerning to a fundamental setting like a control mode and a command format.
PArA_2	Servo adjustment parameter	Parameter about a servo adjustment like a gain and a filter.
PArA_3	Function allocation parameter	Parameter to allocate function status to in and out put signal.
PArA_4	Extension setting parameter	Parameter about extension setting like internal command and alarm output.
PArA_5	Communication setting parameter	Parameter concerning to communication setting like baud rate and axis number.
nonSEt	Save parameter	Parameter write in to a driver (flush memory).
AL_LoG	Alarm history	Reference of alarm history (past 7 times).

2-2. Operation outline

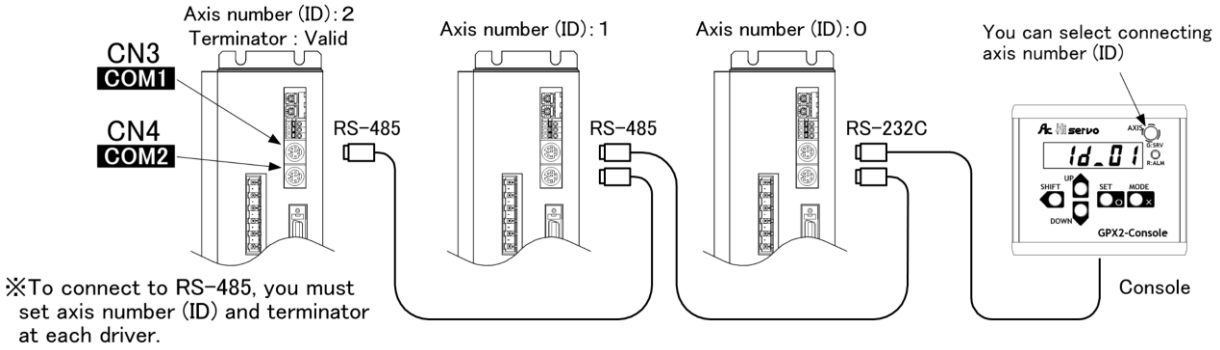


※ If you lose a way during operation, MODE ✕ push 3 times then you can be back to a "Main" loop.

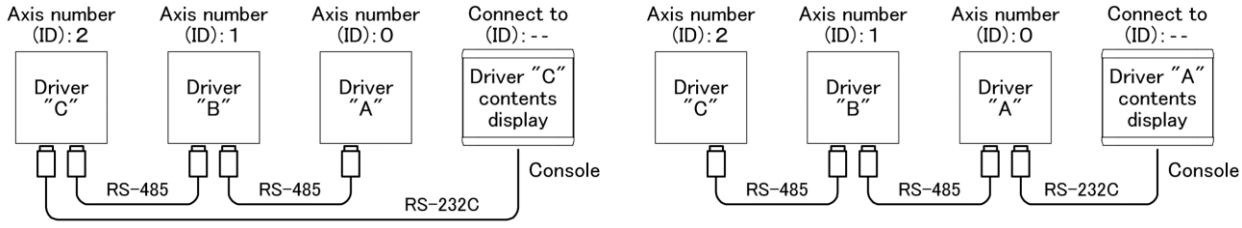

to "Situation display"
Main
Alarm history
AL_LoG.
SET
UP
DOWN
MODE
Sub
Latest alarm
0._AL 10
DOWN
UP
1._AL 14
(1 time before)
2._AL40
(2 time before)
3._ALno
(3 time before)
4._ALno
(4 time before)
5._ALno
(5 time before)
6._ALno
(6 time before)
7._ALno
(7 time before)
Alarm code list
ALno : No abnormality
AL10 : Soft charge not completed
AL11 : Main power supply voltage shortage
AL12 : Position deviation excess
AL13 : Excess speed
AL14 : Excess load
AL15 : Mechanical lock
AL16 : Communication input time out
AL20 : Transistor over heat
AL21 : Over heat detection circuit
AL22 : Cooling fun action
AL23 : Regenerate resistor over heat
AL24 : Regenerate absorption circuit
AL30 : Control power supply voltage shortage
AL40 : Encoder sensor
AL41 : Resolver sensor
AL42 : Others
AL50 : Main power supply excess voltage
AL60 : Excess current
AL70 : CPU
AL71 : Parameter area
AL72 : Capacity PDU code
< Setting station abnormal >
AL97 : Others
AL98 : Connection ID
AL99 : Communication
Main
Save parameter
ronSEt
Sub
Driver write in start
_StArt
SET (for a long time)
Save
※Parameter operation is the same as "Fundamental setting parameter"
Main
Communic setting param
PArA._5
RS-232C-1 (COM1)
P500 Baud rate
RS-232C-2 (COM2)
P510 Baud rate
RS-485
P520 Axis number
P521 Baud rate
P525 Terminator
P526 Response waiting time
Main
Extension setting param
PArA._4
P400 Control value selection function
P401 Extension control mode
JOG
P420 Speed
P421 Accelerating & Decelerating time
P422 Inching travel value
Internal speed 1
P430 Speed
P431 Accelerating time
P432 Decelerating time
P433 S shaped acc/dec time
Internal speed 2
P434 Speed
P435 Accelerating time
P436 Decelerating time
P437 S shaped acc/dec time
Internal speed 3
P438 Speed
P439 Accelerating time
P440 Decelerating time
P441 S shaped acc/dec time
P450 Internal torque 1
P451 Internal torque 2
P452 Internal torque 3
P472 Force stop processing
Main
Function allocation param
PArA._3
Input allocation
P300 Servo ON
P301 Reset
P302 Deviation counter clear
P303 Gain selection
P304 Forward start
P305 Reverse start
P306 Forward force stop
P307 Reverse force stop
Extended input allocation
P320 Forward JOG
P321 Reverse JOG
P322 Command selection 1
P323 Command selection 2
P324 Control value selection 1
P325 Control value selection 2
P326 Control mode selection
Output allocation
P350 Ready
P351 Servo being ON
P352 Positioning completed
P353 Speed reached
P354 Zero speed
P355 Brake open
P356 Control ON
P357 Abnormal happen
P360 Reverse ON
Main
Servo adjustment param
PArA._2
P200 Tuning system
P210 Gain volume Adjustment function 1
Automatic tuning
P220 Inertia estimation
P221 Gain 1 Tuning level
P222 Gain 1 Response level
P223 Gain 1 Inertia ratio
Manual tuning
P242 Gain 1 Position feed forward
P243 Gain 1 Position proportion
P244 Gain 1 Speed proportion
P245 Gain 1 Speed integral
Current command notch filter
P260 Function
P261 Frequency
P262 Q value
Current command low pass filter
P263 Function
P264 Frequency
Speed command low pass filter
P270 Function
P271 Frequency
to "Fundamental setting parameter"

2-3. Select to a connected driver

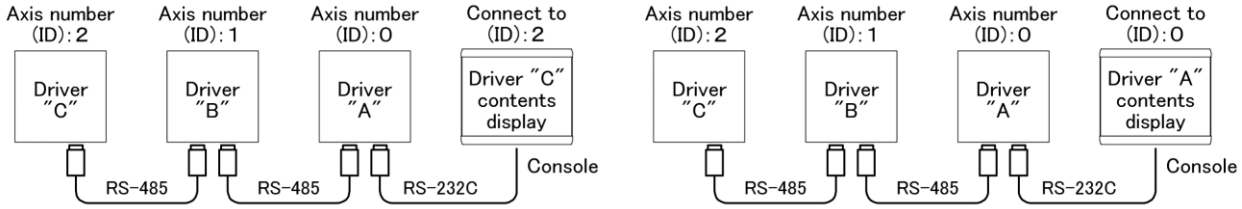
A function of this phrase is a specialized function off setting console, using [AXIS] key.
Driver has 2 pieces of communication connectors and by RS-485 communication, daisy chain connection is possible. You can select an axis number of driver (ID) which you want to display its content from a setting console connected to driver.

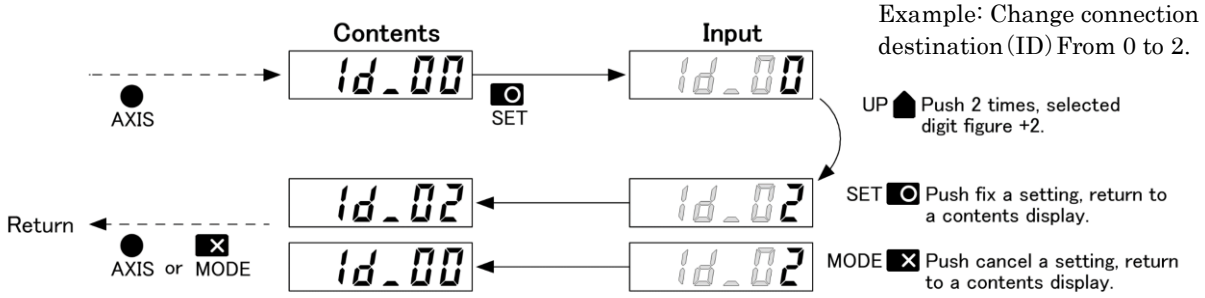


At time of power supply startup (shipment setting), connection destination (ID) is unset. A setting console will display a content of a driver connected by connector.



After that, by selection a Contact to (ID), you may display an objective driver contents.

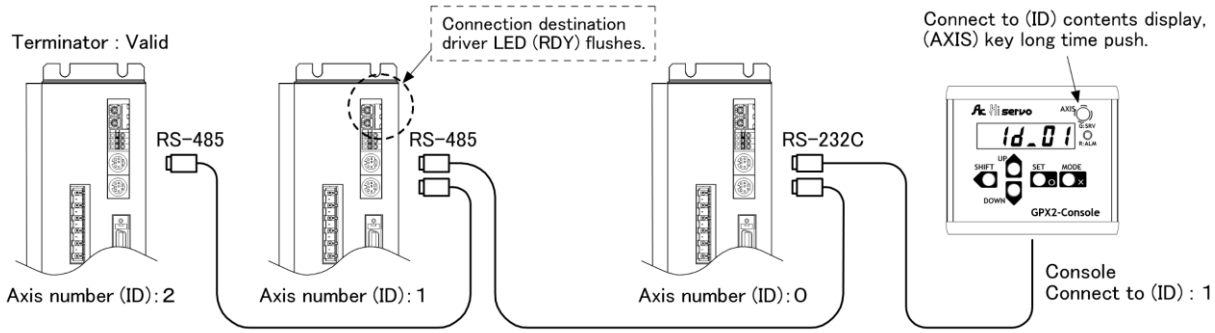




Change operation of connection destination (ID)

◎In case you cannot find an objective driver of connect to during operation.

At a situation of a connect to (ID) is displayed, push [AXIS] key for a long time.
Green LED on upper stage of a front panel of an objected driver flushes about 2 seconds.



◎About a connection destination (ID) at time of startup.

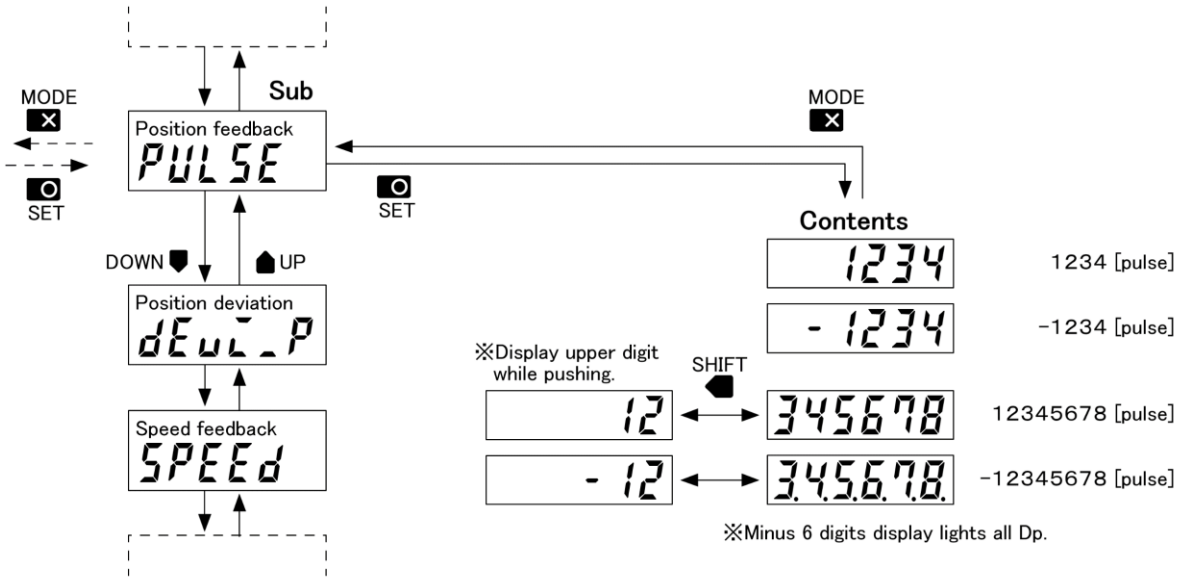
In the factory setting, when the power is turned on again, the connection destination (ID) returns to the unset state.
If you want to specify the connection destination (ID), While the contents are displayed, press and hold the [SHIFT] key for 2 seconds.
When (ID) setting is saved, applied from next startup.
The upper limit of the save function is 1000 steps in combination with "display contents at startup". (refer item 3)

3 Situation monitor of a driver

Motor's speed feedback or torque feedback etc., connected driver's driving situation can be monitored.
Selecting from Sub, transfer to a content display by [SET] key.

Sub manu		Contents		Remarks
PULSE	Position feedback	0	[pulse]	
dEuI_P	Position deviation	0	[pulse]	
SPEEd	Speed feedback	0	[min^{-1}]	Normal startup display
torQUE	Torque feedback	0	[%]	
E_torQ	Effective torque	0	[%]	
InrtIA	Estimation inertia	00	[ratio]	
ALArn	Alarm situation	ALOO	※1	Abnormal happening display

※1 : As for contents of alarm situation, please refer an alarm code list (item 7-1).

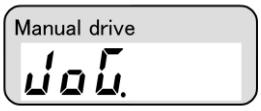


Operation of situation display

◎About a display contents at startup.

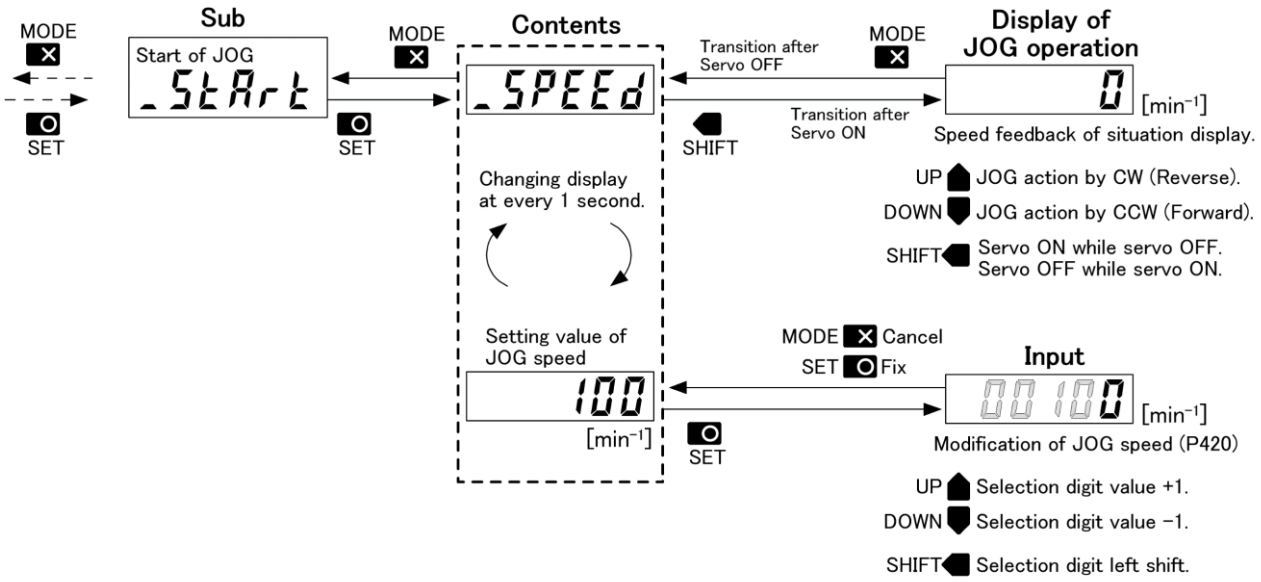
In the factory setting, the display will return to speed feedback (SPEEd) when the power is turned on again.
To change, press and hold the [SHIFT] key for 2 seconds in the sub display you want to specify. If you save the display settings, they will be applied from the next startup.
The upper limit of the save function is 1000 steps in combination with "connection destination (ID) at time of startup". (refer item 2-3)

4 Motor trial run



You can make motor trial run (JOG) while driver CN1 (in and out put connector) is not wired.
Motor rotation speed at trial run is common with extension setting parameter (PArA_4) 's JOG speed (P_420).

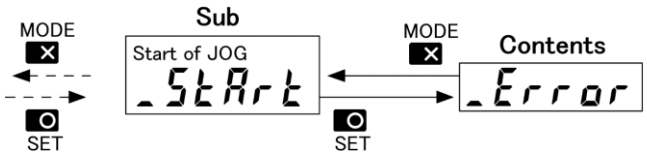
A modification of JOG speed can be effected to an action by real time, but power supply is re input it returns to a value before the modification.
To save the modified value, please refer item 6.



Operation of manual drive

◎About an _Error display.

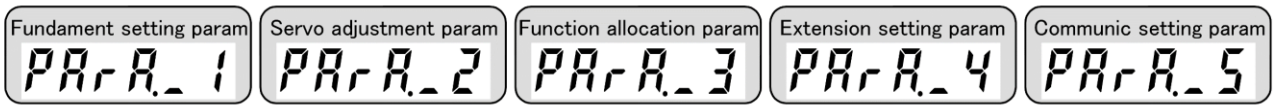
In the case of fundamental setting parameter (PArA_1) 's control mode (P_100) is "torque", following contents display will be shown and motor trial run (JOG) cannot be made.



※When a control mode is selecting "Torque", JOG operation cannot be done.

Please set a parameter's control mode to "Speed" or "Position" when you use this function.

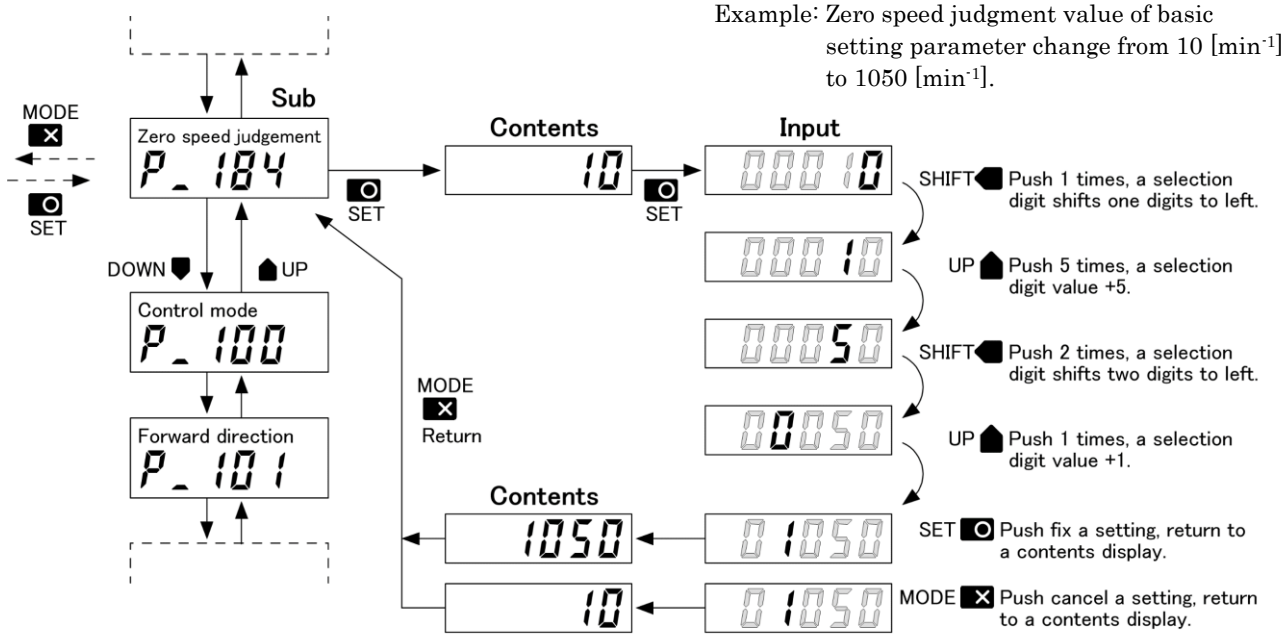
5 Parameter confirmation and setting



Selecting parameter numbers from each set kind of sub and by pushing [SET] key, it will shift to setting contents.
Using that display, if you push [SET] key again, it will shift to setting input.
Depending upon a setting item, it may need a power supply re input. Once you change a setting contents, please be sure to save. (refer item 6)

◎Kinds of setting

Main menu	Function	Sub menu
Fundamental setting parameter	Parameter concerning to a fundamental setting like a control mode and a command format.	Refer item 5-1
Servo adjustment parameter	Parameter about a servo adjustment like a gain and a filter.	Refer item 5-2
Function allocation parameter	Parameter to allocate function status to in and out put signal.	Refer item 5-3
Extension setting parameter	Parameter about extension setting like internal command and alarm output.	Refer item 5-4
Communication setting parameter	Parameter concerning to communication setting like baud rate and axis number.	Refer item 5-5



Operation of parameter setting

5-1. Fundamental setting parameter

PAr A_ 1

Sub menu		Contents (initial value)	Input (setting area)
P_100	Control mode	⏻ 1	0 = torque, 1 = speed, 2 = position
P_101	Forward direction	⏻ 0	0 = CCW, 1 = CW
	Position command pulse		
P_110	Pulse line input format	⏻ 1	0 = 1 pulse, 1 = 2 pulse, 2 = 2 phase(2), 3 = 2 phase(4)
P_111	Electronics gear numerator	⏻ 1	1 to 10000
P_112	Electronics gear dominator	⏻ 1	1 to 10000
	Analog speed command		
P_120	Command factor ※2	3000 [min-1]	1 to 99999
P_121	Command dead zone	0.0 [min-1]	0.0 to 999.9
P_122	Input voltage offset	0.00 [V]	-1.00 to 1.00
P_123	Acceleration time	0 [ms]	0 to 99999
P_124	Deceleration time	0 [ms]	0 to 99999
P_125	S shaped acc/dec time	0 [ms]	0 to 99999
	Analog torque command		
P_130	Command factor	300 [%]	1 to 999
P_131	Command dead zone	0.0 [%]	0.0 to 999.9
P_132	Input voltage offset	0.00 [V]	-1.00 to 1.00
	Feedback pulse output		
P_140	Pulse division numerator	⏻ 1	1~10000
P_141	Pulse division dominator	⏻ 1	1~10000
	Analog monitor output 1		
P_150	Output selection	6	Select from below ※1
P_151	Output factor ※2	3000	-999999 to 999999
P_152	Output standard	0	-999999 to 999999
P_153	Output voltage offset	0.00 [V]	-1.00 to 1.00
P_154	Averaging process function	16 [step]	0~256
	Analog monitor output 2		
P_160	Output selection	9	Select from below ※1
P_161	Output factor ※2	300	-999999 to 999999
P_162	Output standard	0	-999999 to 999999
P_163	Output voltage offset	0.00 [V]	-1.00 to 1.00
P_164	Averaging process function	16 [step]	0 to 256
P_170	Position deviation excessive judgement value	⏻ 10000 [pulse]	0 to 100000
P_171	Speed control value ※2	⏻ 3500 [min-1]	0 to 99999
P_172	Torque control value ※2	⏻ 300 [%]	0 to 1000
P_180	Mechanical lock judgement function	⏻ 0	0 = invalid, 1 = valid
P_181	Position keep function	⏻ 0	0 = invalid, 1 = valid
P_182	Position complete judgement value	⏻ 10 [pulse]	0 to 10000
P_183	Speed reaching judgement value ※2	⏻ 3000 [min-1]	0 to 99999
P_184	Zero speed judgement value	⏻ 10 [min-1]	0 to 10000

※1 : Analog monitor selection group
0 = Position feedback [pulse], 1 = Position command [pulse], 2 = Position deviation [pulse],
6 = Speed feedback [min-1], 7 = Speed command [min-1], 8 = Speed analog input [V],
9 = Torque feedback [%], 10 = Torque command [%], 11 = Torque analog input [V],
12 = Main power supply voltage [V] (GPX2 - 8~16 only), 13 = Estimated inertia ratio [ratio],
306 = Effective torque [%], 4 = Position command speed [pps]

※2 : It may be different depending upon combined motor specification.

※3 : ⏻ (Power supply) marked parameter should be re-power supply input after a modification.

5-2. Servo adjustment parameter

PAr A_2

Sub menu		Contents (initial value)	Input (setting area)
P_200	Tuning system	⏻ 0	0 = automatic, 1 = manual
P_210	Gain volume Adjustment function 1	1	0 = invalid, 1 = valid
	Automatic tuning		
P_220	Inertia estimation	0	0 = invalid, 1 = valid
P_221	Gain 1 Tuning level	10	1.0 to 10.0
P_222	Gain 1 Response level	00	-10.0 to 10.0
P_223	Gain 1 Inertia ratio	02 [ratio]	0.0 to 30.0
	Manual tuning		
P_242	Gain 1 Position feed forward	0 [%]	0 to 100
P_243	Gain 1 Position proportion	30	0 to 1000
P_244	Gain 1 Speed proportion	300	0 to 5000
P_245	Gain 1 Speed integral	150	0 to 5000
	Current command notch filter		
P_260	Function	0	0 = invalid, 1 = valid
P_261	Frequency	10000 [Hz]	10.0 to 1500.0
P_262	Q value	07	0.5 to 5.0
	Current command low pass filter		
P_263	Function	0	0 = invalid, 1 = valid
P_264	Frequency	10000 [Hz]	10.0 to 3000.0
	Speed command low pass filter		
P_270	Function	0	0 = invalid, 1 = valid
P_271	Frequency	10000 [Hz]	10.0 to 3000.0

※1 : In the case of setting modification of automatic tuning gain 2 (P224 to P226), manual tuning gain 2 (P248 to P251) which are with out notation, please use a tool software (TelGPX2).

※2 : ⏻ (Power supply) marked parameter should be re-power supply input after a modification.

5-3. Function allocation parameter

PAr A_3

Sub menu		Contents (initial value)	Input (setting area)
	Input allocation		It allocates function to input 1 to 8. (double allocation possible) 0.0 = always OFF (function invalid), 0.1 = input 1 positive logic, 0.2 = input 2 positive logic, 0.3 = input 3 positive logic, 0.4 = input 4 positive logic, 0.5 = input 5 positive logic, 0.6 = input 6 positive logic, 0.7 = input 7 positive logic, 0.8 = input 8 positive logic, 1.0 = always ON (function valid), 1.1 = input 1 negative logic, 1.2 = input 2 negative logic, 1.3 = input 3 negative logic, 1.4 = input 4 negative logic, 1.5 = input 5 negative logic, 1.6 = input 6 negative logic, 1.7 = input 7 negative logic, 1.8 = input 8 negative logic
P_300	Servo ON	0.1 Positive logic	
P_301	Reset	0.2 Positive logic	
P_302	Deviation counter clear	0.2 Positive logic	
P_304	Forward start	0.3 Positive logic	
P_305	Reverse start	0.4 Positive logic	
P_306	Forward force stop	17 Negative logic	
P_307	Reverse force stop	18 Negative logic	
	Extended input allocation		
P_320	Forward JOG	0.5 Positive logic	
P_321	Reverse JOG	0.6 Positive logic	
P_322	Command selection 1	0.0	
P_323	Command selection 2	0.0	
P_324	Control value selection 1	0.0	
P_325	Control value selection 2	0.0	
P_326	Control mode selection	0.0	
	Output allocation		It allocates function to output 1 to 4. (Double allocation prohibited) ※1 0.0 = no allocation (function invalid), 0.1 = output 1 positive logic, 0.2 = output 2 positive logic, 0.3 = output 3 positive logic, 0.4 = output 4 positive logic, 1.0 = no allocation (function invalid), 1.1 = output 1 negative logic, 1.2 = output 2 negative logic, 1.3 = output 3 negative logic, 1.4 = output 4 negative logic
P_350	Ready	0.0	
P_351	Servo being ON	0.0	
P_352	Positioning completed	0.1 Positive logic	
P_353	Speed reached	0.0	
P_354	Zero speed	0.2 Positive logic	
P_355	Brake open	0.3 Positive logic	
P_356	Control ON	0.0	
P_357	Abnormal happen	14 Negative logic	
P_360	Reverse ON	0.0	

※1 : If the function allocation to the output signal is duplicated, "warning" occurs. Please be careful.

※2 : In the case of setting modification of gain selection (P303), specified item abnormal (P370) and specified item warning (P371) which are with out notation, please use a tool software (TelGPX2).

5-4. Extension setting parameter

PAr A_4

Sub menu		Contents (initial value)	Input (setting area)
P_400	Control value selection function	⏻ 0	0 = invalid, 1 = valid
P_401	Extension control mode	⏻ -1	-1 = no extension, 0 = torque, 1 = speed, 2 = position
	JOG		
P_420	Speed	100 [min-1]	1 to 99999
P_421	Accelerating & Decelerating time	500 [ms]	0 to 99999
P_422	Inching travel value	0 [pulse]	1 to 999999 (0 = infinite feed)
	Internal speed 1		
P_430	Speed	1000 [min-1]	-99999 to 99999
P_431	Accelerating time	100 [ms]	0 to 99999
P_432	Decelerating time	100 [ms]	0 to 99999
P_433	S shaped acc/dec time	100 [ms]	0 to 99999
	Internal speed 2		
P_434	Speed	2000 [min-1]	-99999 to 99999
P_435	Accelerating time	100 [ms]	0 to 99999
P_436	Decelerating time	100 [ms]	0 to 99999
P_437	S shaped acc/dec time	100 [ms]	0 to 99999
	Internal speed 3		
P_438	Speed ※2	3000 [min-1]	-99999 to 99999
P_439	Accelerating time	100 [ms]	0 to 99999
P_440	Decelerating time	100 [ms]	0 to 99999
P_441	S shaped acc/dec time	100 [ms]	0 to 99999
P_450	Internal torque 1	50 [%]	-99999 to 99999
P_451	Internal torque 2	100 [%]	-99999 to 99999
P_452	Internal torque 3	150 [%]	-99999 to 99999
P_472	Force stop processing	⏻ 0	0 = torque zero, 1 = speed/torque zero, 2 = speed zero

※1 : In the case of setting modification of specified abnormality function (P402), specified warning function (P403), and Warning judgement value (P410 to P416) which are with out notation, please use a tool software (TelGPX2).

※2 : It may be different depending upon combined motor specification.

※3 : ⏻ (Power supply) marked parameter should be re-power supply input after a modification.

5-5. Communication setting parameter

PAr A_5

Sub menu		Contents (initial value)	Input (setting area)
P_500	RS-232C-1 (COM1) Baud rate	⏻ 2	Select from below ※1
P_510	RS-232C-2 (COM2) Baud rate	⏻ 2	Select from below ※1
P_520	RS-485 Axis number	⏻ 0	0 to 7
P_521	RS-485 Baud rate	⏻ 2	Select from below ※1
P_525	RS-485 Terminator	⏻ 0	0=無効、 1=有効
P_526	RS-485 Response waiting time	⏻ 1 [ms]	0 to 999

※1 : Baud rate selection group
0 = 9600 [bps], 1 = 19200 [bps], 2 = 38400 [bps], 3 = 57600 [bps], 4 = 115200 [bps]

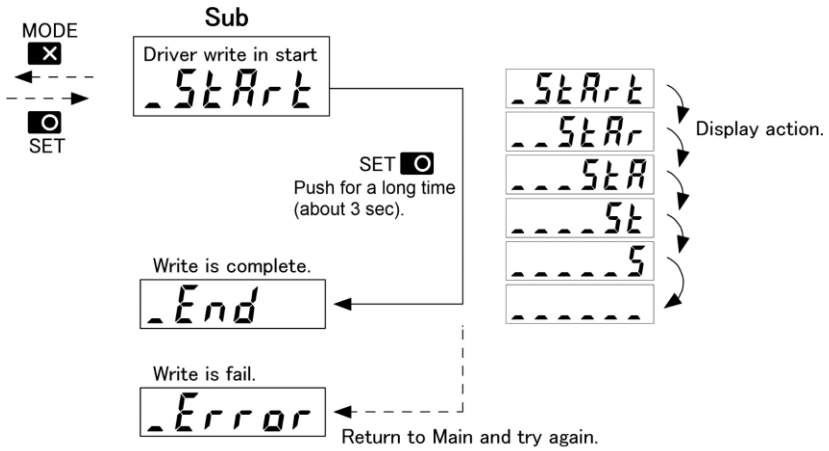
※2 : ⏻ (Power supply) marked parameter should be re-power supply input after a modification.

6 Save a modified parameter

Save a modified parameter contents (item 5) into a flush memory in a driver.

Please do not cut an operation power supply (driver control power supply) while writing operation.

While sub display (_StArt), please push [SET] key for a long time. Once display changes to (_End), writing operation completes.

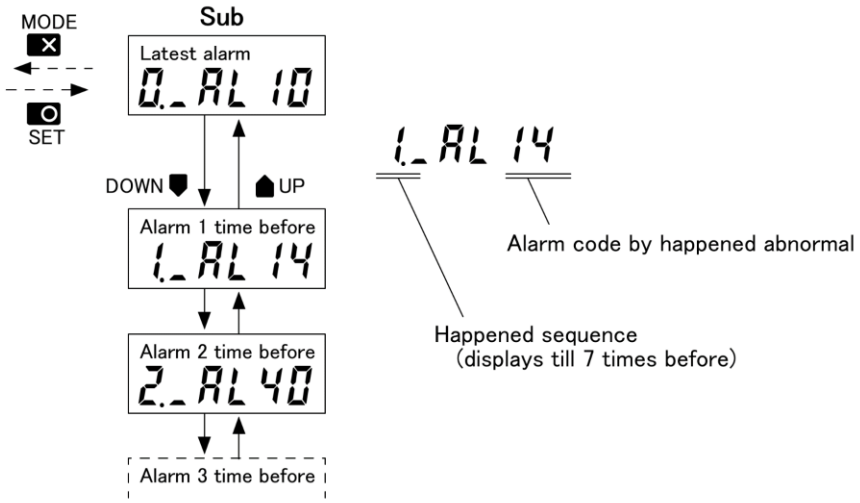


Saveing operation of parameter

7 Display of alarm history

You may refer a past alarm history saved in a connected driver. A setting station shows 7 past history display.

To check a history more than 8 times before, please use tool software (TelGPX2).



Reference operation of alarm history

7-1. List of alarm code

AL - -

Alaem code	Abnormal class (Reset function)	Abnormal contents	Cause
ALno	–	No abnormality	–
AL 10	**Minor fault** (Reset: Possible)	Soft charge not completed	Input a servo signal at no main power supply situation.
AL 11		Main power supply voltage shortage	Driver main power supply (internal bus voltage) fall less than DC180 [V] during motor drive.
AL 12		Position deviation excess	A position deviation excesses a position deviation excess determination value (item P170).
AL 13		Excess speed	A situation which a feedback speed excesses a speed control value (item P171) continues more than 1 [sec].
AL 14		Excess load	Detects an excess load situation by electronics thermal system. Miss wiring by power line (TB1, 2) or sensor (CN2).
AL 15		Mechanical lock	In the zero-speed determination value (item P184) of feedback speed, the lowest torque control situation continues more than 0.2 [sec].
AL 16		Communication input time out	while motor trial run is done, from tool software by communication, an abnormal communication continues more than 2.5 [sec].
AL20	**Temperature** (Reset: Possible)	Transistor over heat	A cooling heat sink temperature excesses 80 [℃]. Detect an internal protection of power element.
AL21		Over heat detection circuit	Detecting an abnormality at over heat detecting electric circuit.
AL22		Cooling fan action	Detect an abnormality of a fan. (only GPX2 - 60 to 80)
AL23		Regenerate resistor over heat	To detect an over heat of internal regenerate resistor by thermal signal or resistor temperature rise 35 [K].
AL24		Regenerate absorption circuit	To detect an abnormality of electric circuit which does a regenerate absorption.
AL30	**Control power supply voltage shortage** (Reset: Possible)	Control power supply voltage shortage	Input voltage of a driver control power supply falls less than AC80 [V]. (increasing a case of instant power break down)
AL40	**Motor position sensor** (Reset: Not possible)	Encoder sensor	Wiring abnormality like sensor (CN2) disconnection and short circuit. Sensor system of a combined motors does not match. A logic of sensor signals and frequency abnormal situation.
AL41		Resolver sensor	
AL42		Others	
AL50	**Main power supply excess voltage** (Reset: Not possible)	Main power supply excess voltage	By regenerate energy, a driver main power supply (internal bus) rises more than DC430 [V]. A shortage of regenerate absorption capacity.
AL60	**Excess current** (Reset: Not possible)	Excess current	To detect an excess current of driver output stage by short circuit of motor power and ground fault.
AL 70	**System abnormal** (Reset: Not possible)	CPU	Detected abnormal of CPU and control circuit by excess noise.
AL 71		Parameter area	Detected abnormal in parameter area internally in memory (data contents
AL 72		Capacity PDU code	Detect an abnormal in driver capacity detection circuit.
AL97	**Setting stataion abnormal** (※1)	Others	Hard ware of setting station is abnormal.
AL98		Connection ID	Cannot find an objected driver of connecting ID.
AL99		Communication	Detected a communication abnormality between setting station and driver CPU.

※1 : After AL90, abnormality of a setting station. Driver main body's abnormal will not happen.

< REVISION HISTORY >

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