

Operation Manual

Smart Screw Driver SDC-24 / SDC-40



SDC Screwdriver

SDC-40, SDC-24

Quick Set Up

Installation:

1. After unpacking system, please connect cable to driver and controller. Be aware that cable's ends are indetified so one specific end goes to controller and other to driver. Cable must snap in completelly, please verify both ends are fully connected.
2. Connect power cord to the back of controllers and plug it into the 110V outlet. Turn on unit.
3. On Controller Keyboard, click on "mode" than click enter. Display will show "P001".
4. With the help of the arrows, select P76 and click enter. A blinking "0" will b shown. Type in 77 and click enter. This will reinitialize the system. Please turn system OFF, wait 5 seconds and turn it ON
5. With the arrows help, select P209 and click enter. A number will show up. PLEASE WRITE THIS NUMBER DOWN AS THIS IS THE FIRMWARE VERSION OF YOUR SYSTEM.
6. Please type in P59 and click enter. The display might show "0" or "1". Make sure "0" for USB communication is selected. If display showed "0" than click "reset" button. If "1" was shown, please change it to "0" than click enter.

Smart Manager Software:

1. Obtain firmware version of your system by Typing in 209 on the display of your controller.
2. Go to page 87 on this operation manual. Look at the chart and locate the corresponding Smart Manager Software for the Firmware you have writen down for your system.
3. Ask your Sales Rep for a copy of the Smart Manager Software you need according to Firmware Version of your System.

You can also request Smart Manager software on these email addresses below. (MAKE SURE YOU INDICATE FIRMWARE VERSION OF YOUR SYSTEM OBTAINED ON P209 when sending a request). john.brackmann@mountztorque.com, sergio.muratalla@mountztorque.com, damian.valdiviezo@mountztorque.com

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1. GENERAL SAFETY RULES

WARNING! Read and understand all instructions. Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury

SAVE THIS INSTRUCTIONS

1.1 Work Area

- **Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.
- **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Power tools create sparks which may ignite the dust or fumes.
- **Keep bystanders, children, and visitors away while operating a power tool.** Distractions can cause you to lose control.

1.2 Electrical Safety

- **Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. Do not use any plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.** If the tools should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.
- **Avoid body contact with grounded surface ad pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is grounded.
- **Don't expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock
- **Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately.** Damaged cords increase the risk of electric shock.
- **When operating a power tool outside, use an outdoor extension cord marked W-A or W.** These cords are rated for outdoor use and reduce the risk of electric shock.

1.3 Personal Safety

- **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.

- **Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry, or long hair can be caught in moving parts.
- **Avoid accidental starting. Be sure switch is off before plugging in.** Carrying tools with your finger on the switch or plugging in tools may result in personal injury.
- **Remove adjusting keys or switches before turning the tool on.** A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
- **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enables better control of the tool in unexpected situations.
- **Use safety equipment. Always wear eye protection.** Dust mask, non-skid safety shoes, hard hat, or hearing protection must be used for appropriate conditions.

1.4 Tool use and Care

- **Use clamps or other practical way to secure and support the workplace to a stable platform.** Holding the work by hand or against your body is unstable and may lead to loss of control.
- **Do not force tool. Use the correct tool for your application.** The correct tool will do the job better and safer at the rate for which it is designed.
- **Do not use tool if switch does not turn it on or off.** Any tool that cannot be controlled with the switch is dangerous and must be repaired.
- **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.** Such preventive safety
- **Store idle tools out of reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.
- **Maintain tools with care. Keep cutting tools sharp and clean.** Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control.
- **Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.
- **Use only accessories that are recommended by the manufacturer for your model.** Accessories that may be suitable for one tool, may become hazardous when used on another tool.

1.5 SERVICE

- **Tool service must be performed only by qualified personnel.** Service or maintenance performed by unqualified personnel could result in a risk of injury
- **When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.** Use of unauthorized parts or failure to follow Maintenance instructions may create a risk of electric shock or injury.

2. SPECIFIC SAFETY RULES

2.1 Hold tool by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord. Contact with a "live" wire will make exposed metal parts of the tool "live" and shock the operator.

2.2 Never lubricate aerosol oil on to the electrical part.

3. Product

It consist of DC Servo screwdriver and controller as a complete system.

1) Standard Item



2) Option accessories

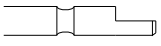


4. Main feature

- 1) Digital torque set and save 8 memories
- 2) Long endurance, less noise and heat, and light weight screwdriver
- 3) Auto speed setting by torque setting
- 4) Monitoring fastening quality and count of screw numbers
- 5) Error information by code display
- 6) Easy parameter setting by Smart-Manager (PC software)
- 7) Real time torque data and curve display
- 8) Real time fastening data output (USB, RS-232C)
- 9) Maintenance information and history memory
- 10) Firmware upgrade by Com port

5. Screwdriver

5.1 Specification

no	Item	Specification	
		SDC-24 series	SDC-40 series
1	El. Power	DC24V, 5A max	DC40V, 5A max
2	Motor	Swiss DC servo motor	
3	Dimension	refer 5.2 screwdriver model	
4	Torque range	refer 5.2 screwdriver model	
5	Speed range	refer 5.2 screwdriver model, +/- 5%, Auto change	
6	Torque accuracy	10% in full scale	
7	Torque repeatability	+/- 3%	
8	Bit size	 Dia 4mm half moon or 1/4" Hex	1/4" Hexagonal
9	Start	Remote by I/O, Trigger lever	
10	Cable	10P Robot cable	

*Bit cushion 4mm / pressure 4 Kg

5.2 Model for SDC-24 series

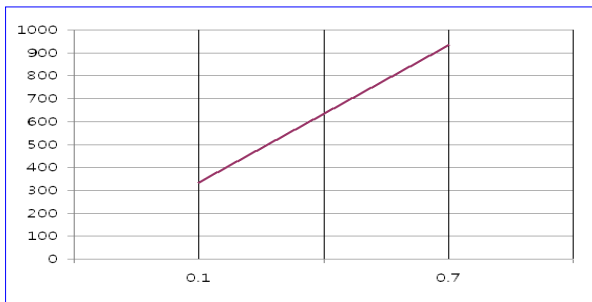
	Type		Torque Kgf.cm	Speed (RPM) Auto change	Bit
	Offset	Straight			
Automation	SD120Z	SDA120	0.30 ~ 1.50	240 -1000	4mm half moon
	SD200Z	SDA200	0.50 ~ 2.00	420 - 1000	
	SD300Z	SDA300	1.00 ~ 3.00	360 - 890	
		SDA600	1.50 ~ 6.00	190 - 710	1/4" hex
		SDA1000	2.0 ~ 10.0	130 - 430	
Manual		SD070	0.10 ~ 0.70	100 - 1000	4mm half moon
		SD120	0.17 ~ 1.50	240 - 1000	
		SD200	0.50 ~ 2.00	420 - 1000	
		SD300	1.00 ~ 3.00	360 - 890	
		SD600	1.50 ~ 6.00	190 - 710	
		SD1000	2.0 ~ 10.0	130 - 430	1/4" hex

※ Automation type has 4mm bit cushion / pressure 4 Kg

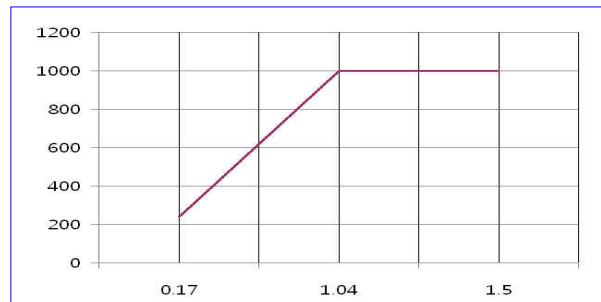
5.3 Model for SDC-40 series

Type		Torque Kgf.cm	Speed (RPM) Auto change	Bit
Automation Straight type	SDA05N	1.00 ~ 5.00	300 - 1000	4mm half moon
	SDA09N	1.50 ~ 9.00	300 - 1000	
	SDA18N	4.0 ~ 18.0	300 - 1000	1/4" hex
	SDA28N	5.0 ~ 28.0	190 - 1000	
Manual	SD05N	1.00 ~ 5.00	300 - 1000	4mm half moon
	SD09N	1.50 ~ 9.00	300 - 1000	
	SD18N	4.0 ~ 18.0	300 - 1000	1/4" hex
	SD28N	5.0 ~ 28.0	190 - 1000	

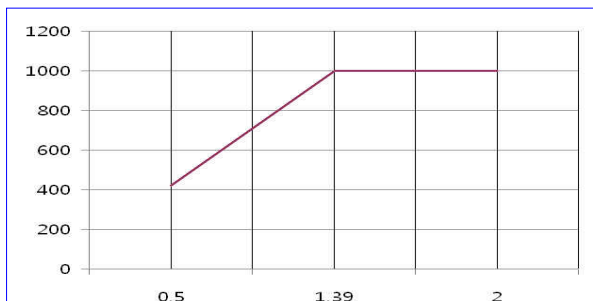
5.4 Auto Speed change by torque setting



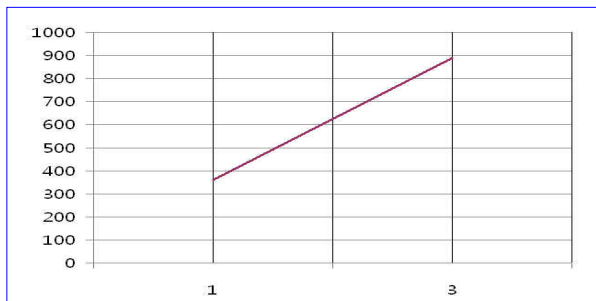
SD070



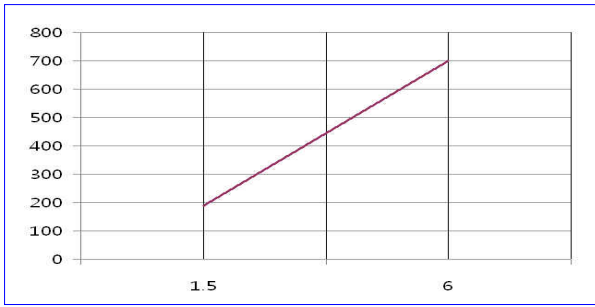
SD120



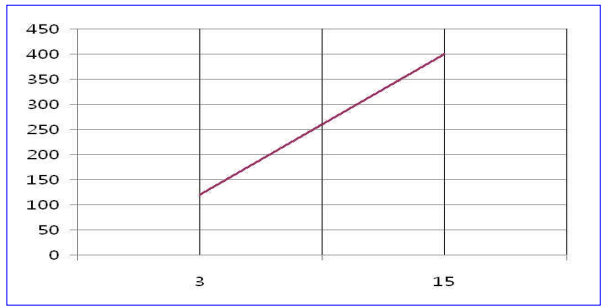
SD200



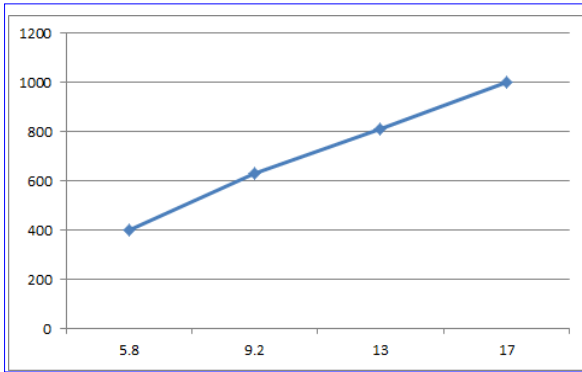
SD300



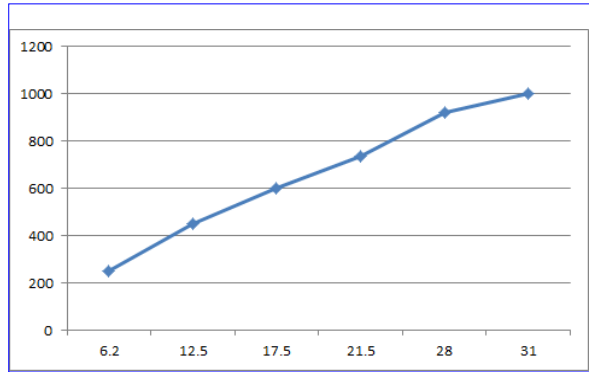
SD600



SD1500



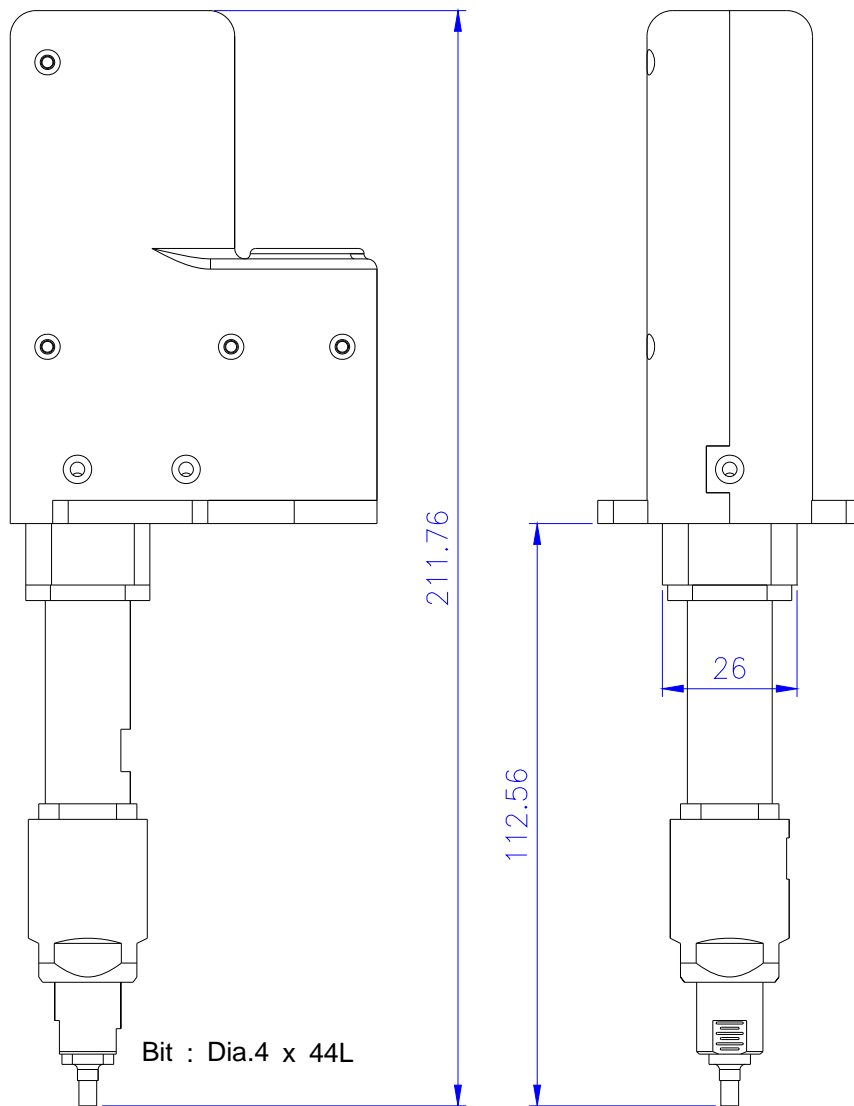
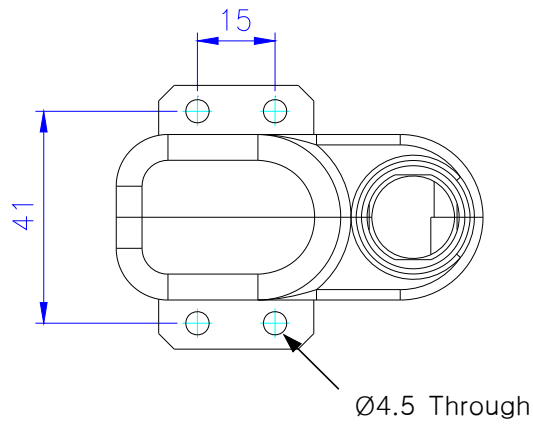
SD18N



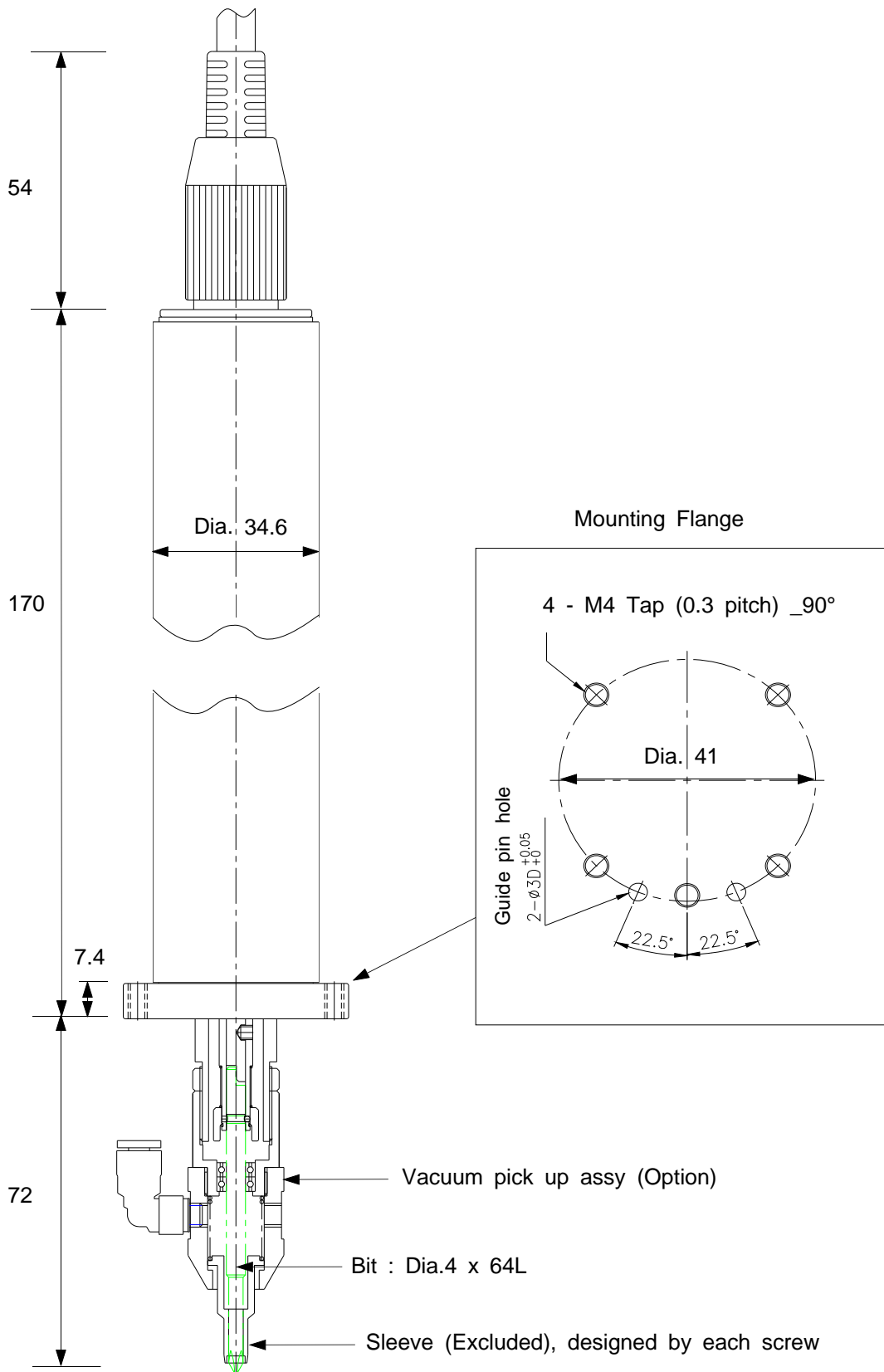
SD28N

5.4 Screwdriver dimension

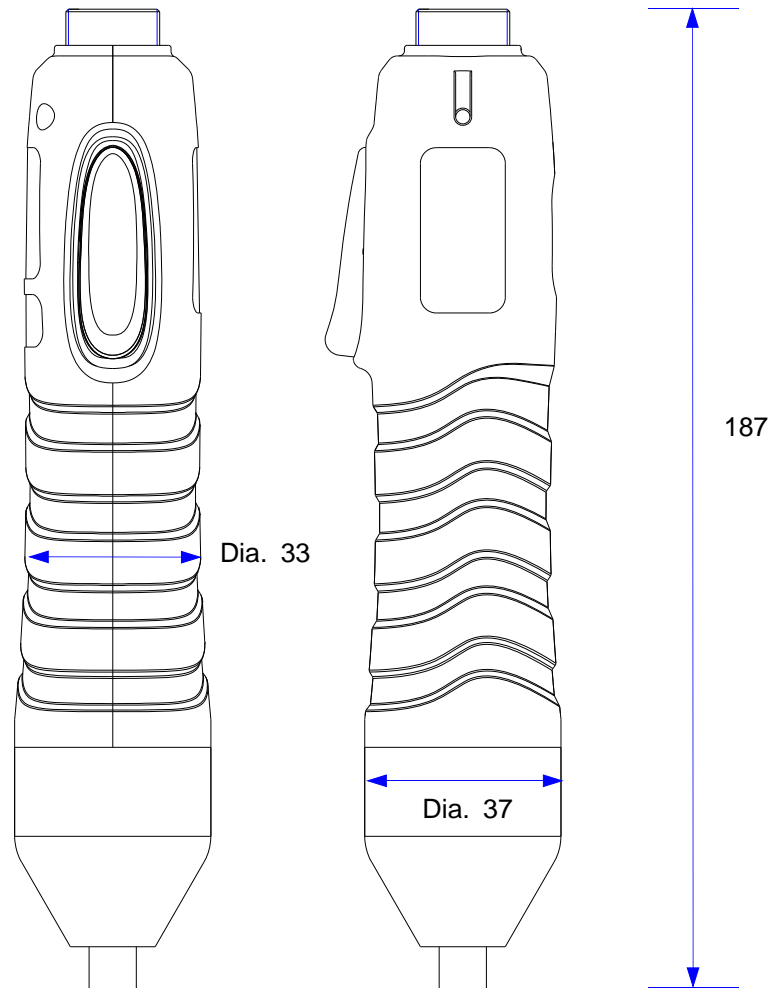
- Offset type (SD120Z, SD200Z, SD300Z)



■ Straight type (SDA120-FV, SDA200-FV, SDA300-FV, SDA600-FV, SDA1500-F)



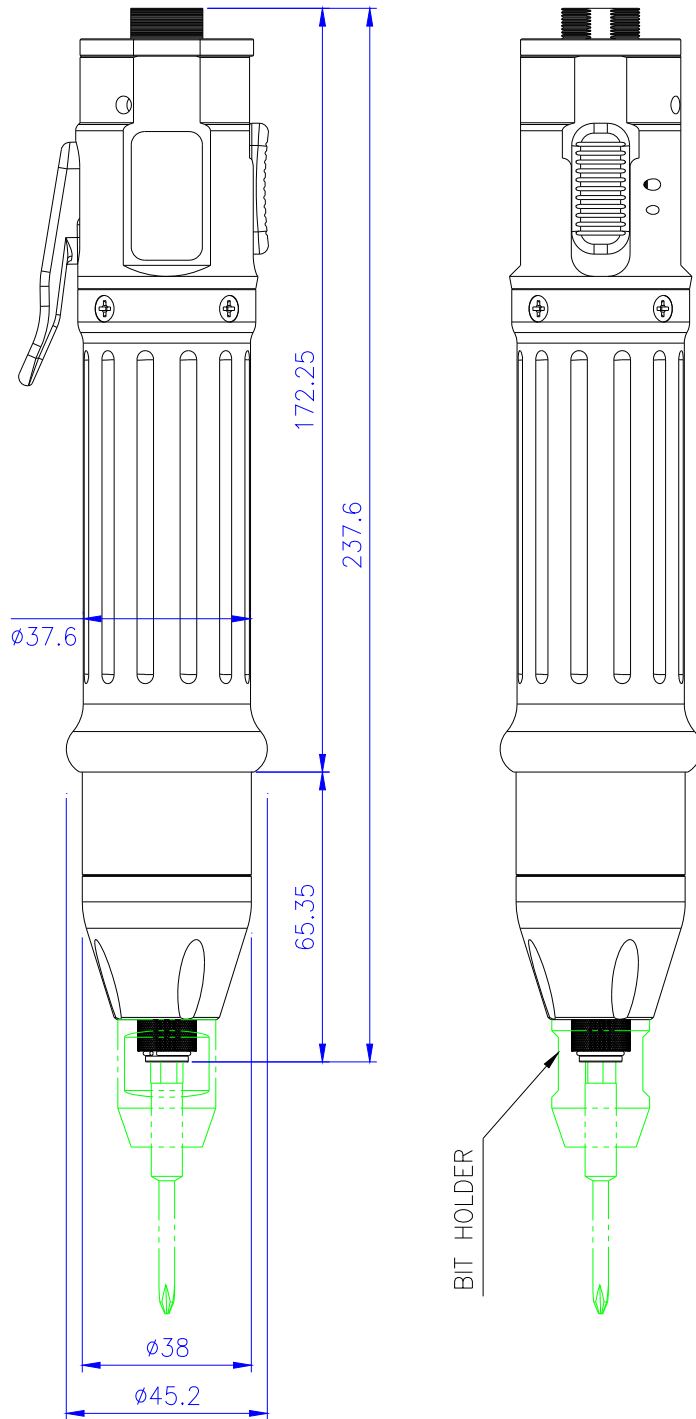
■ Manual Hand held type (SD070, SD120, SD200, SD300, SD600, SD1500)



Weight

- SD070 : 260 gr
- SD120 : 260 gr
- SD200 : 295 gr
- SD300 : 295 gr
- SD600 : 340 gr
- SD1000 : 340 gr

■ Manual Hand held type (SD05N, SD09N, SD18N, SD28N)



6. Controller

6.1 Specification

no	Item		Specification	
			SDC-24 series	SDC-40 series
1	Input		AC120VC or AC220V, 50~60Hz	
2	Output		DC24V, 5A	DC40V, 3A
3	Control Range	Torque	0.1 ~ 15.0 Kgf.cm	1 ~ 28.0 Kgf.cm
		Speed	100 - 1,000 rpm	300 - 1,000 rpm
		Angle	0.4° step	
4	Preset parameters		Torque, (Speed) & Angle	
5	Preset # selecting		1) Front panel button 2) 25P I/O interface	
6	Torque calibration		- 10% ~ +10%	
7	Auto recognition		Auto detection of connected driver when power ON of controller	
8	Error display		Error code display (3 groups)	
9	Fastening quality control		Fastening data verification (NG/OK) against the pre-setting pattern of angle.	
10	Screw Counter		Total 8 programs of tightening screw number and sequence	
11	Parameter setting and monitoring		MS Windows PC software, Smart-Manager or front panel	
12	Operating environment		0 ~ 40℃ / 15 ~ 80% RH (without dew)	

6.2 Controller Dimension

[Front]



Display

Buttons

Connector to driver

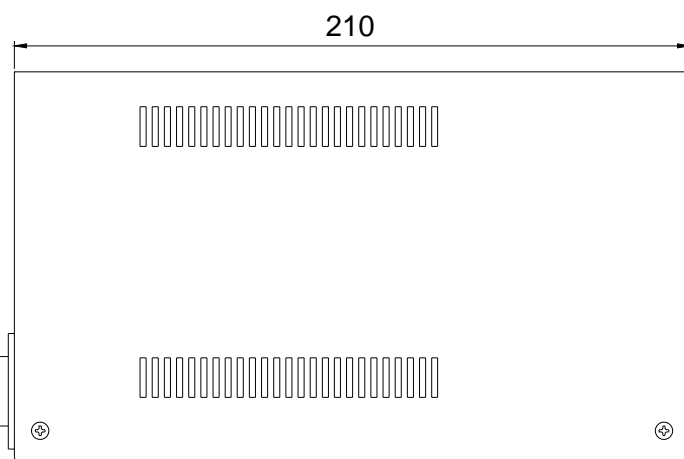
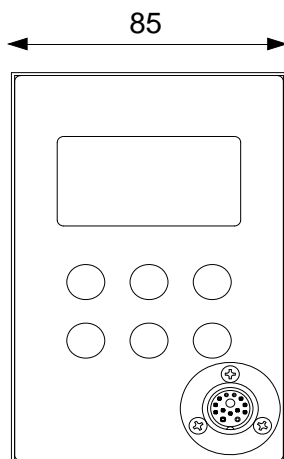
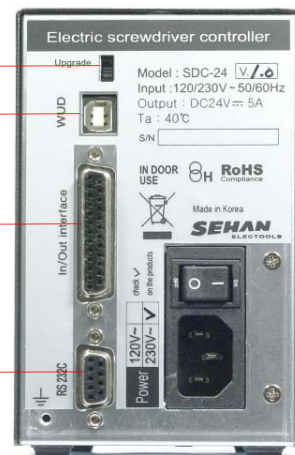
[Back]

Firmware upgrade s/w

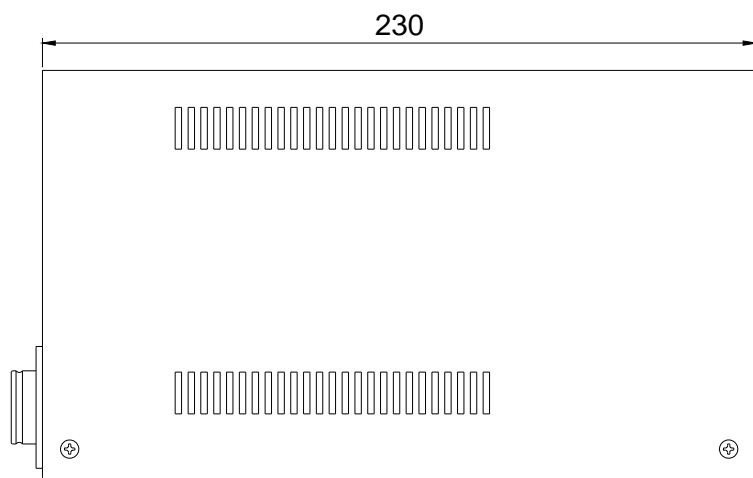
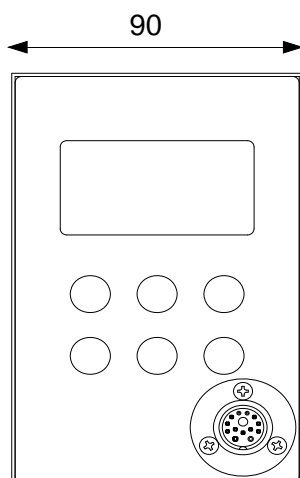
USB port

25P I/O

RS-232C port



SDC-24	Dimension / Weight	85(w) 210(d) 131.5(h)mm / 1.9 Kg
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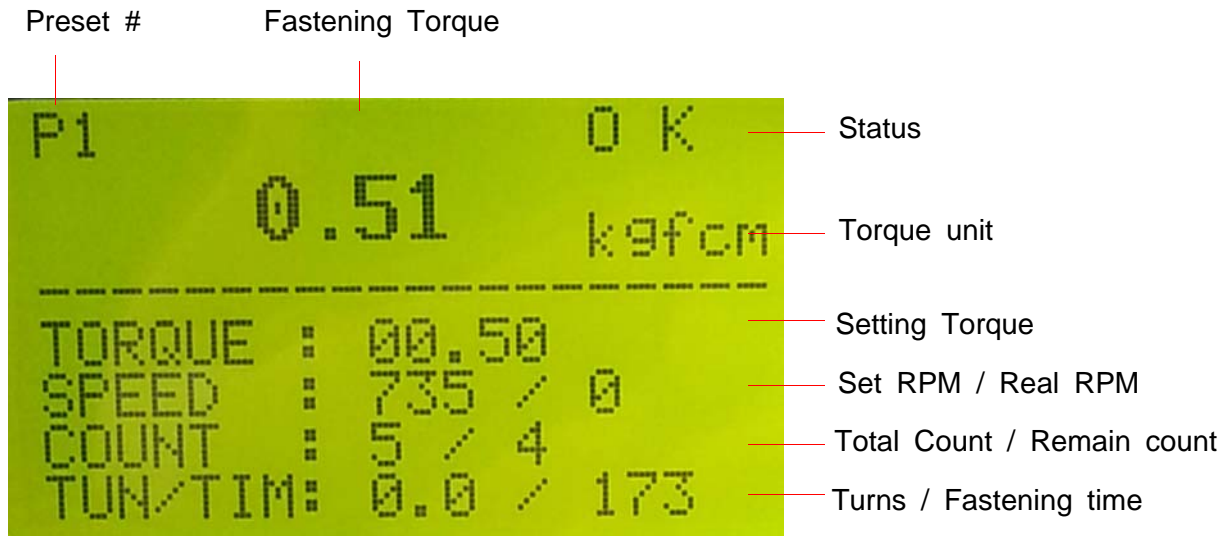


SDC-40	Dimension / Weight	90(w) 230(d) 141.5(h)mm / 2.3 Kg
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7. Operation

7.1 LCD display details

1) Information of LCD



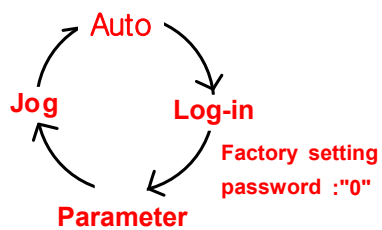
2) Key Buttons

MODE button :

By pressing the MODE button, it circulate **Auto**, **Log-in and Parameter** mode. Auto means operating.

Before parameter mode, password required.

Every settings is possible in Parameter mode.



**button**

Log-in Mode	Log-in is required for parameter setting with password Initial password "0" can be changed on P75
Parameter Mode	Cursor shift up to left at the Parameter mode

**button**

Auto(Work) Mode	Select the next preset number or Model no. select when P138 is enabled
Log-in & Password	It increase the number up

**button**

Auto Mode (Operation)	It move the cursor downward
Parameter Mode	It decrease the number down
Jog Mode	Manual start / stop in reverse rotation

**Enter button**

Parameter Mode	It select or save the chosen display
Jog Mode	Manual start / stop in Forward rotation

**button**

It returns to the previous mode. Also it reset the error

7.2 Parameter number group

Number	Main contents	Description
1- 8	Torque	Save the target torque from 1-8
11-18	Rotation speed	Save the rotation speed for P1-P8
21-28	Min. rotation turn for OK/NG verification	Save the minimum rotation turn or running time for OK fastening of P1-P8
31-38	Max turn	Save the limit number of turn for P1-P8 (It stop at the limit number of turn and torque)
41-48	Soft start time	Change time to the target speed
51-58	First angle (turn)	Screwdriver run with the speed set on P84 as per the angle value on P51 - 58. And it change to the original speed set on P11 - 18 "0" = Disable
61-89	Other parameters	Change of other parameters
90-97	Screw Counter	Screw counter related pattern setting
100-139	Counter- Model	Parameters of fastening sequence of each model
140-159	Multi sequence	Multi sequence data
160-167	Error history	The latest error number record from P160 to 167
169	Version	Firmware version

7.3 Preset number and parameters

The preset numbers from 1 to 8 are effected together with parameter 1~8 for torque, parameter 11~18 for speed, parameter 21~28 for min. angle, parameter 31~38 for max. angle, parameter 41~48 for soft start.

	1st data	2nd data	3rd data	4th data	5th data	6th data
Preset no.	Torque	Speed	Min angle	Max angle	Soft start	Free Speed Angle
1	P1	P11	P21	P31	P41	P51
2	P2	P12	P22	P32	P42	P52
3	P3	P13	P23	P33	P43	P53
4	P4	14	P24	P34	P44	P54
5	P5	P15	P25	P35	P45	P55
6	P6	P16	P26	P36	P46	P56
7	P7	P17	P27	P37	P47	P57
8	P8	P18	P28	P38	P48	P58

The data from 3rd to 4th are optional.

The 3rd and 4th data can be used for monitoring fastening quality.

They can be used or not.

7.4 Torque, speed & angle setting (I) - by PC program

Set torque, speed & angle on the PC program and upload to the SDC-24 controller, then parameters will be provided to the controller.

Please refer the details to the article 9.3 PC program, Smart-Manager..

[PC program : Smart Manager]

The screenshot shows the 'Smart-Manager - SDC V1.10.0 E' software interface. The main window contains a table of 8 presets (numbered 1 to 8) with columns for TORQUE, SPEED (RPM), MIN ANGLE (TURN), MAX ANGLE (TURN), SOFT START (ms), and FREE SPEED ANGLE(TURN). Each cell in the table contains a numerical value and a parameter ID (e.g., P1, P11, P21, etc.).

Below the table is a configuration panel with several sections:

- Torque Unit:** Radio buttons for Kgf.cm (selected), Nm, Lbf.in, ozf.in, and cNm. A note states: "Change of unit will reset the parameter to factory default setting". A 'Change' button is present.
- Min Angle control:** Radio buttons for 'No select' (selected), 'No TorqueUp after the Min angle(turn)->Error E330', 'TorqueUp before the Min angle(turn)->Error E331', and 'Both select'.
- Max Angle control:** Radio buttons for 'On the target Angel(turn)' (selected), 'Stop and verify OK', and 'Stop and verify NG'. A note says: "* key in '0' not to use".
- Start angle control:** Radio buttons for 'Disable' and 'Enable'.
- Auto speed:** Radio buttons for 'Disable' and 'Enable'.

The status bar at the bottom shows 'COM5 38400 : Open', 'Happy day !!!', and 'Log-in'.

7.5 Torque, speed and Angle setting (II) - on the front panel

Log-in is required whenever controller power is OFF and ON for choosing parameter mode. Once log-in with password, it displays Log-IN on mode circulation.

Password can be changed on P75.

All parameters including torque, speed are changed or set in Parameter mode.

Example) Preset #1 - Torque 0.5Kgf.cm to 0.6 kgf.cm



No	Button	LCD Display	Description
0	Operation	<pre> P1 READY 0.0 k9fcm ----- TORQUE : 00.50 SPEED : 735 / 0 COUNT : 5 / 5 TUN/TIM: 0.0 / 0 </pre>	Auto(Work) mode
1	MODE	<pre> [PASSWORD] [0000] </pre>	Log-in Factory setting password "0000"
2		<pre> [PASSWORD] [LOGIN] </pre>	Log-in message
3	MODE	<pre> [PARAMETER] Please enter.. </pre>	Parameter mode
4		<pre> [PARAMETER] [P001] [00.50] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4 </pre>	P1 : Torque 1
5		<pre> [PARAMETER] [P001] [00.50] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4 </pre>	Value : 0.5
6		<pre> [PARAMETER] [001] Saving.. [P001] [00.60] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4 </pre>	New Value Save new
7	RESET	<pre> [PARAMETER] Please enter.. </pre>	Parameter mode
8	MODE	<pre> P1 [JOG] STATUS : READY TORQUE : 00.60/00.00 SET key : Fastening DOWN key: Loosening </pre>	Jog mode
9	MODE	<pre> P1 READY 0.0 k9fcm ----- TORQUE : 00.60 SPEED : 835 / 0 COUNT : 5 / 5 TUN/TIM: 0.0 / 0 </pre>	Auto(Work) mode

7.6 Details of each parameter numbers

1) Torque

Number	Unit	Range	Initial
P1~8	0.01 (Kgf.cm)		
Description	Each number from P1 to 8 contains the torque value for Preset # 1 to 8. The value of parameter 1 is the target torque saved in Preset # 1. Torque unit can be selected on P10		

2) Initial Preset # display on the front panel

Number	Unit	Range	Initial
P9		1 ~ 10	1
Description	The default setting of preset # can be selected between 1 to 8 and Multi A/B on P09 [1, 2, 3, 4, 5, 6, 7, 8, Multi_A, Multi_B]		

3) Torque Unit

Number	Unit	Range	Initial
P10		1 ~ 4	1
Description	<p>It selects one of the torque units below ; "1" : Kgf.cm "2" : N.m "3" : lbf.in "4" : Ozf.in</p> <p>[Caution] Change of unit will reset every parameter to factory initial setting. The torque unit should be selected first before parameter setting</p>		

4) Rotation Speed (Not recommended)

Number	Unit	Range	Initial
P11~18	1 rpm	depend on Model	
Description	<p>Each number from parameter 11 to 18 contains the speed value for Preset # 1 to 8. The value of parameter 11 is the target torque saved in Preset #1.</p> <p>Preset #1 have the torque of P1 and speed of P11.</p> <p>The speed is automatically changed on the torque setting. Changing speed to higher than auto setting is not recommended. Otherwise the torque can be over by the inertia.</p>		

5) Screw type (Clockwise or Counter-clockwise)

Number	Unit	Range	Initial
P19		0 ~ 1	0
Description	<p>It selects one of the screw type below ; "0" : Clockwise "1" : Counter-clockwise The initial value is "0" for "Clockwise" After selection change, power off the controller and on again.</p>		

6) Define of 25P I/O interface

Number	Unit	Range	Initial
P20		0 ~ 4	0
Description	<p>Each pin no. of 25P I/O interface can be used with one of following function.</p> <p>"0" : Direct preset no. select IN : preset # selecting through pin no.1 to 8 OUT : Selected preset # display through pin 10 to 17</p> <p>"1" : Remote control by PLC with 25P I/O port IN / OUT : for PLC</p> <p>"2" : Combined IN/OUT IN : Direct preset # selecting through 1 to 8 OUT : for PLC</p> <p>"3" : Optional remote control by PLC with 25P I/O port IN / OUT : for PLC (except Start, For/Rev selection on the screwdriver)</p> <p>"4" : Connected to " Socket Tray "</p>		

7) Min. Angle control for Fastening Quality monitoring

Number	Unit	Range	Initial
P21~28	0.1 turn	0 ~ 30.0	0
Description	<p>Minimum angle can be set as a threshold point For fastening quality control by different setting on P78.</p> <p>"0" : No use "0.1~30.0" : Value of rotating angle (turn)</p> <p>P78 Min angle control setting should be one of below</p> <p>0 : No use</p> <p>1 : No torque up after Min angle on P78 - Er330</p> <p>2 : Torque up before Min angle on P78 - Er331</p> <p>3 : Both (1+2)</p> <p>If the driver stop without torque up after the min angle, it provide fastening NG output signal with the error code E330. It is most serious mistake by operator which is open found but difficult to be recognized..</p> <p>If the driver stops without torque up before the preset turn, it does not provide fastening NG. Because it is very common operating together with screw feeder.</p> <p>If the driver stop with torque up before the min angle, it provide fastening NG output signal with the error code E331. It is useful to detect the wrong aligned, engaged screw or floating screws</p>		

8) Max Angle control

Number	Unit	Range	Initial
P31~38	0.1 turn (36°)	0 ~ 30.0	0
Description	<p>"0" : No use "0.1~30.0" : Value of rotating angle (turn)</p> <p>Function #1 Angle control stop and verify OK</p> <p>P79 Max angle control setting should be " 0 " : Stop and verify OK</p> <p>The driver stops at the set turn(angle) and provide fastening OK output signal(pin #25). If the load reach to the target torque, it stops immediately even before the set turns (angle), and provide Torque-up and Fastening OK output signal together.</p> <p>For example, It have 6.0Kgf.cm in P3, 500rpm in P13 and 5 turns in P33, the driver will run with 500 rpm and stop at 5 turns (1800 degree). But if the driver reach to 6.0 Kgf.cm of the target torque before 5 turns, it will stop immediately at any turn.</p> <p>Function #2 Limit of Fastening angle for NG detection</p> <p>P79 Max angle control setting should be " 1 " : Stop and verify NG (Er332)</p> <p>If there is no torque up untill the set angle(turn), it stop and provide NG output signal with the error code E332.</p> <p>This function is useful to protect the screw which is continuously running around the screw hole without engaging.</p> <p>The latest fastening angle(turn) can be monitored on the LCD display of front panel.</p>		

9) Soft start setting 41 ~ 48

Number	Unit	Range	Initial
P41~48	1 ms	0 ~ 300ms	0
Description	<p>Soft start time to the target speed is selectable from 0 - 300mS for each preset #</p>		

10) Free speed angle setting 51 ~ 58

Number	Unit	Range	Initial
P51~58	0.1 turn (36°)	0 ~ 100.0 turn	0
Description	<p>For the screw tightening process, screwdriver has auto speed (A1) by system according to the torque setting. But operator can have different speed on P84 (Free speed) within the angle on P51~58.</p> <p>Be sure that Free speed angle should be less than A1 angle value (before SCREW SEATING).</p> <p>※ Free speed angle < Screw Seating angle</p> <p>"0" = No use</p>		

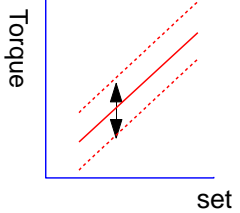
11) FND Display (for FND version only)

Number	Unit	Range	Initial
P29		1 ~ 5	1
Description	<p>One of 5 types of display can be selected.</p> <p>"1" : Preset no. + Speed Example) 1R 100 --> Preset #1- 1,000rpm</p> <p>"2" : Preset no. + Torque [Stop] ↔ Speed [Running] Example) 1R 15.0 --> Preset #1- 10Kgf.cm</p> <p>"3" : Fastening Torque [Stop] ↔ Preset no.+Torque [Running] Example) 1R098 [Stop] - 1R 10.0 [Running] Remain screw no. = 1 (9 screws are tightend)</p> <p>"4" : Screw counter [Stop] ↔ Preset no.+Torque [Running] Example) 10c01 [Stop] - 1R 15.0 [Running]</p> <p>"5" : Screw counter ↔ Preset no.+Torque Example) 10c01 ↔ 1R 15.0 (Alternately)</p>		

12) Auto fastening data output

Number	Unit	Range	Initial
P30		0 ~ 1	0
Description	<p>Monitoring data can come out automatically through USB (RS-232) without data request command protocol when "1" is selected on P30</p> <p>0 : Smart Manager 1 : Auto output Enable</p>		

13) Torque compensation

Number	Unit	Range	Initial
P39	1 %	90 ~ 110%	100
Description	<p>Output torque can be decreased or increased between -10% to +10% for each preset #.</p> <p>This torque tuning value is saved in controller, not in driver.</p> <p>Be careful tuning value when replace the screwdriver.</p> 		

14) Motor acceleration

Number	Unit	Range	Initial
P40	10ms	10 ~ 200	50
Description	<p>The motor increase the rotation speed up to the target in the set time. It works for all preset #.</p>		

15) COM port select

Number	Unit	Range	Initial
P49		0 or 1	1
Description	One of two communication port should be selected between RS-232C and USB (converted from RS-232C) 0 : USB (converted from RS-232C) 1 : RS-232C		

16) Initial Loosening speed

Number	Unit	Range	Initial
P50	rpm	50 ~ 800	200
Description	Initial speed for 1 turn of reverse is selectable. Setting : 50 ~ 800 rpm		

17) Converted torque limit

Number	Unit	Range	Initial
P59	%	0 ~ 10	0
Description	If the converted torque is over than the setting value(%), NG (Er 335) will be displayed "0" : No use "1~10%" : +/- tolerance limit from target		

18) Angle detection setting II

Number	Unit	Range	Initial
P86		0 or 1	0
Description	Angle monitoring can be started from the input signal (pin # 5) of 25P I/O. In/Out for PLC (1) should be selected on P20. " 0 " : Disable " 1 " : Enable		

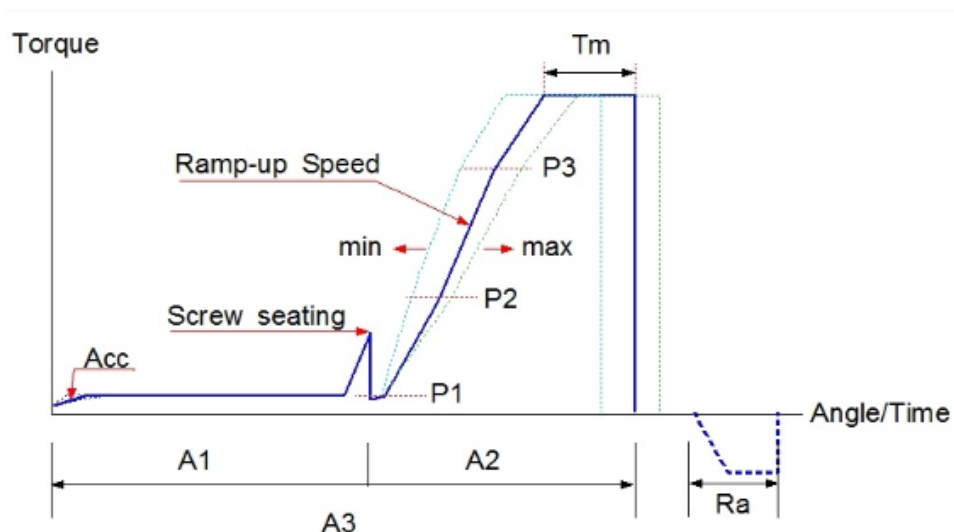
19) Time limit for fastening, Loosening and motor stall

Number	Unit	Range	Initial
P60~62	0.1 sec	0 ~ 600	see below
Description	<p>It prevent the continuous running over the preset time in direction of fastening and loosening for safety operation. The driver stops automatically at the preset time and provide the pattern NG with the error code belows;</p> <p>P60 : Limit of fastening run time error code - E300 P61 : Limit of loosening run time error code - E301 Initial value = 10.0 sec</p> <p>Also it prevent the continuous time going against the motor stall for over heat protection.</p> <p>P62 : Limit of motor stall time error code - E304 Initial value = 1.0 sec</p>		

20) Torque control profile setting (P63~73)

There are parameters related with torque control profile as below

- A1 (Speed primary) : Speed is controlled with the target setting, torque is monitored until the monitored torque reaches to the set torque (percentage setting on P63) - Screw Seating Point
- A2 (Torque primary) : Motor stops at Screw seating Point, and control motor current to target setting (target torque) with limited speed.



Number	Unit	Range	Initial
P63~73			
Description	<p>P63 Screw Seating Point (Factory setting : 30 %) Setting : 10 ~ 50 % of the target torque</p> <p>P64 P1 setting in A2 process (Factory setting : 40 %) Setting : 10 ~ 60 % of the target torque</p> <p>P65 P2 setting in A2 process (Factory setting : 60 %) Setting : 40 ~ 80 % of the target torque</p> <p>P66 P2 setting in A2 process (Factory setting : 80 %) Setting : 60 ~ 95 % of the target torque</p> <p>P67 Ramp up speed setting in A2 process with percentage of the target speed (Factory setting : 50 %) Setting : 10 ~ 100 % of the target torque</p> <p>P68 Torque rising time in ramp up process (Factory setting : 100 mS) Setting : 100 ~ 300 mS</p> <p>P69 Start point of ramp up speed on P67 Selecting : P1, P2, or P3 (Factory setting : P1)</p> <p>P70 Target torque holding time (Tm) Setting : 10 ~ 200 mS (Factory setting : 20 mS)</p> <p>P71 Auto reverse angle setting after torque holding process for bind screw releasing (Factory setting : 0) Setting : 0 ~ 100° (0 = No use) *** Remark, Scale = 0.4° step</p> <p>P72 Angle limit during torque Holding(Tm) (Factory setting : 0) Setting : 0 ~ 360° (0 = No use)</p> <p>P73 Angle limit during Ramp-up process (Factory setting : 0) Setting : 0 ~ 10 turns (0 = No use)</p>		

21) Error display time setting

Number	Unit	Range	Initial
P74	sec	0 ~ 10	1
Description	Error display and reset after the below set time "0" : Manual reset by RESET button "1 ~10.0 sec" : Auto reset after set time		

22) Password

Number	Unit	Range	Initial
P75		0 ~ 9999	0000
Description	Factory setting password is " 0 " at the initial. Password can be changed between 0 - 9999 on P89.		

23) Parameter initialize to factory setting

Number	Unit	Range	Initial
P76		0 or 77	
Description	Key in "77" on P76 and press Enter button. All parameters come back to the factory setting		

24) Beep sound ON/OFF

Number	Unit	Range	Initial
P77		0 or 1	1
Description	The beep sound can be off 0 : OFF 1 : ON		

25) P21~28 Min. Angle setting and NG type selecting

Number	Unit	Range	Initial
P78		0 ~ 3	0
Description	<p>Select one of following type of NG with Min. angle setting on P21~28 (Error code : 307)</p> <p>"0" : No use</p> <p>"1" : No Torque-up NG after Min. angle.</p> <p>"2" : Torque up NG before Min. angle</p> <p>"3" : Combined "1" and "2"</p> <p>** Setting angle "0" means no use, too</p>		

26) P31~38 Max Angle setting and OK/NG verification

Number	Unit	Range	Initial
P79		0 ~ 1	0
Description	<p>Motor stops at the set Max angle, and verify as one of below</p> <p>"0" : OK</p> <p>"1" : NG and display Error code 332</p> <p>** Max angle setting "0" means no use of this feature</p>		

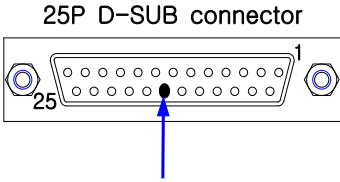
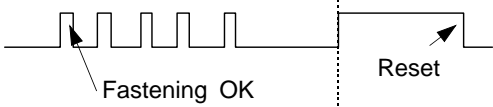
27) Count start(IN) & finish(OUT) signal type I

Number	Unit	Range	Initial
P80		0 ~ 3	0
Description	<p>For monitoring and qualifying the number of screws, SDC-24 should receive the count START signal and STOP(Finish) signal in some application. SDC-24 provides the count complete signal out when it reach to the target number.</p> <p>SDC-24 provides 4 different types of signal to be selected. The sensor or switch can be connected to SDC-24 directly for Start signal.</p> <p>"0" : Auto reset.</p> <p>The count number is reset to the target number automatically after "0" .</p> <p>"1" : If the count number shows "0" during the ON status of the count Start signal, it provide the count COMPLETE OUT signal. If the Start signal is turned OFF before the count number "0", it provide the count NG OUT signal</p> <p>"2" : It start count with a pulse type of signal till the set time on P77. If the count does not reach to the target within the set time, it is NG. If there is no time set on P77, There is no time limit to count stop (finish)</p> <p>"3" : It start count with a pulse type of signal. If the count does not reach to the target before 2nd pulse type of signal, it is NG.</p>		

28) Count start(IN) & finish(OUT) signal type II

Number	Unit	Range	Initial
P81	0.1 sec	0 ~ 999.9	0
Description	<p>The fastening time limit from Count START for NG judgment. The fastening work should be finished within the set time. Otherwise, the work-piece will leave the working area.</p> <p>* Refer to the article 5.13.2 for details</p>		

29) COUNT complete signal type

Number	Unit	Range	Initial
P82		0 ~ 3	0
Description	<p>Select the type of Count complete signal output on P20 of 25P I/O port</p> <div style="text-align: center;">  <p>Pin no.20 Count cycle complete</p> </div> <p>Count complete</p> <p>"0" Count complete (500ms) _____</p> <p>"1" Torque OK + Count complete  </p> <p>"2" Count complete (100ms) _____</p> <p>"3" Alarm when screw missed in a cycle</p> <p>"0" : It provide 500ms of pulse type count complete signal after fasten all set numbers.</p> <p>"1" : It provide every pulse(0.5s) signal of torque OK and count complete signal after fasten all set numbers. The count complete signal will be off after reset of count number when next work piece come in.</p> <p>"3" : It provide 100ms of pulse type count complete signal after fasten all set numbers.</p> <p>"4" : It provide 100ms of pulse type alarm signal when screw missed in a cycle.</p>		

30) Middle count number setting

Number	Unit	Range	Initial
P83		0 ~ 99	0
Description	When the count number reaches to the Middle count number, count complete signal OUT become ON till the total count is completed. Signal types on P82 are ignored on this feature "0" : No use " 1~99" : Middle count number		

31) Free speed setting

Number	Unit	Range	Initial
P84	rpm	0 ~ max speed	-
Description	Speed setting for the angle on P51 ~ 58. The screwdriver runs with this speed and change speed to it's auto speed. "0" = No use		

32) Free reverse rotation

Number	Unit	Range	Initial
P85		0 or 255	0
Description	Free reverse rotation is available for screw tightening process by selecting one or more preset #. Free reverse rotation angle can be set on P98 Selecting preset# on the front panel of controller, key in the numeric numbers as below for each preset# Preset #1 : 1 Preset #5 : 16 Preset #2 : 2 Preset #6 : 32 Preset #3 : 4 Preset #7 : 64 Preset #4 : 8 Preset #8 : 128 For multiple choosing preset numbers, just add numeric numbers for each preset #. (Example) Preset #1 & 5 = 17 (1+16) Preset #4, 6 & 8 = 168 (8+32+128)		

33) Output pin #5 management (Driver Lock / Angle count reset)

Number	Unit	Range	Initial
P86		0 or 1	0
Description	Angle count reset	Disable (0) ... Lock	Enable (1)

34) Auto speed by torque setting

Number	Unit	Range	Initial
P88		0 or 1	1
Description	The speed setting is automatically selected by program according to the torque setting. "0" : Disable "1" : Enable		

35) No torque complete Error

Number	Unit	Range	Initial
P89		0 or 1	0
Description	If operator release the trigger lever and stop operation of screwdriver after screw seating point without completing cycle, it gives a error alarm "0" : Disable "1" : Enable		


36) Screw count number setting

Number	Unit	Range	Initial
P90		0 ~ 99	5
Description	Screw number for counting screws.		

37) Reverse lock setting

Number	Unit	Range	Initial
P91		0 ~ 1	1
Description	Enable/ Disable of Reverse rotation switch 0 : Disable 1 : Enable		

38) Trigger start setting

Number	Unit	Range	Initial
P92		0 ~ 1	0
Description	Trigger () start Enable/Disable with start lever 0 : Disable 1 : Enable		

39) Reverse start setting

Number	Unit	Range	Initial
P93		0 ~ 1	0
Description	Reverse rotation switch can start the driver in reverse by pushing it. 0 : Disable 1 : Enable		

40) Baud rate setting of RS232C

Number	Unit	Range	Initial
P97		0 ~ 3	2
Description	Baud rate of RS232C is selectable 0 : 9,600 bps 1 : 19,200 bps 2 : 38,400 bps 3 : 57,600 bps		

41) Free reverse rotation angle

Number	Unit	Range	Initial
P98	turn	0 ~ 10.0	0
Description	Free reverse rotation angle setting 0 : Disable 0.1 ~ 10.0 : Reverse angle before fastening		

42) Free reverse rotation Enable/Disable

Number	Unit	Range	Initial
P100		0 or 1	0
Description	Selectable Free reverse rotation (Enable/Disable) 0 : Disable 1 : Enable		

43) Free reverse rotation speed setting

Number	Unit	Range	Initial
P101	rpm	0 ~ 1,000	0
Description	Free reverse rotation speed setting 0 : No use 1 ~ 1,000 : Free reverse speed		

44) Free speed setting

Number	Unit	Range	Initial
P102	rpm	0 ~ 1,000	0
Description	Free speed setting 0 : No use 1 ~ 1,000 : Free speed in free speed angle		

45) Engaging torque detection Enable/Disable

Number	Unit	Range	Initial
P103		0 or 1	0
Description	Selectable Free reverse rotation (Enable/Disable) 0 : Disable 1 : Enable		

46) Engaging torque detection speed setting

Number	Unit	Range	Initial
P104	rpm	0 ~ 1,000	0
Description	Free reverse rotation speed setting 0 : No use 1 ~ 1,000 : Free reverse speed		

47) Engaging torque detection level

Number	Unit	Range	Initial
P105	%	0 ~ 50	0
Description	Engaging torque value setting 0 : No use 1 ~ 50% : Percentage of the target torque		

48) Engaging torque detection angle limit

Number	Unit	Range	Initial
P106	turn	0 ~ 20.0	0
Description	Engaging torque detection angle limit 0 : No use 1 ~ 20 turn : Engaging torque can be detected before the angle limit		

49) Engaging torque detection time limit

Number	Unit	Range	Initial
P107	sec	0 ~ 10.0	0
Description	Engaging torque detection time limit 0 : No use 1 ~ 10.0 : Engaging torque can be detected before the time limit		

50) Preset # selecting for Engaging torque detection

Number	Unit	Range	Initial								
P108		0 ~ 255	0								
Description	<p>Engaging torque detection is available for screw tightening process by selecting one or more preset #.</p> <p>Selecting preset # on the front panel of controller, key in the numeric numbers as below for each preset #</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Preset #1 : 1</td> <td style="width: 50%;">Preset #5 : 16</td> </tr> <tr> <td>Preset #2 : 2</td> <td>Preset #6 : 32</td> </tr> <tr> <td>Preset #3 : 4</td> <td>Preset #7 : 64</td> </tr> <tr> <td>Preset #4 : 8</td> <td>Preset #8 : 128</td> </tr> </table> <p>For multiple choosing preset numbers, just add numeric numbers for each preset #.</p> <p>(Example)</p> <p>Preset #1 & 5 = 17 (1+16)</p> <p>Preset #4, 6 & 8 = 168 (8+32+128)</p>			Preset #1 : 1	Preset #5 : 16	Preset #2 : 2	Preset #6 : 32	Preset #3 : 4	Preset #7 : 64	Preset #4 : 8	Preset #8 : 128
Preset #1 : 1	Preset #5 : 16										
Preset #2 : 2	Preset #6 : 32										
Preset #3 : 4	Preset #7 : 64										
Preset #4 : 8	Preset #8 : 128										

51) Angle monitoring start from Engaging torque detection

Number	Unit	Range	Initial
P109		0 or 1	0
Description	Angle monitoring start from Engaging torque Enable/Disable 0 : Disable 1 : Enable		

52) Auto reverse rotation after tightening Enable/Disable

Number	Unit	Range	Initial
P110		0 or 1	0
Description	Auto reverse rotation after tightening process Enable/Disable 0 : Disable 1 : Enable		

53) Auto reverse rotation speed

Number	Unit	Range	Initial
P111	rpm	0 ~ 1,000	0
Description	Auto reverse rotation speed setting 0 : No use 1 ~ 1,000 : speed for auto reverse		

54) Auto reverse rotation angle

Number	Unit	Range	Initial
P113	turn	0 ~ 20.0	0
Description	Auto reverse rotation angle setting 0 : No use 1 ~ 20.0 : Auto reverse angle		

55) Preset # for Auto reverse rotation after tightening

Number	Unit	Range	Initial								
P114	turn	0 ~ 20.0	0								
Description	<p>Auto reverse feature is available after screw tightening process by selecting one or more preset #.</p> <p>Selecting preset # on the front panel of controller, key in the numeric numbers as below for each preset #</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Preset #1 : 1</td> <td style="width: 50%;">Preset #5 : 16</td> </tr> <tr> <td>Preset #2 : 2</td> <td>Preset #6 : 32</td> </tr> <tr> <td>Preset #3 : 4</td> <td>Preset #7 : 64</td> </tr> <tr> <td>Preset #4 : 8</td> <td>Preset #8 : 128</td> </tr> </table> <p>For multiple choosing preset numbers, just add numeric numbers for each preset #.</p> <p>(Example)</p> <p>Preset #1 & 5 = 17 (1+16)</p> <p>Preset #4, 6 & 8 = 168 (8+32+128)</p>			Preset #1 : 1	Preset #5 : 16	Preset #2 : 2	Preset #6 : 32	Preset #3 : 4	Preset #7 : 64	Preset #4 : 8	Preset #8 : 128
Preset #1 : 1	Preset #5 : 16										
Preset #2 : 2	Preset #6 : 32										
Preset #3 : 4	Preset #7 : 64										
Preset #4 : 8	Preset #8 : 128										

56) Error history (except the pattern error)

Number	Unit	Range	Initial								
P160~167											
Description	<p>The total 8 latest errors except the pattern error is recorded from P160 to P167.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">P160 : The last error</td> <td style="width: 50%;">P164 : The last error -4th</td> </tr> <tr> <td>P161 : Before the last error</td> <td>P165 : The last error -5th</td> </tr> <tr> <td>P162 : The last error -2nd</td> <td>P166 : The last error -6th</td> </tr> <tr> <td>P163 : The last error -3rd</td> <td>P167 : The last error -7th</td> </tr> </table>			P160 : The last error	P164 : The last error -4th	P161 : Before the last error	P165 : The last error -5th	P162 : The last error -2nd	P166 : The last error -6th	P163 : The last error -3rd	P167 : The last error -7th
P160 : The last error	P164 : The last error -4th										
P161 : Before the last error	P165 : The last error -5th										
P162 : The last error -2nd	P166 : The last error -6th										
P163 : The last error -3rd	P167 : The last error -7th										

57) Others

No	Description
P169	Software version
The rest parameter numbers are spare or vacant address.	

7.7 Error code

1) System error

code	Error	Description	How to reset
110	AD offset error	When the power of controller is ON, the current offset is out of range. Reset and retry booting. If failed, repair is required	RESET button
111	SMPS Fault by overload	Overload protection over 8A on SMPS power supply circuit.	Power Off →On after 1 min.
112	Over speed	Over rotation speed than the set value. Check the cable connection.	Auto reset after 1 sec.
113	Communication error	Communication error during connected	Power Off →On
114	Screwdriver recognition error	Controller can not recognize the connected screwdriver	Power Off →On
115	Controller recognition error	Program itself can not recognize the controller information.	Power Off →On
118	No motor rotation error	When motor rotation is not monitored	RESET button
200	Parameter reading failure	It failed to read parameter at all. Check the EEPROM damage or communication failure	Power Off →On
201	Parameter Checksum error	The read parameter is wrong by the checksum routine	Power Off →On
220	Multi-sequence program error	Multi-sequence program is wrong	RESET button

2) Pattern error

code	Error	Description	How to reset
300	Fastening time limit	Over the fastening time limit on P60	Auto reset after set time
301	Loosening time limit	Over the loosening time limit on P61	Auto reset after set time
302	Angle limit during ramp-up	Angle is over the setting limit on P73 during ramp-up	
303	Angle limit during torque holding(Tm)	Angle is over the setting on P72 during torque holding	
304	Motor stall by loosening failure	Motor stall by loosening failure within time limit on P62	Auto reset after set time
310	Time over in screw counting	Over the time limit of screw counting on P81	Auto reset after set time
311	Screw missing	When the work-piece moves out of the working area without complete number of fastening, it provide alarm for 3 seconds and display the latest number. It can be clear to "0" by pressing RESET button.	Auto reset after set time or RESET button
330	No torque-up	When the driver stops without torque-up after set time in P21~28	Auto reset after set time
331	Angle laps	Torque up too earlier than the time on P21~28	Auto reset after set time
332	Angle over	There is no torque up over the set max. angle on P31~38	Auto reset after set time
333	No torque complete	Operation stops before complete cycle of torque up by releasing lever trigger	Auto reset after set time

7.8 Preset number selecting by sensor

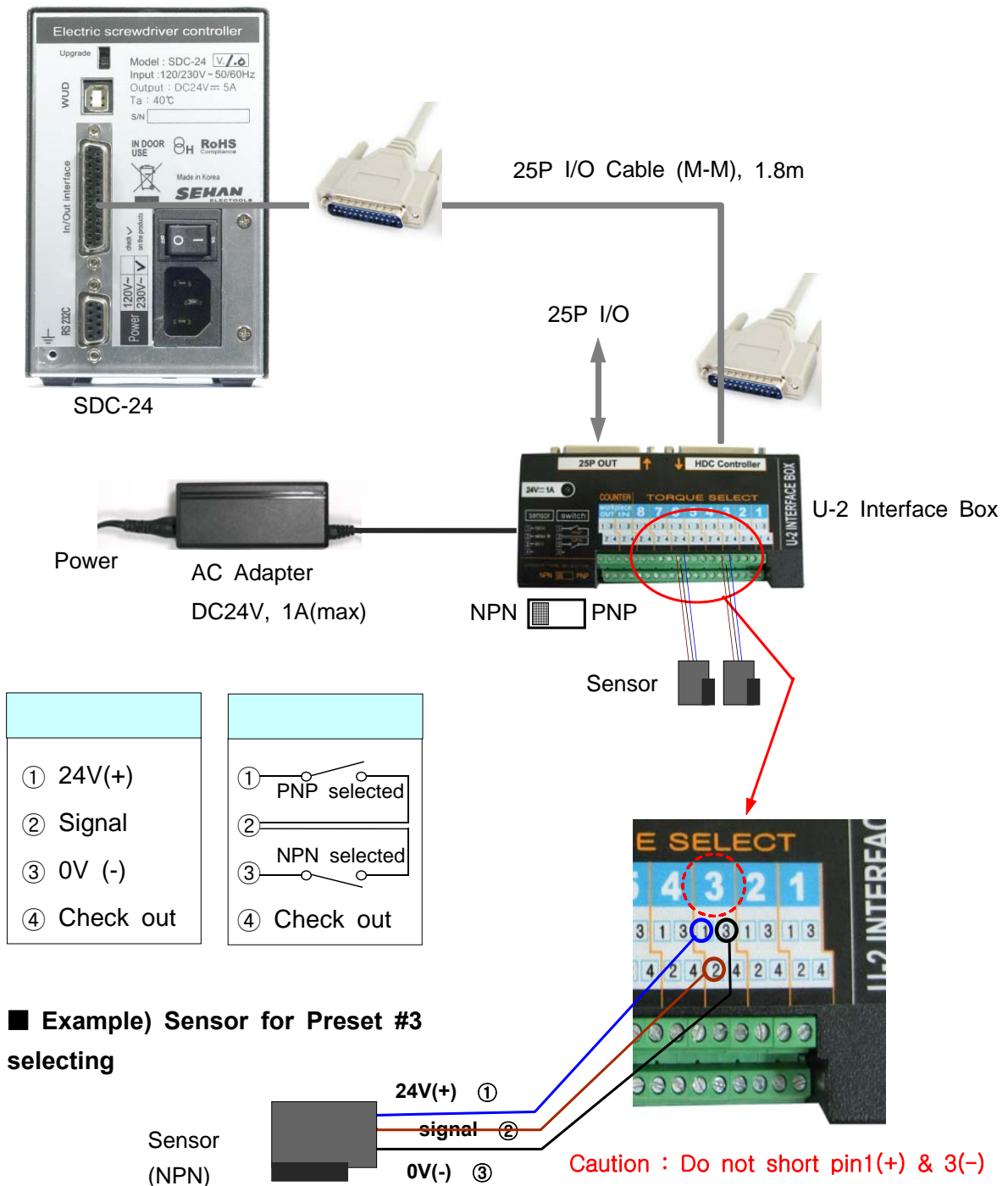
The 8 sensor on U-2 Interface Box are linked to 8 preset numbers through 25P I/O interface. These ports are designed for sensors to be wired directly. When the sensor 1 is activated, the preset no.1 is selected accordingly. The configuration of 25P I/O port is different by the setting on P20.

[P20 Setting] Select " 0 "

"0" : Torque selector by Sensor

"1" : Remote control I/O for PLC

The sensor can be replaced to the switch (mechanical switch)

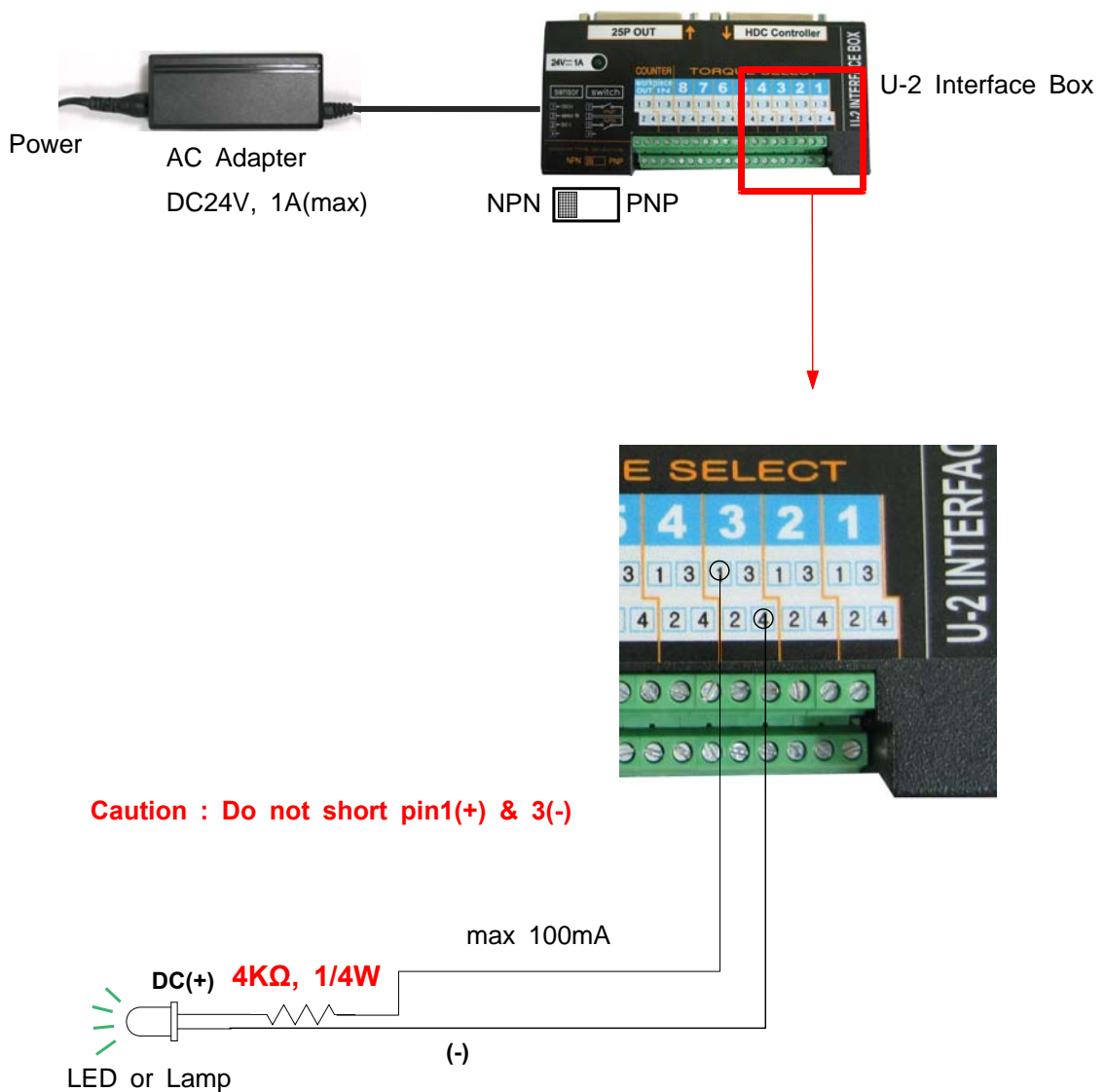


7.9 Wiring example of check out signal output

The pin no.4 (status check out signal) of each sensor port 1 to 8 is useful to check which preset number is selected by the LED, if LED is wired. The LED will require the external or internal DC power source for lighting.

The wirings for both power sources are as below

[P20 Setting] Select " 0 "



Depend on the LED or lamp, the resistance value should be calculated for protection of LED

7.10 Preset number selecting by 25P I/O port

The 25P I/O port is useful interface with the PLC. The PLC can select one of the 8 preset numbers through 3 pins. It can not be used together with the direct sensor port

For 25P I/O port, choose "1" on the parameter P20.

By binary coding with 3 pins (pin no.1,2 and 3) among 25 pins, it make 1 to 8 decimal preset number. The torque selecting code should be before the Start signal.

1) Binary coding with 3 pins

Preset no.	pin ③	pin ②	pin ①	pin ⑧
1	0	0	0	
2	0	0	1	
3	0	1	0	
4	0	1	1	
5	1	0	0	
6	1	0	1	
7	1	1	0	
8	1	1	1	
Multi A			0	1
Multi B			1	1

7.11 25 PIN I/O configuration

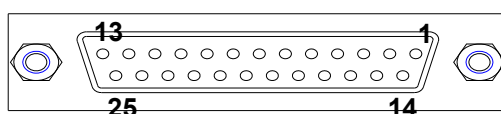
The configuration of 25P I/O port is different by the setting on P64.

[P20 Setting]

"0" : Torque selector by Sensor

"1" : Remote control I/O for PLC




"2" : Torque selector by Sensor (Input) + Remote control I/O for PLC (Output)



25P D-SUB connector



7.11.1 25 PIN I/O configuration for Preset # selecting by sensors

[P20 Setting] " 0 " : Torque selector by Sensor

PIN no.	Configuration	IN / OUT
1	Torque select IN1	<p>INPUT (to Controller)</p> 
2	Torque select IN2	
3	Torque select IN3	
4	Torque select IN4	
5	Torque select IN5	
6	Torque select IN6	
7	Torque select IN7	
8	Torque select IN8	
9	Reset (include cycle reset) or Work-piece move OUT from area (P76 "3" selected)	<p>OUTPUT (from controller)</p> 
19	Work-piece move IN to area	
23	Model select IN1	
24	Model select IN2	
10	Status of torque select OUT1	
11	Status of torque select OUT2	
12	Status of torque select OUT3	<p>OUTPUT (from controller)</p> 
13	Status of torque select OUT4	
14	Status of torque select OUT5	
15	Status of torque select OUT6	
16	Status of torque select OUT7	
17	Status of torque select OUT8	
18	ALARM (NG)	
20	Cycle count complete	
25	Fastening OK OUT	
21	Output COM	
22	Input COM	

7.11.2 25P I/O configuration for PLC



[P20 Setting] - " 1 " : Remote control I/O for PLC

PIN no.	Configuration	IN / OUT	
1	Torque select IN1	<p>INPUT (to Controller)</p> 	
2	Torque select IN2		
3	Torque select IN3		
4	START		
5	Driver Lock (P86 : 0) Angle count start by signal (P86 : 1)		
6	F/R (Forward 0, Reverse 1)		
7	Model select IN3		
8	Multi-sequence (8-1) MA:1-0, MB:1-1		
9	Reset (include cycle reset) or Work-piece move OUT from area (P76 "3" selected)		
19	Work-piece move IN to area		
23	Model select IN1		
24	Model select IN2		
10	Error code OUT1		<p>OUTPUT (from controller)</p> 
11	Error code OUT2		
12	Error code OUT3		
13	Error code OUT4		
14	Status of F/R OUT (F:0, R:1)		
15	Torque up (without verifying result)		
16	Status of Motor Run OUT		
17	READY		
18	ALARM (NG)		
20	Cycle count complete		
25	Fastening OK OUT (Verifying OK)		
21	Output COM		
22	Input COM		

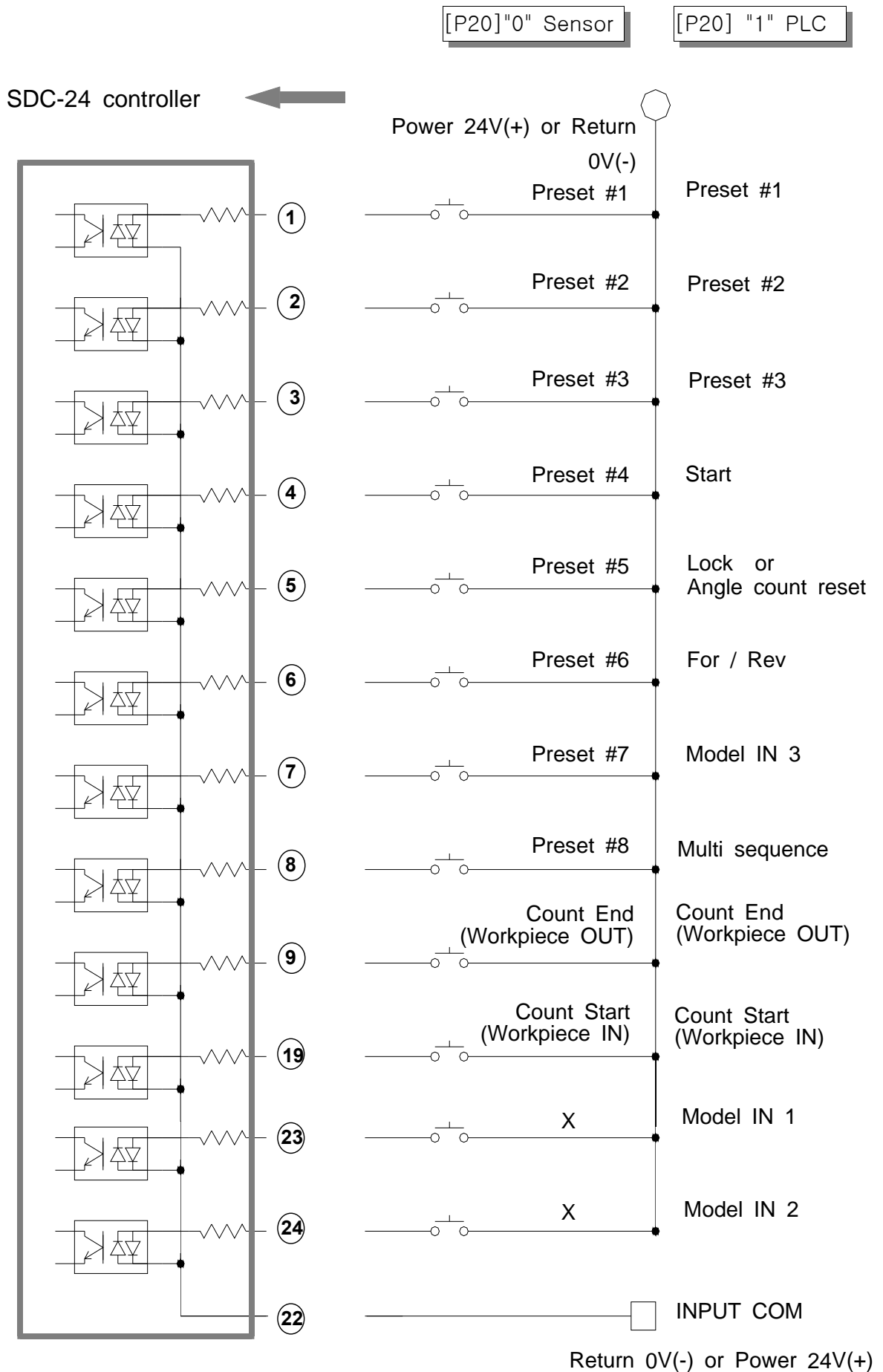
7.11.3 25P I/O configuration for

Torque selector by Sensor (Input) + PLC (Output)

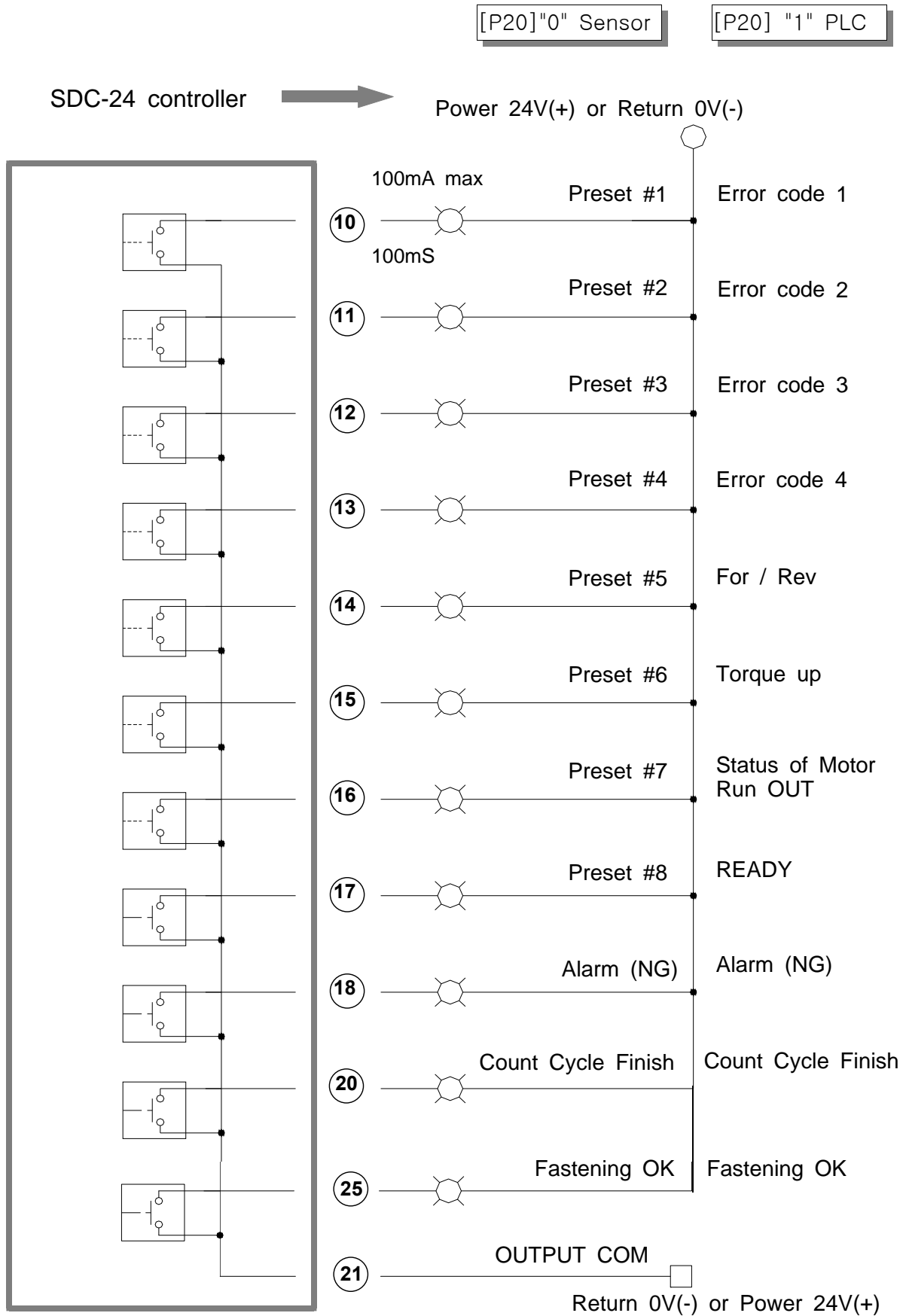
[P20 Setting] - " 2 " : Combined

PIN no.	Configuration	IN / OUT
1	Torque select IN1	INPUT (to Controller) 
2	Torque select IN2	
3	Torque select IN3	
4	Torque select IN4	
5	Torque select IN5	
6	Torque select IN6	
7	Torque select IN7	
8	Torque select IN8	
9	Reset (include cycle reset) or Work-piece move OUT from area (P80 "3" selected)	
19	Work-piece move IN to area	
23	Model select IN1	OUTPUT (from controller) 
24	Model select IN2	
10	Error code OUT1	
11	Error code OUT2	
12	Error code OUT3	
13	Error code OUT4	
14	Status of F/R OUT (F:0, R:1)	
15	Torque up (without verifying result)	
16	Status of Motor Run OUT	
17	READY	
18	ALARM (NG)	
20	Cycle count complete	
25	Fastening OK OUT (Verifying OK)	
21	Output COM	
22	Input COM	

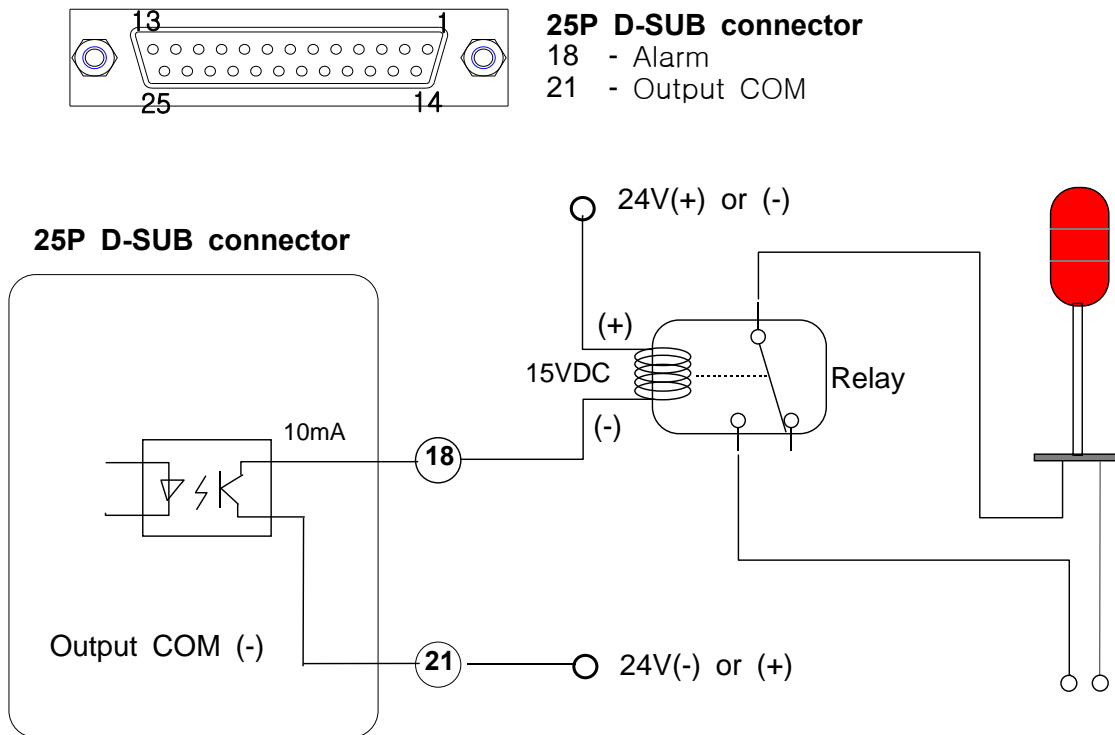
7.11.4 25P Interface schematic - INPUT



7.11.5 25P Interface schematic - OUTPUT



7.11.6 Wiring of the Alarm signal to the Tower Lamp

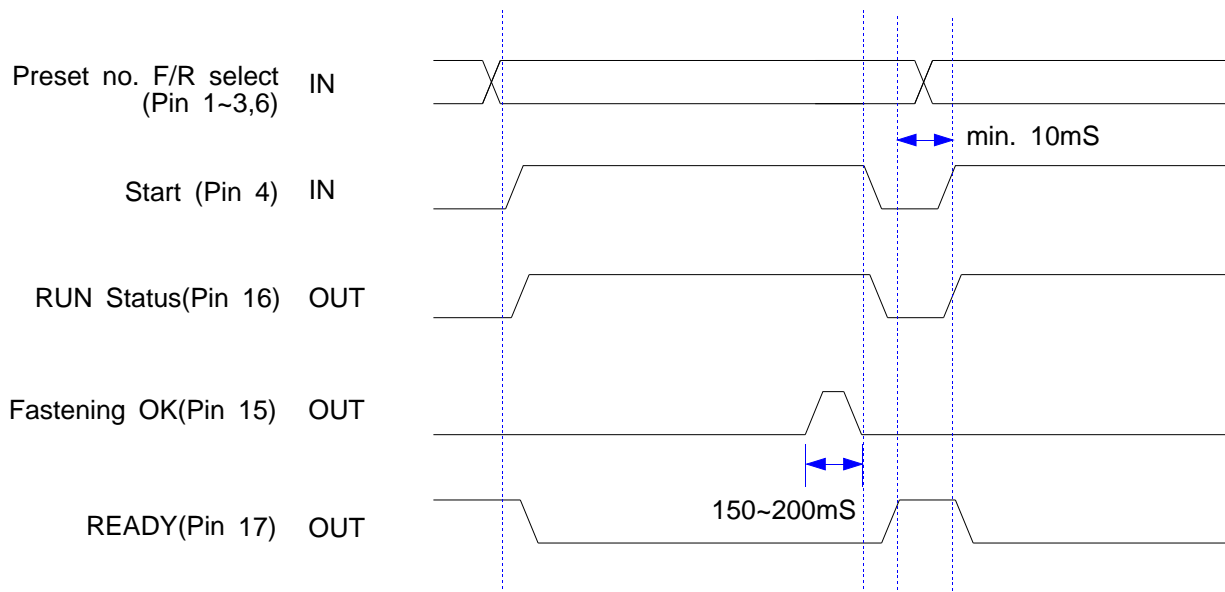


7.11.7 Error code pin composition on 25P Output _ [P20] "1" PLC selected

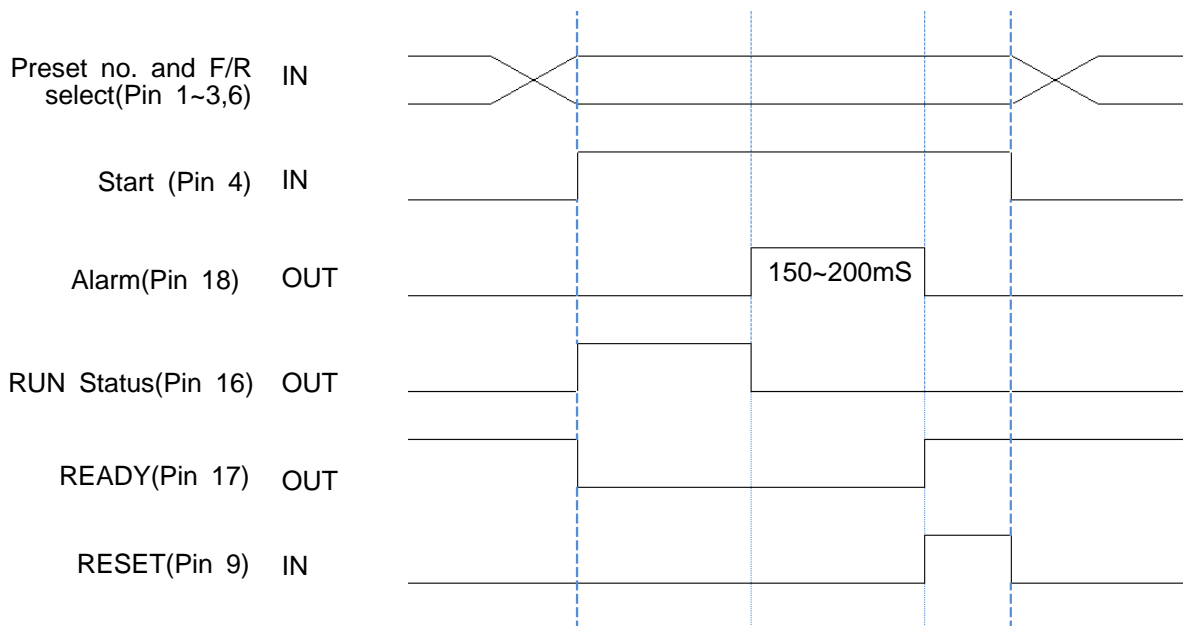
Error code	pin 10	pin 11	pin 12	pin 13
110	0	0	0	1
111	0	0	1	0
112	0	0	1	1
113	0	1	0	0
114,115,200,201	0	1	0	1
330, 333	0	1	1	0
331	0	1	1	1
332	1	0	0	0
220	1	0	0	1
300, 301	1	0	1	0
311	1	0	1	1
302	1	1	0	0
303	1	1	0	1
304	1	1	1	0
310	1	1	1	1

7.12 25PIN I/O timing chart

1) Fastening OK



2) Fastening NG



7.13 Built-in Screw Counter

(patent)

The screw counter has two basic features.

- ① Fastening quality verification (OK/NG)
- ② Monitoring the number of screws and verification OK/NG

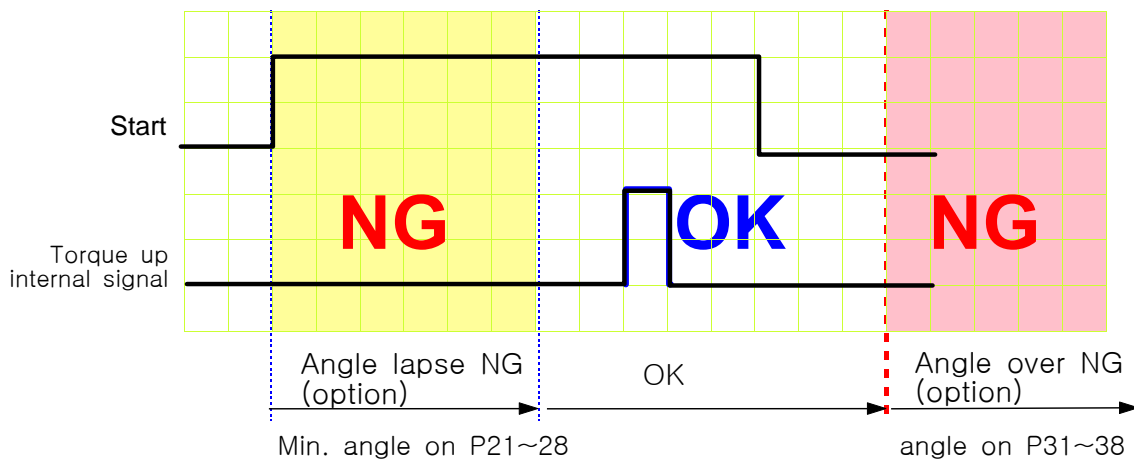
It has the additional features as below

- ① 4 different type of Count Start and Finish signal (selectable)
- ② Real time monitoring by PC program
- ③ Error code display and monitoring basic data including fastening time, angle

7.13.1 Fastening quality verification (OK/NG)

It count down one by one from the total target number with OK fastening.

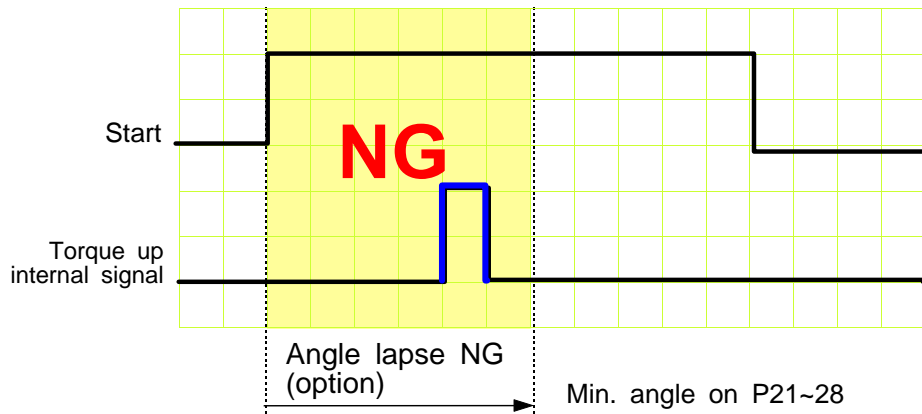
1) Fastening OK



- The driver is designed to stop automatically when the torque reach to the target. The fastening is finished. If there is set angle on P21~28, The only fastening over the set angle is OK.

- If fastening is not finished over maximum angle setting on P31~38, driver stops, and verify it as NG with error code **E332**

2) Fastening NG (Angle lapse) Error Code Display : **Er331**



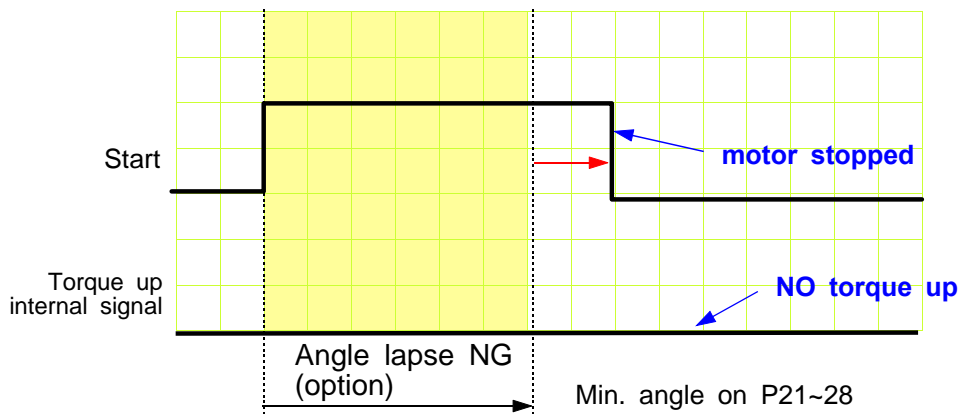
If the driver reach to the target torque before the Min. angle setting on P21 ~ 28, it is NG (Angle lapse)

Even the torque reached to the target, the screw is not fastened enough.

The LCD will display Er331 for set time and reset automatically.

3) Fastening NG (No Torque up) Error Code Display : **Er300**

If fastening is cancelled over Min. angle on P21 ~ 28, it displays error code 300 when this NG verification is selected on P78



The operator sometimes release the start lever just before the torque reach to the target. This is distinguished from the short idling run for screw pick-up from the screw presenter. And it is one of the serious quality failure.

7.13.2 Count Start & Stop signal to SDC-24 (parameter P80)

For SDC-24 to verify the missing screw, it require two basic signals ; Count start and stop. It will count the number of screw with Start signal, and verify OK as soon as it reach to the target number, or NG with Stop signal when the number of fastened screw is less than the target.

SDC-24 provides Count complete OK or NG Output signal, too.

The count complete OK means that a process of cycle is finished.

There are 4 different type of the Count start/Stop signals which is selectable on parameter P82 as below. Depend on the working area, one of them can be chosen.

The signal port for Count Start and Count complete OK is located on Count port of the back panel of SDC-24.

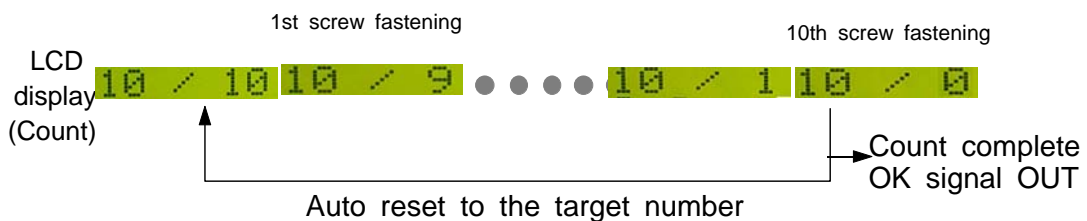
*** Refer to the page 51, 52 for wiring.

It is same as the preset no. selecting by sensor

1) Auto Reset (select "0" on P80)

When the count number reach to the target, it display " 0 " (remained number) on LCD and reset the number to the target immediately.

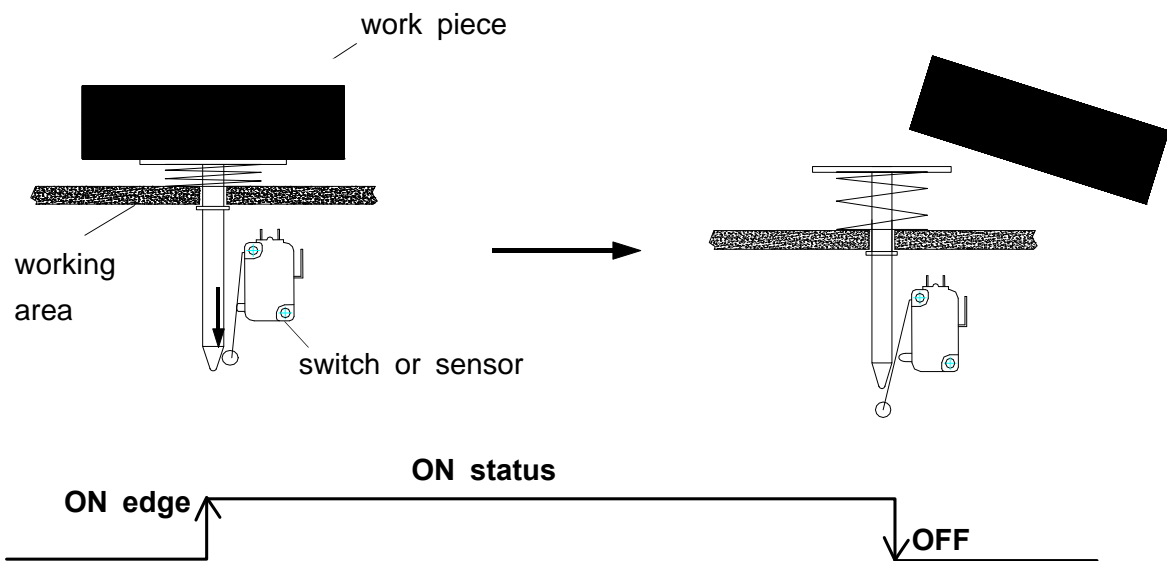
Example) the target screw number is "10"



SDC-24 starts to count the number of screw fastening without any signal from the external to SDC-24.

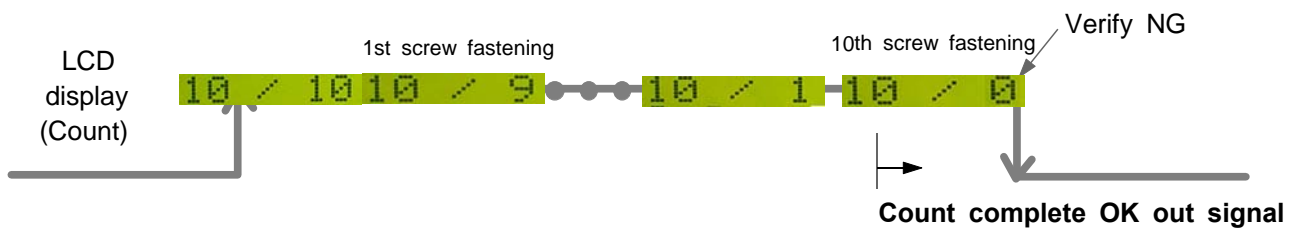
2) One continuous pulse type signal (select "1" on P80)

It starts counting the screw number from the ON signal edge and keep counting on ON status. If the number reaches to the target on ON status, it provide the Count complete OK out signal. It verify the NG when the ON status turned OFF which means that the fastening work is finished, because the work piece left the working area. If there is still remained number over 1 on LCD, it verify it NG with **error code Er311**

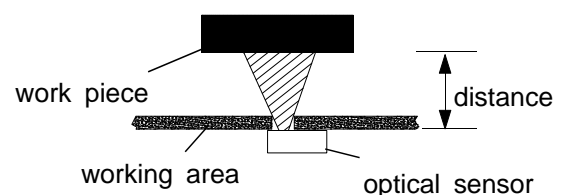


The display is reset to the target number when the Count Start signal is turned ON again.

Example) the target screw number is "10"



The above switch can be replace to the sensor as shown on right



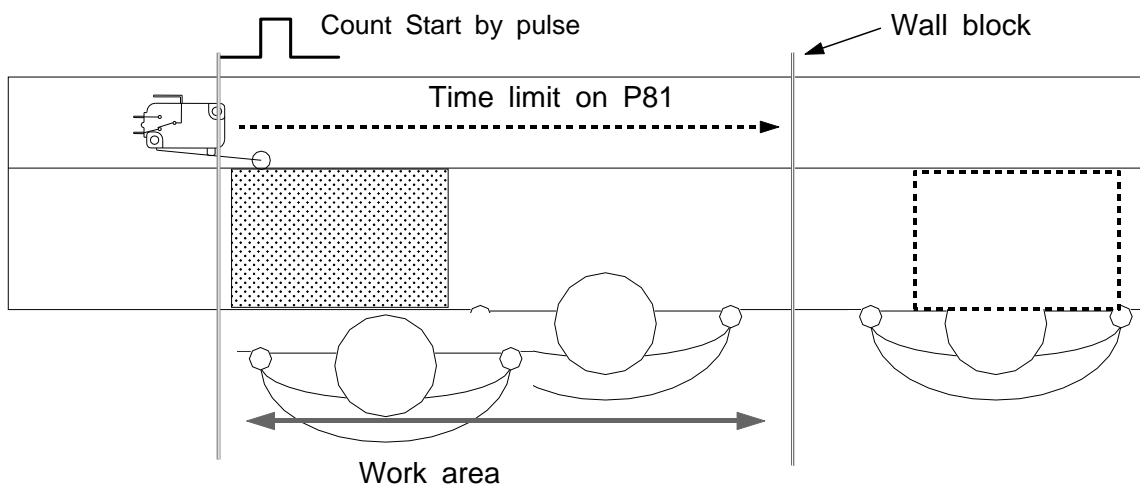
3) One Pulse type signal (select "2" on P80)

It starts counting number of screw on receipt of pulse signal. There is no Count Stop signal. When the counting reach to the target, it will provide the count complete OK output signal.

But if the time after start is limited on P81, SDC-24 will verify NG at the set time. If the fastening is not complete till the set time, it will verify NG with the error code **Er311** for 3 seconds and will display the number remained.

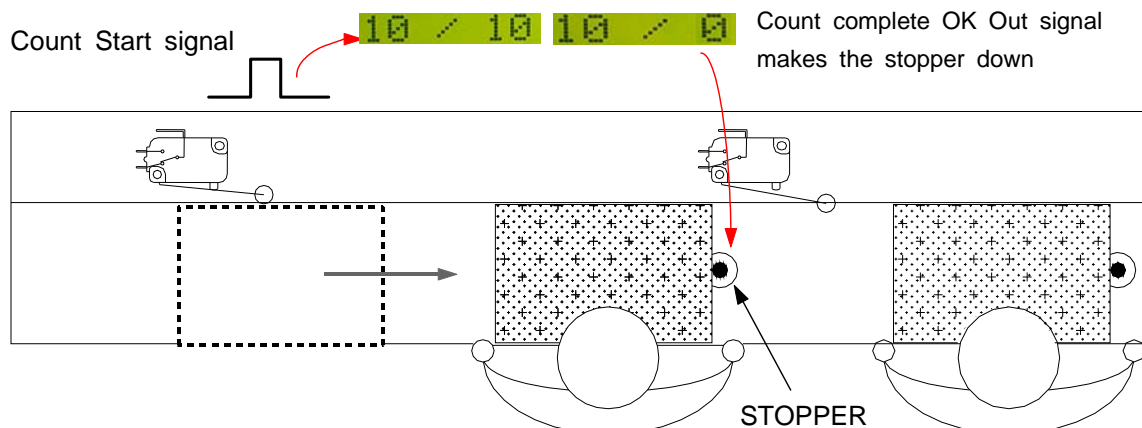
It can be clear to the target by pressing RESET button

Example #1) Count start pulse signal with time limit



Example #2) Count start pulse signal **without** time limit

Without the fastening time limit after Start on P81, it can be a useful application with a pallet conveyor system with stopper as shown below. The stopper does not go down keeping the work piece in work area, if there is no Count complete OK signal from the SDC-24.



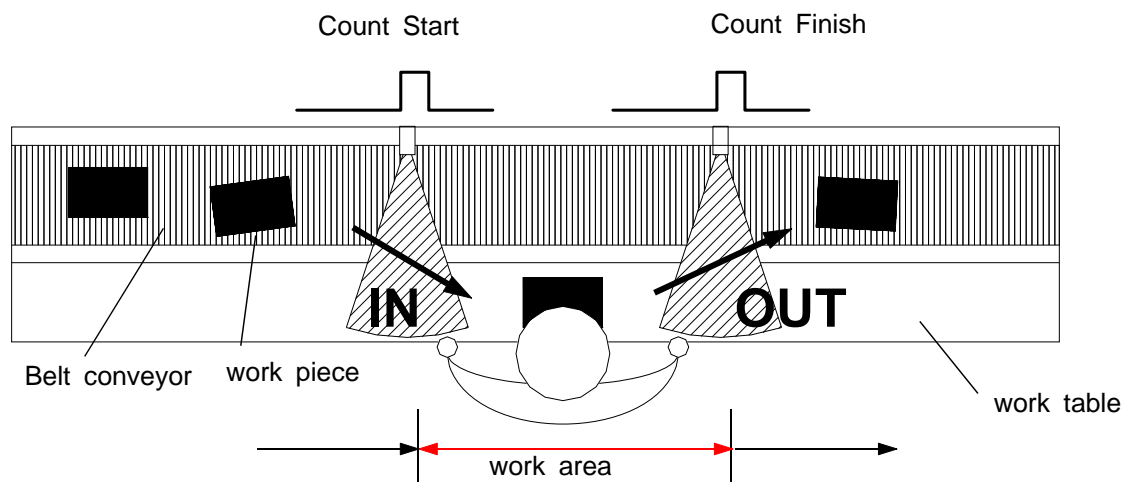
4) Two pulse type signal (select "3" on P80)

As shown the picture below, there are two pulse type signals. The left one is for Count Start and the right one is for Count stop signal. The right one detects work piece moving out of work area for verifying NG. If the count number does not reach to the target, it will provide error code **Er311**

The Count Start sensor or switch is wired to the COUNT port on the back.
The Count Stop sensor or switch is wired to pin 9 of the 25P I/O connector.
(refer to the page 37,38 for details)

The preset no. selecting on P20 should be "0", direct Sensor port

*** Refer to the page 51, 52 for wiring.
It is same as the preset no. selecting by sensor

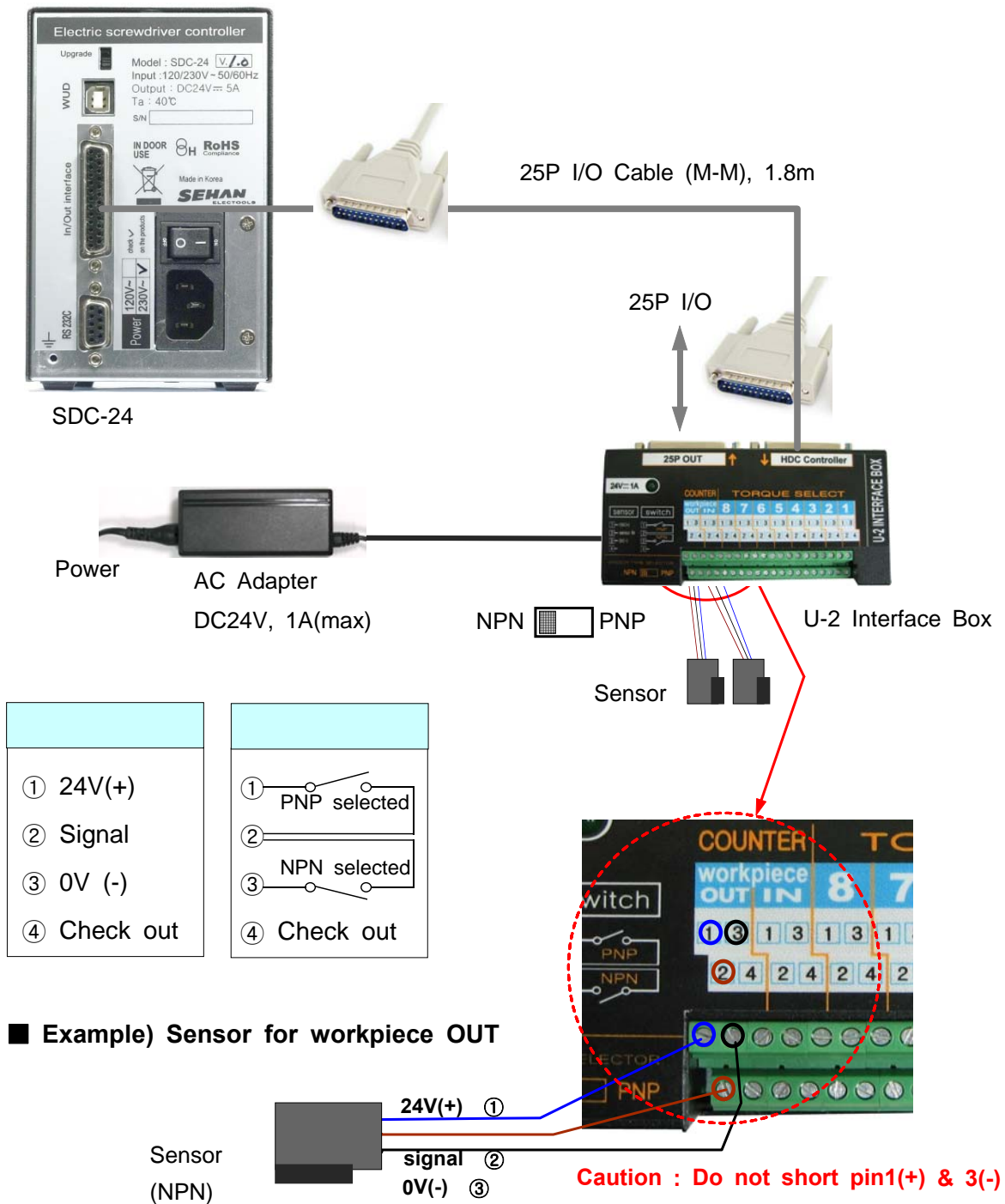


The above two sensors can be replaced to switches.

7.13.3 Wiring of Count Start & Stop

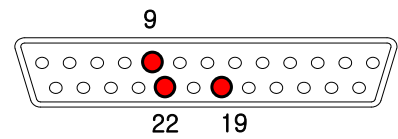
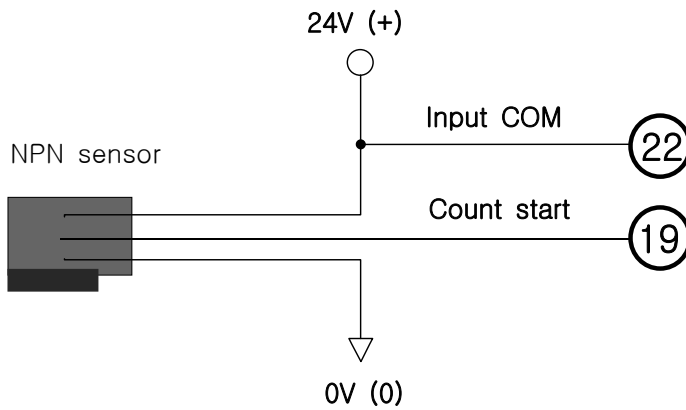
1) Count Start & Stop signal through U-2 Interface Box

U-2 Interface Box is very useful to connect sensors or switches for selecting preset #.



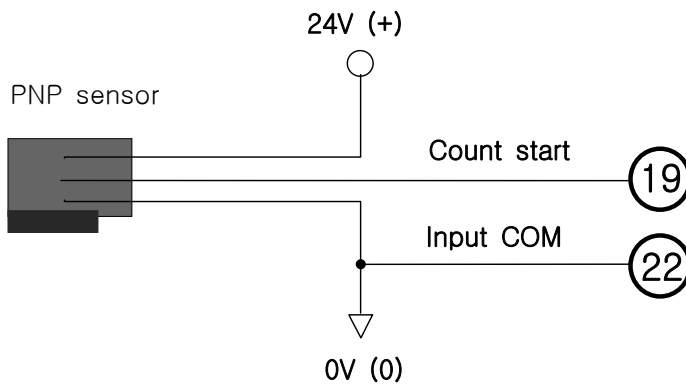
2) Direct wiring to 25P I/O interface port

■ SENSOR (NPN type)

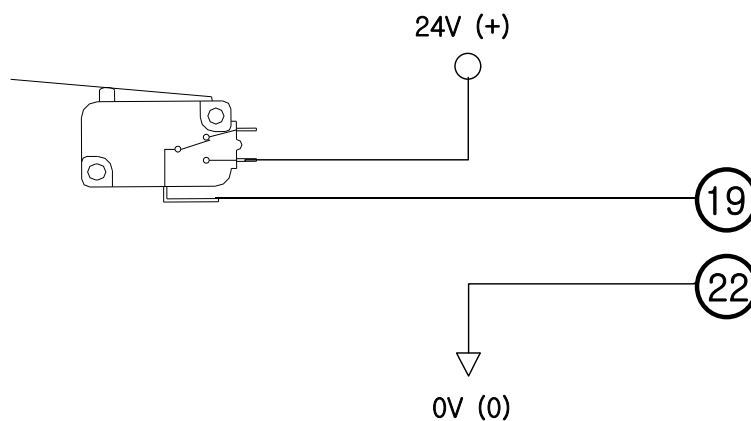


25P I/O D-Sub connector

■ SENSOR (PNP type)



■ Switch



7.13.4 Operation of Screw counter on SDC

The screw counter function of SDC controller can be used as a single fastening quality monitoring device.

■ Parameter setting for single

	parameter no.	Setting
Optional	P21 ~28	Key in the minimum angle on P21 to 28 for fastening OK of Preset no. 1 to 8
Optional	P31 ~38	Key in the maximum turn on P31 to 38 for fastening OK of Preset no. 1 to 8
※	P90	Key in the numbers of screw to count ex) Key in "5" on P90 --> 5 screws
※	P78	select one of Count Start signal type ex) select "2" One pulse type signal
Optional	└─┬─> P81	Time limit after the Count Start signal ex) Key in "200" for 20 seconds (unit 0.1 sec)

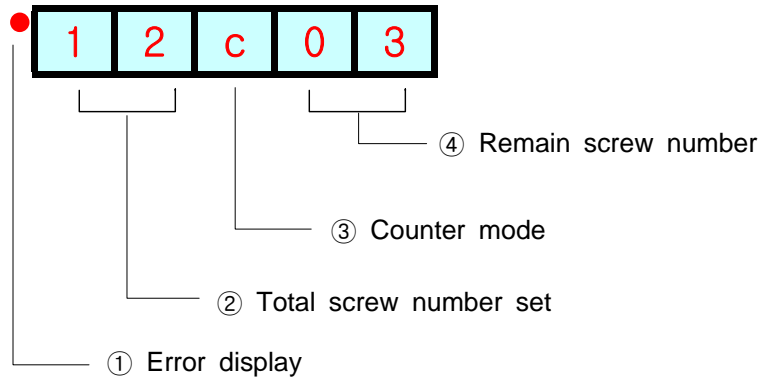
※ mark settings are always necessary.

After setting the parameter above, the LCD display will show

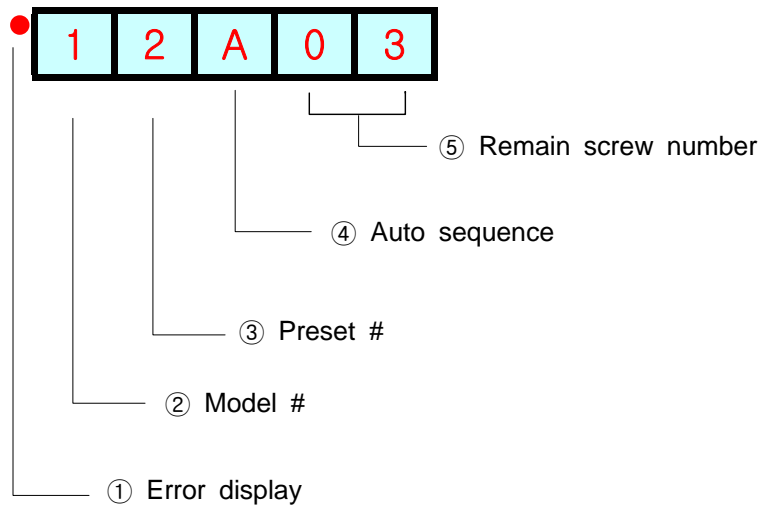


on the work mode. The number 05 will be decrease one by one against the screw fastening OK to "0". The number "0" will be reset to "05" on receipt of Count Start of "One pulse type signal"

7.13.5 FND display for Counter mode (select "3" on P29)
(for FND tversion only)



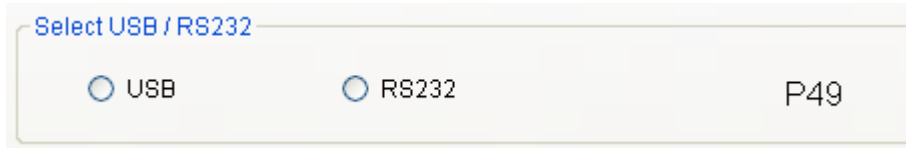
7.13.6 FND display for Model selecting
(for FND version with firmware v1.06 or lower)



8. USB communication

HDC controller has built-in RS232-USB converter. It has the USB com port which is converted from basic RS-232C protocol communication.

To use USB com port, select "USB" on P49.



8.1 port and Cable



USB COM cable [A-B]

8.2 USB Driver install

Before driver install, disconnect the cable.

Install file : HDC_40i USB driver.zip



Extract the provide file, and double click "Preinstaller.exe" for auto installation on PC.



9. RS-232C communication (Option)

The SDC controller has one RS-232C communication port.

Operator should choose one of communication port between USB or RS-232C on P49

These two communication port can not be used together at same time.

9.1 Connection

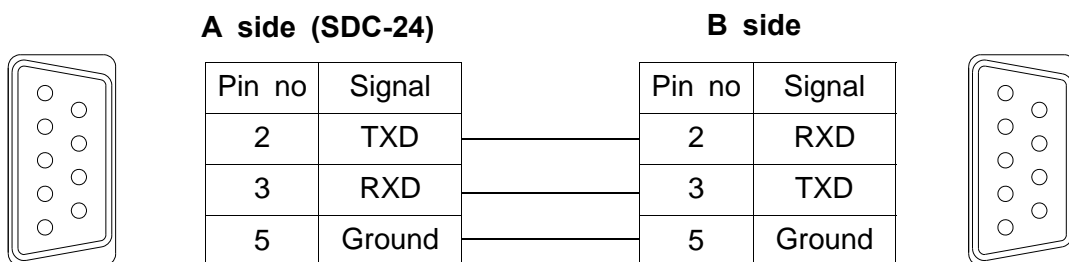
- 1) Select RS232 on P49 com port selecting.



- 2) Cable details

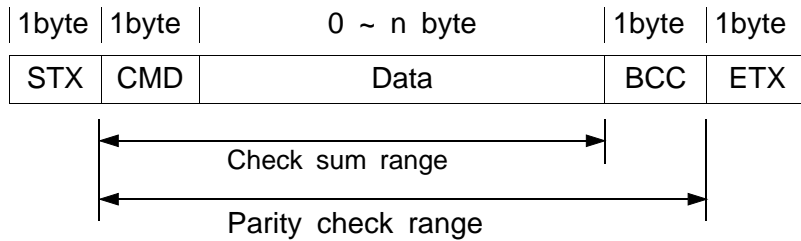


RS232C cable 2M Female-male



9.2 Protocol

9.2.1 Protocol frame



- Baud rate : 38400 BPS
- Data bit : 8bit
- Parity : None
- Stop Bits : 1

9.2.2 Communication control letter

Name	Word	Description
Packet start	STX	It means Packet start at the first of the message.
Packet finish	ETX	It means Packet end at the last of the message.
OK response	ACK	OK response on the message receipt
NOK response	NAK	NOK response on the message receipt
Packet end	ETB	It means the packet end of the first message of two blocks of long message

9.2.3 Command

The command for data request and response are same, but distinguished by the capital letter for request, the small letter for response.

no	Description	Command	Direction
1	Status request	V (capital)	PC → SDC-24
	Status response	v (small)	PC ← SDC-24
2	Parameter data request	P (capital)	PC → SDC-24
	Parameter data response	p (small)	PC ← SDC-24
3	Save the value of parameter	S (capital)	PC → SDC-24 <small>← ACK</small>
4	Monitoring data request	M (capital)	PC → SDC-24
	Monitoring data response	m (small)	PC ← SDC-24
5	Graph data request	G (capital)	PC → SDC-24
	Graph data response	g (small)	PC ← SDC-24

9.2.4 Check sum(BCC)

It add all binary number within Check sum range and convert to 1 Byte of ASCII code. The "35H" is check sum result (BCC) in the example shown.

STX	CMD	Data	BCC	ETX
-----	-----	------	-----	-----

Example)

STX	V	1	.	0	0	1	BCC	ETX	----- ASCII code
-----	---	---	---	---	---	---	-----	-----	------------------

STX	56	20	21	2E	30	30	31	BCC	ETX	----- Hexa code
-----	----	----	----	----	----	----	----	-----	-----	-----------------

```

5 6 H
2 0 H
3 1 H
2 E H
3 0 H
+ 3 0 H
-----
1 3 5 H ----- Hexa code
      ↓ ↓
      33H 35H ----- Hexa value of "5" in ASCII code

```

9.2.5 Command details

1) Status request and response

Request

STX	V	2	BCC	ETX
-----	---	---	-----	-----

Response

STX	v	1	1	2	2	3	3	3	3	4	4	4	5	BCC	ETX
-----	---	---	---	---	---	---	---	---	---	---	---	---	---	-----	-----

1 : Target count number on P90 (Model #1) (00 - 99)

2 : Current count number (remained) (00 - 99)

3 : Current Speed set (0000 - 1800)

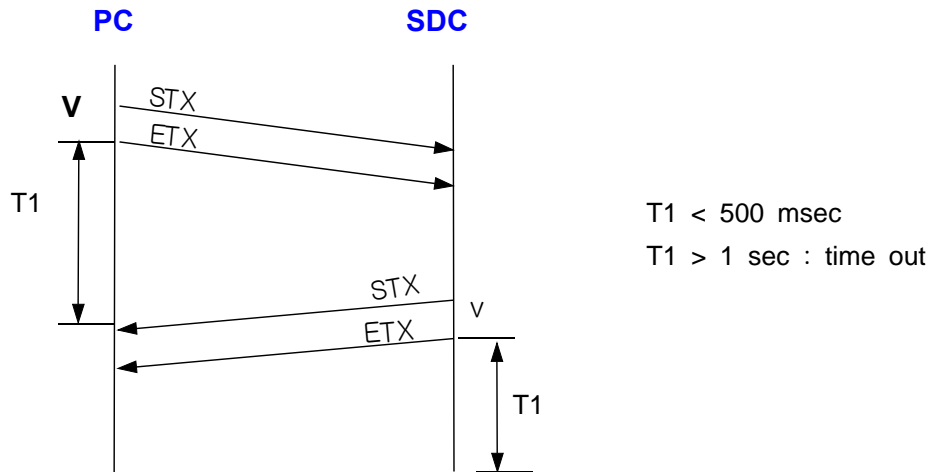
4 : Current Torque set / unit 0.1 (000 - 150)

5 : Fastening status

"0" : On fastening

"1" : Fastening OK

"2" : Fastening NG



2) Parameter data request and response

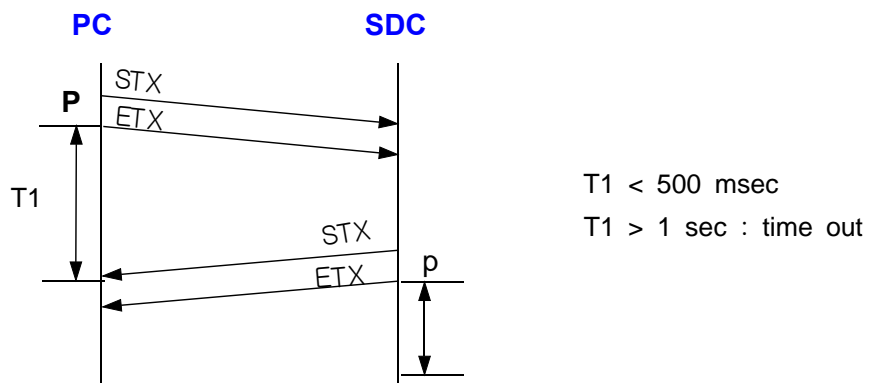
Request

STX	P	1	1	1	BCC	ETX
-----	---	---	---	---	-----	-----

Response

STX	p	2	2	2	2	BCC	ETX
-----	---	---	---	---	---	-----	-----

- 1 : Parameter no. / ex) key in "001" which means the parameter no P1
- 2 : Torque value of preset #1 in **4 digits** (0000 - 9999)
- Example) "0150" for 1.5 Kgf.cm in SD120 selected



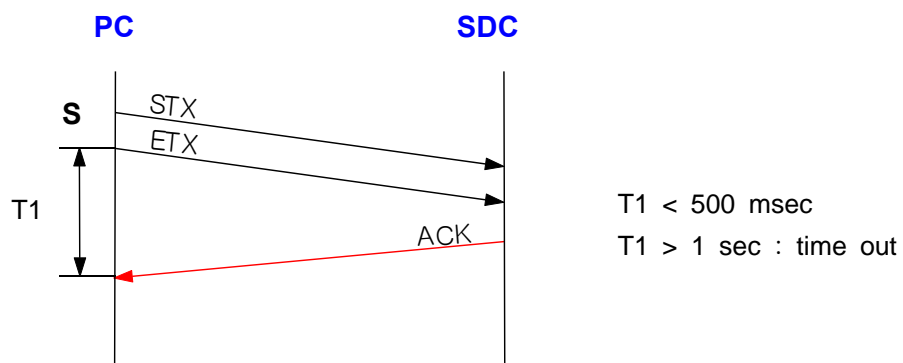
3) Save parameter data

Transmit		Parameter #			Data				BCC	ETX
STX	S	1	1	1	2	2	2	2	BCC	ETX

1 : Parameter no. / ex) key in "001" which means the parameter no P1

2 : Torque value of preset #1 in **4 digits** (0000 - 9999)

Example) "0150" for 1.5 Kgf.cm in SD120 selected



4) Request monitoring data

Request

STX	M	1	BCC	ETX	(Start)	STX	M	2	BCC	ETX	(Stop)
-----	---	---	-----	-----	---------	-----	---	---	-----	-----	--------

Response

STX	m	monitoring data as below				BCC	ETX
-----	---	--------------------------	--	--	--	-----	-----

Check mark on Enable on P30 (auto fastening data output), then every fastening data will be out at every event through RS-232 without data request command.

The output data consist of 13 fastening information as below

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----

STX	data	Serial no	Fastening time	Preset #	Torque	Converted torque	RPM	A1	A2	A3	Error no.	count no.	Fasten Loosen	status	Check Sum data	ETX
-----	------	-----------	----------------	----------	--------	------------------	-----	----	----	----	-----------	-----------	---------------	--------	----------------	-----

␣	m	9039000001	01350	1	0120	0122	1700	0330	0010	0340	101	02	1	1	8	␣
---	---	------------	-------	---	------	------	------	------	------	------	-----	----	---	---	---	---

Each data is divided by comma(,) between data.

example) ␣m9039001,01350,1,085,084,1700,0330,0010,0340,101,02,1,1,8 ␣

1. Start of Text (STX) : ␣
2. Data : m (monitoring) data
3. Serial no. : 9039000001 (2009, March / 10 digits)
4. Fastening time : 1350 ms
5. Preset # : 1
6. Torque setting : 8.5
7. Fastening torque (converted torque) : 8.4
8. Speed : 1700 rpm
9. A1 : Angle of A1 00.00/ 4 digits (3.3 turn)
10. A2 : Angle of A2 00.00/ 4 digits (0.1 turn)
11. A3 : Angle of A1 + A2 00.00/ 4 digits (3.4 turn)
12. Error code : 000 (No error, Fastening OK) if 301, error 301
13. Screw count # : 4 screws remained
14. For / Rev : Fastening (1), Loosening (0)
15. status : Complete (1), - (0)
16. Data check sum : See article 9.3.4
17. End of Text (EXT) : ␣

5) Request Torque graph data

Request

STX	G	C	1	BCC	ETX	(Start)
-----	---	---	---	-----	-----	---------

**** Request is required on every 500mS. If there is no request in 1 sec, torque graph data output will be canceled**

1. Packet start
2. Command (G : Torque Graph data request)
3. Data type : Current(C), Torque(T)
4. Sampling Rate : 1(5ms), 2(10ms), 3(15ms)
5. Checksum
6. Packet end

Response

1	2	3	4	5	6	7	8	9	10	11	12	13
STX	command	data type	Sampling Rate	Fastening Time	Torque	Converted torque	RPM	A1	A2	Data(200 data)	Check Sum data	ETX
↵	g	T	2	01000	085	084	0700	0330	0010	xx, ... yy,zz,	8	↵

← Data field →

Each data is divided by comma(,) between data.

1. Start of Text (STX) : ↵
2. Command : (g : torque data response)
3. Data type : Torque(T)
4. Sampling Rate : 2(10ms)
5. Fastening time : 1,000 mS
6. Torque setting : 8.5
7. Current converted torque : 8.4
8. Speed : 700 rpm
9. Angle on A1 : 3.3 turn
10. Angle on A2 : 0.1 turn
11. Torque data (current / torque) : 200 data
12. Data check sum : See article 9.3.4
13. End of Text (ETX) : ↵

6) Screwdriver information data request and response

Request

STX	D	1	1	1	BCC	ETX
-----	---	---	---	---	-----	-----

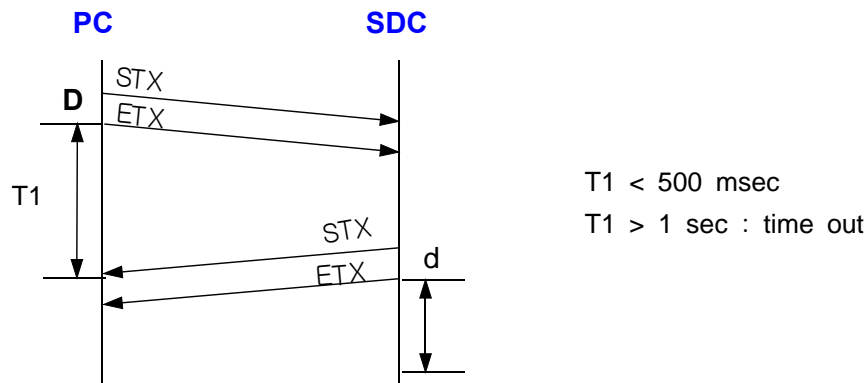
Response

STX	d	2	2	2	2	BCC	ETX
-----	---	---	---	---	---	-----	-----

1 : Parameter no. / ex) key in "001" which means driver parameter no.1

2 : Version value in 4 digits (0000 - 9999)

Example) "1009" for version 1.00.9



Screwdriver information data

Driver parameter	Data	Description
1	Software version	x 0.1 (unit)
2	Gear ratio	x 0.1 (unit)
3	Efficiency (%)	Standard = 100
4	Driver model	->See Model table
5	Calibration year	2 byte
6	Calibration month	2 byte
7	Calibration day	2 byte
8	No use	
9	S/N #1(last 2byte)	Total 8byte hexa --> 10 digits Decimal number ex) 41 B1 BC F9 -->1102155001
10	S/N #2(3rd 2byte)	
11	S/N #3(2rd 2byte)	
12	S/N #4(1st 2byte)	
13	Torque compensation data	P39 on SDC

Screwdriver Model table		
1	SD120Z	F_24V motor
2	SDA200Z	F_24V motor
3	SDA300	F_24V motor
4	SDA200	F_24V motor
5	SDA150ZM	M_30V motor
6	SDA200ZM	M_30V motor
7	SDA300M	M_30V motor
8	SDA200M	M_30V motor
9	SDA600M	M_30V motor
10	SD1500	M_30V motor
11	SD120	M_30V motor
12	SD200	M_30V motor
13	SD300	M_30V motor
14	SD600	M_30V motor

10. PC communication software, *Smart-Manager (for MS Windows)*

With free PC communication software, Smart-Manager, it is easy to set the parameters including torque, speed, fastening monitoring and quality control.

For changing parameters of controller by PC software, it require Log-in password.

For the manager Log-in password of Smart-Manager software, please contact to the distributor or service center. The password can not be open to operators without agreement of managing group. Smart-Manager without Log-in is available by request, too

10.1 Software install

- PC Operating System : MS Windows (2000, XP, Vista)
- Display : 1024 x 768 (Optimized)

The Hi-Manager software require MS Dot Net framework v 4.0 or higher on your OS before install.

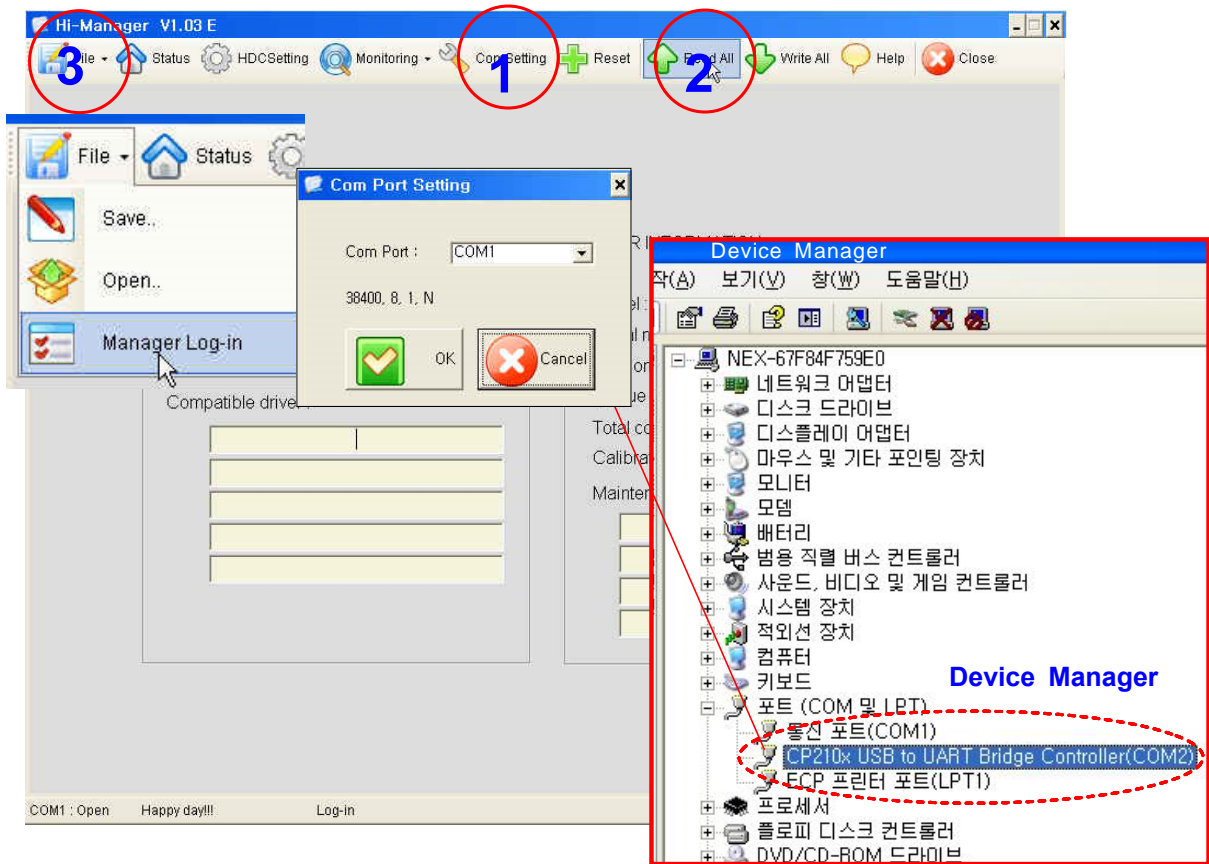
Window 2000 and XP can be updated with Dot Net framework on the download center of Microsoft web site. (www.microsoft.com).

Microsoft .NET Framework ver 4.0

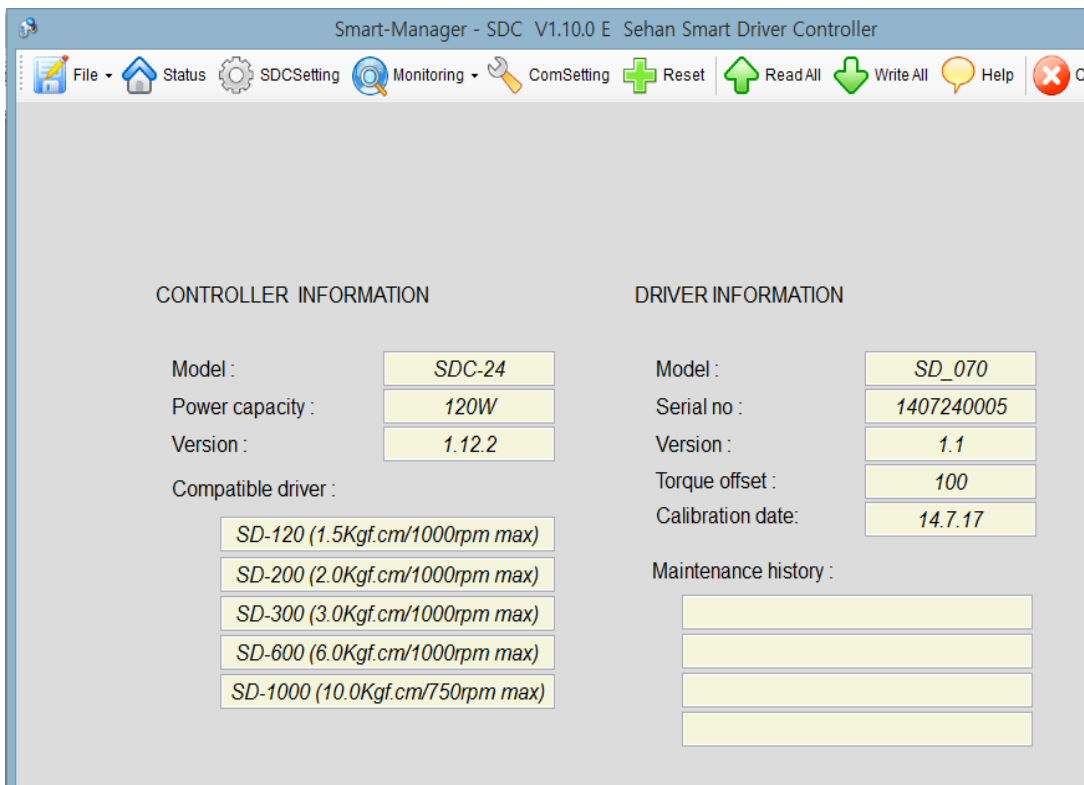
For installation of Hi-Manager, just copy the file (Smart-Manager.exe) on your PC, and double click for open.

10.2 How to use

- Install the provided USB driver (SDC-24 USB driver) on your PC
- Connect the SDC-24 controller to PC, and Power on.
- Check COM port no. for SDC-24 USB port on your PC.
example) **CP210x USB to UART Bridge Controller** (COM4)
- Open the *Smart-Manager* software
- Select the Comport no and click OK
- Click " READ ALL " menu for read all parameters from the connected SDC-24 controller.
- For changing parameter, it require Manager Log-in password.



If you can find Controller and Driver Information on the opening page as below, the communication is successful.



10.3 Parameter setting on *Smart-Manager*

1) Fastening Setting (SDC-24 Setting -->)

The screenshot shows the 'Fastening Setting' window in Smart-Manager. The main area contains a table with 8 rows of parameters:

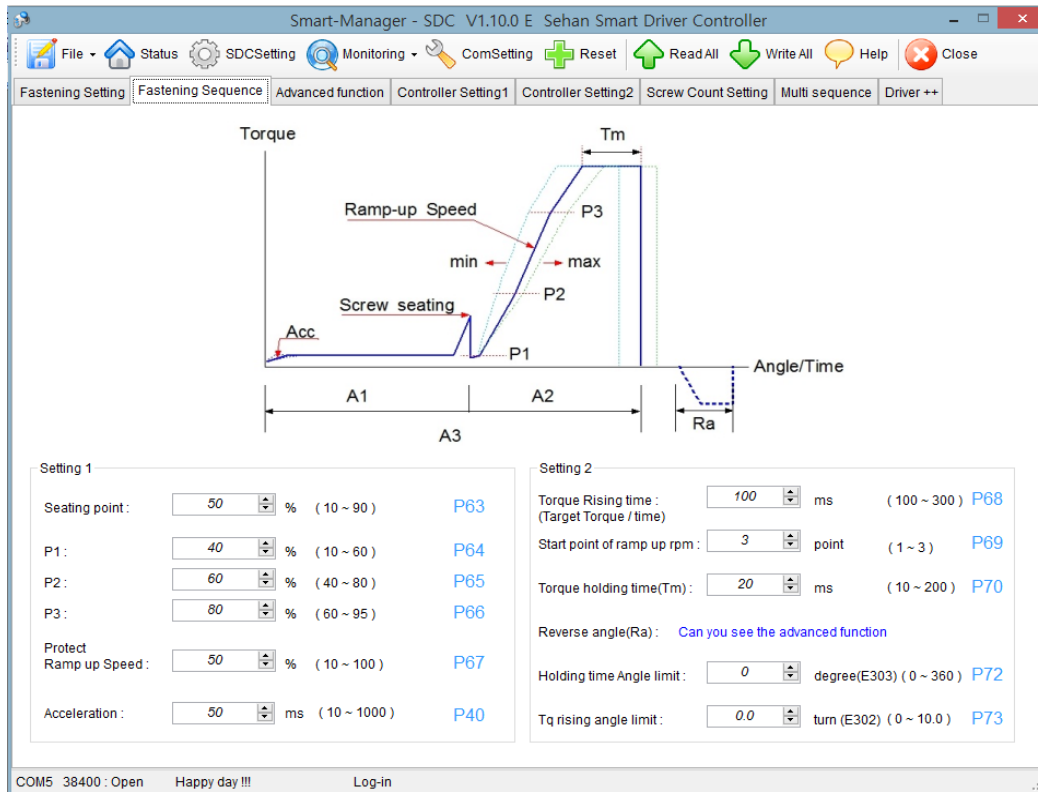
Preset no	TORQUE	SPEED (RPM)	MIN ANGLE (TURN)	MAX ANGLE (TURN)	SOFT START (ms)	FREE SPEED ANGLE(TURN)
1	0.50	735	0.0	0.0	0	0.0
2	0.70	935	0.0	0.0	0	0.0
3	0.40	635	0.0	0.0	0	0.0
4	0.20	435	0.0	0.0	0	0.0
5	0.50	735	0.0	0.0	0	0.0
6	0.50	735	0.0	0.0	0	0.0
7	0.50	735	0.0	0.0	0	0.0
8	0.50	735	0.0	0.0	0	0.0

Below the table are control panels for:

- Torque Unit:** Radio buttons for Kgf.cm (selected), Nm, Lbf.in, ozf.in, and cNm. A warning message states: "[Caution] Change of unit will reset the parameter to factory default setting".
- Min Angle control:** Radio buttons for 'No select' (selected), 'No TorqueUp after the Min angle(turn)->Error E330', 'TorqueUp before the Min angle(turn)->Error E331', and 'Both select'.
- Max Angle control:** Radio buttons for 'On the target Angel(turn)' (selected), 'Stop and verify OK', and 'Stop and verify NG -> Error E332'. A note says '* key in '0' notto use'.
- Start angle control:** Radio buttons for 'Disable' (selected) and 'Enable'.
- Auto speed:** Radio buttons for 'Disable' and 'Enable' (selected).

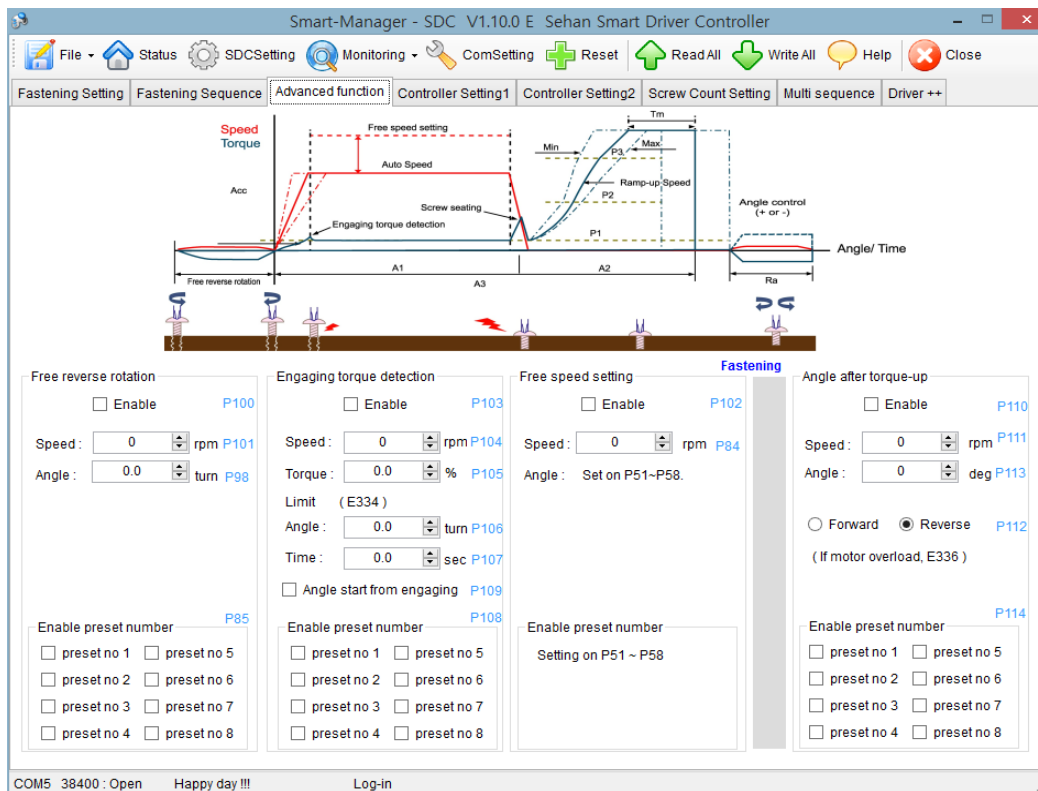
- Select the torque unit before setting other parameters. Otherwise all parameters changed to the factory setting after change of torque unit.
- Change or select parameters, and Click " WRITE ALL" menu to write new settings on the connected SDC-24 controller.
- To allow parameter change, be sure that it require **Manager Log-in** on File menu. Ask to the distributor for the **Log-in password**.
- Monitoring is possible without Manager Log-in.

2) Profile of fastening process

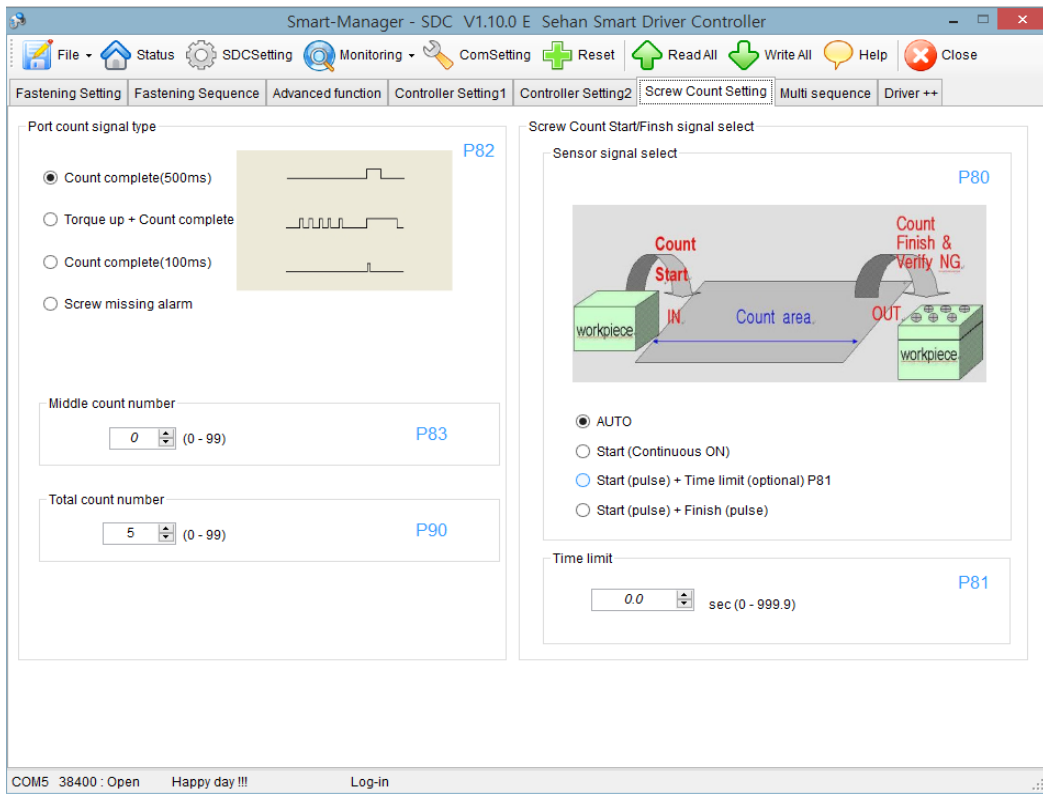


** Refer to 5.6 Parameter details

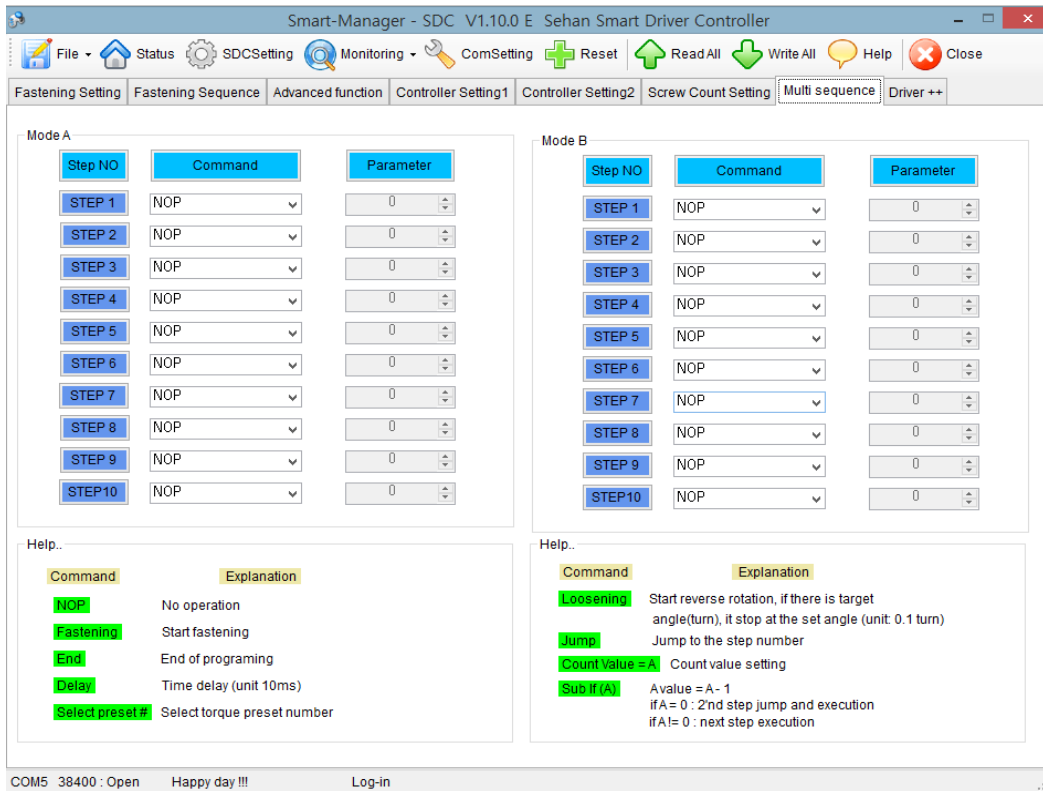
3) Advanced Fastening process



4) Counter Setting



5) Multi Sequence Setting (SDC Setting -->)



** Mode A, B comes after preset # 8 with displaying of mA, mB.

Fastening OK signal output after sequence. Each fastening step - torque up output

※ Explanation details of JUMP, COUNT VALUE=A, SUB IF(A) command

■ Example multi sequence program

Mode B

Step NO	Command	Parameter
STEP 1	Count Value = A	10
STEP 2	Select Preset#	1
STEP 3	Fastening	0
STEP 4	Loosening	5
STEP 5	Select Preset#	3
STEP 6	Fastening	0
STEP 7	Sub If (A)	0
STEP 8	Jump	2
STEP 9	End	0
STEP10	NOP	0

The above multi sequence shows 10 times repeat of steps from 2 to step 7, and finish cycle completely.

- Count value = A

Count number of step selected or operated

- Sub if (A)

If the counted number A (on step 1), is not 10, go to the next step (8)

If the counted number A (on step 1), go the 2nd next step (9).

- Jump

Move to the setting step (2)

6) Driver ++ setting

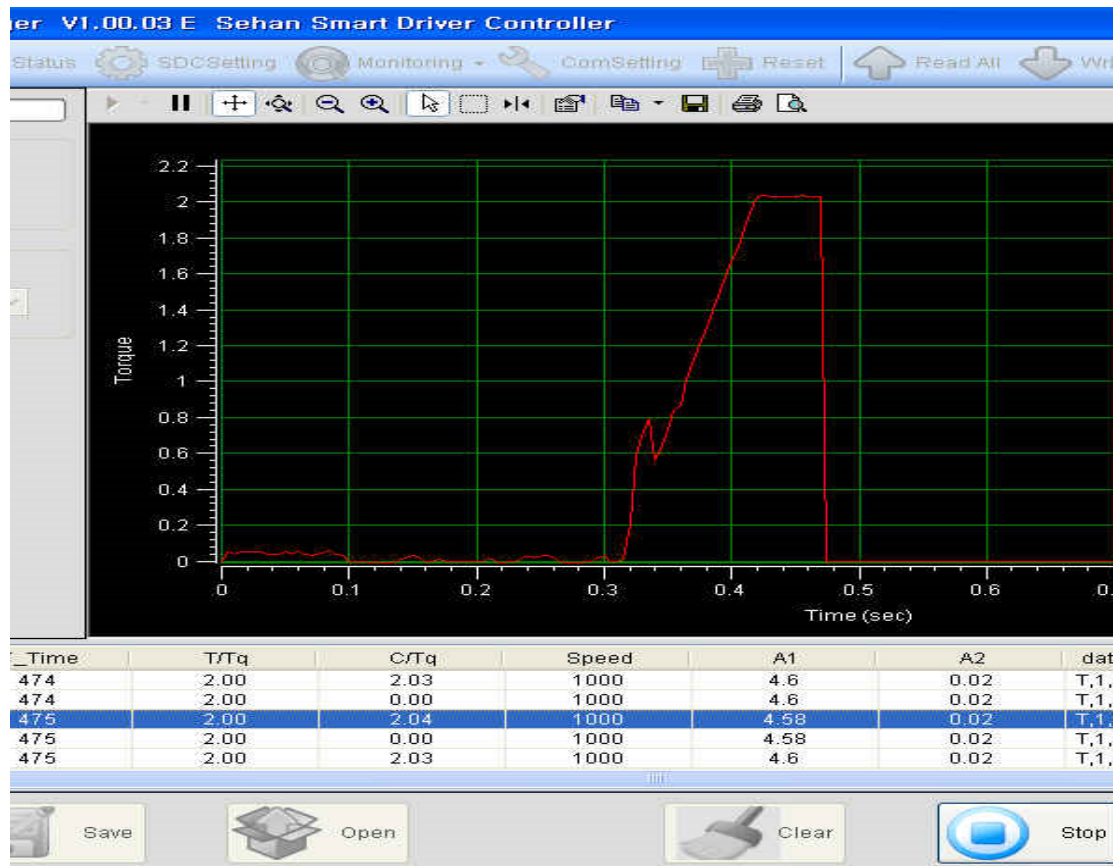
7) Real-time Monitoring data

Number	Time	F_Time	F_No	T/Tq	C/Tq	Speed	A1	A2	Angle(A3)	Error	Count	F/L
9	2012-02-07 오전 ...	470	1	2.00	2.03	1000	4.53	0.02	4.56	0	3	F
10	2012-02-07 오전 ...	475	1	2.00	2.03	1000	4.56	0.03	4.59	0	2	F
11	2012-02-07 오전 ...	473	1	2.00	2.04	1000	4.57	0.02	4.6	0	1	F
12	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.53	0.02	4.56	0	5	F
13	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.57	0.02	4.59	0	4	F
14	2012-02-07 오전 ...	470	1	2.00	2.03	1000	4.53	0.02	4.55	0	3	F
15	2012-02-07 오전 ...	473	1	2.00	2.04	1000	4.54	0.02	4.57	0	2	F
16	2012-02-07 오전 ...	475	1	2.00	2.03	1000	4.58	0.02	4.61	0	1	F
17	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.54	0.02	4.57	0	5	F
18	2012-02-07 오전 ...	474	1	2.00	2.03	1000	4.56	0.02	4.59	0	4	F
19	2012-02-07 오전 ...	471	1	2.00	2.04	1000	4.53	0.02	4.56	0	3	F
20	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.56	0.02	4.59	0	2	F
21	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.55	0.02	4.58	0	1	F
22	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.53	0.03	4.56	0	5	F
23	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.56	0.02	4.59	0	4	F
24	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.55	0.03	4.58	0	3	F
25	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.55	0.02	4.58	0	2	F
26	2012-02-07 오전 ...	470	1	2.00	2.03	1000	4.52	0.02	4.54	0	1	F
27	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.56	0.02	4.59	0	5	F
28	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.54	0.02	4.57	0	4	F
29	2012-02-07 오전 ...	474	1	2.00	2.03	1000	4.55	0.02	4.58	0	3	F
30	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.54	0.02	4.57	0	2	F
31	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.56	0.02	4.58	0	1	F
32	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.53	0.02	4.56	0	5	F
33	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.53	0.02	4.56	0	4	F
34	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.55	0.02	4.58	0	3	F
35	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.55	0.02	4.57	0	2	F
36	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.54	0.02	4.57	0	1	F
37	2012-02-07 오전 ...	471	1	2.00	2.03	1000	4.53	0.02	4.56	0	5	F
38	2012-02-07 오전 ...	472	1	2.00	2.03	1000	4.55	0.02	4.58	0	4	F
39	2012-02-07 오전 ...	474	1	2.00	2.03	1000	4.54	0.02	4.57	0	3	F
40	2012-02-07 오전 ...	473	1	2.00	2.03	1000	4.55	0.02	4.58	0	2	F
41	2012-02-07 오전 ...	474	1	2.00	2.03	1000	4.55	0.02	4.58	0	1	F

** The data can be saved in CSV format file.

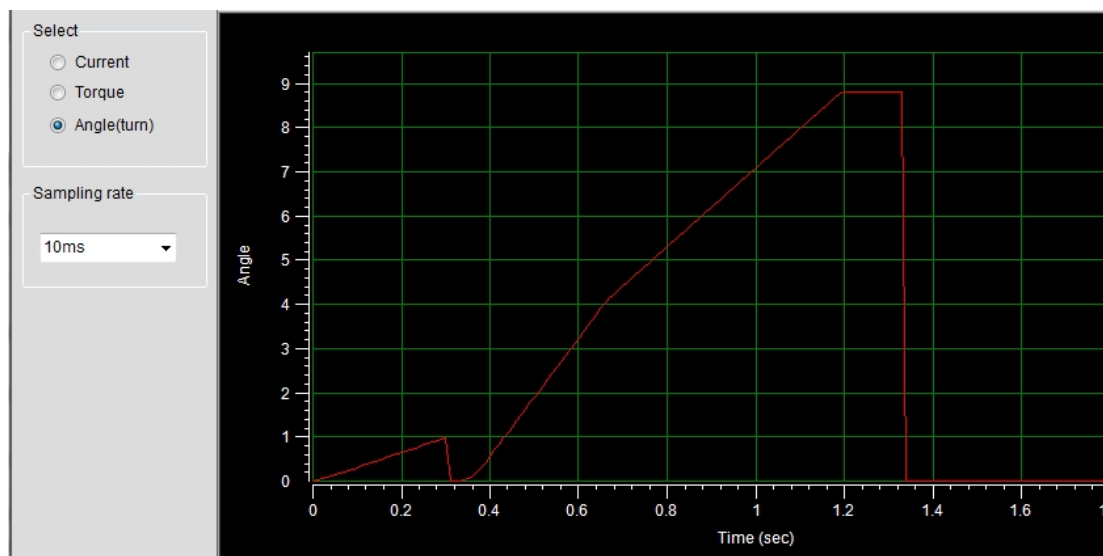
8) Real-time Torque or Angle curve

■ Torque curve



- Data sampling rate : 5, 10, 15mS (selectable)
- Data and curve can be saved in a file (*.cgd).
- Graph data select : Torque or current, Angle

■ Angle curve



9) Screw Counter - Single

The screenshot displays the Hi-Manager V1.13 E software interface. The main window is divided into several sections:

- Remain Count:** A large red number '2' is displayed in a white box.
- Result:** The word 'fastening' is displayed in a large blue font.
- Fastening count value:** An empty white input field.
- Model Name:** The text 'LG LCD TV 42"' is displayed in green on a yellow background.
- Setting status:** Three cyan buttons show 'Count: 5', 'Speed: 1700', and 'Torque: 5.0'.
- Control:** Two buttons labeled 'START' and 'STOP' are visible.
- Model Select Table:** A table with 9 rows and 3 columns: NO, Count, and Model Name.

NO	Count	Model Name
1	16	SAMSUNG PAVV 32"
2	20	LG LCD TV 42"
3	14	SONY DISPLAY 32"
4	18	PHILIPS LCD TV 40"
5	16	SHARP LCD TV 36"
6	15	TOSHIBA FLAT TV 32
7	16	AUDIOVOX FLAT 32
8	1	
9	1	
- Select Model:** Two buttons labeled 'SAVE' and 'SELECT' are located at the bottom right.



SDC Firmware / Smart-Manager Upgrade History by version

NO	Date	Firmware Version	Upgrade history	Smart -Manager Software Version	Controller Hardware (Back of Unit)
#REF!	11-Jun-14	1.12.2	- Bug solved_ LCD display of Nm	V1.11.0	2.1
#REF!	3-Sep-14	1.14.0	LG related. Not valid	V1.11.0	2.1
#REF!	1-Oct-14	1.15.0	- Factory default setting is changed to RS232C from USB. - New model added (SDA1000, SDA300, SD400M) model : SD400 speed : 150 - 1000rpm Auto speed : 293 - 591rpm torque range : 1.5 - 4.0kgfcm	V1.12.0b	2.1
#REF!	23-Oct-14	1.15.1	- New model added (SD1800, SD2800 with controller SDC-40) Model : SD1800 Torque range : 4 - 18.0kgfcm Auto speed : 306 - 1000rpm Model : SD2800 Torque range : 5 - 28.0kgfcm Auto speed : 220 - 920rpm	V1.12.1	2.1
#REF!	10-Nov-14	1.15.2	-New model added (SDA071 - custom made offset type for I phone 6) model : SDA071 speed : 150 - 1000rpm Auto speed : 293 - 591rpm torque range : 0.2 - 0.6kgfcm	V1.12.2	2.1
#REF!	5-Jan-15	1.16.0	- Reverse rotation available during Multi sequence process (changed) - Buzzer sound on fastening OK (added) - Model select feature added (same as Hybrid driver) - Parameter added P138 : Model select (OFF = 0 / Disable, ON = 1 / Enable) P139 : Auto sequence (OFF = 0 / Disable, ON = 1 / Enable) P130 : Screw count number for model #1 (P90 is not used no more)	V1.13.0	2.1
#REF!	29-Jan-15	1.16.3	- Converted torque display on every Forward rotation (changed) - Data Manager is available	V1.13.0b	2.1
#REF!	12-Mar-15	1.16.6	Model no. is selectable by UP button on the front panel when P138 is enabled. Preset # will not be selectable accordingly.	V1.13.0b	2.1
#REF!	30-Mar-15	1.16.7	SD-1500 minimum torque change 3.0 -> 2.5kgfcm	V1.13.6	2.1
14	3 - Jul - 15	1.17.0	Model added : SDA-071T , SDA-28n, SDA-18n, SD-05n, SD-09n	V1.14.0	2.1
15	2015-07-16	1.17.1	Fixed the symptom of showing low torque range when using Lbf.in unit (resulted from converted torque display parameter error).	V1.14.0	2.1
16	2015-08-14	1.17.2	SD18n,SD28n Speed is reduced 10%. (Over-torque symptom was deleted in hard joint), solved error : unit error in P113 Controller	V1.14.0	2.1
17	2015-09-14	1.18.0	Model add : SD-060 (changed to the angle type because the speed of the reducer is increased to 2.127:1 from 2:1), Parameter add : P90 (available to change the fastening completion signal through setting to 200 ~ 500ms.)	V1.15.0	2.1
18	2015-10-26	1.18.4	P50 - Inital loosening speed -> loosening speed (changed) P68 - changed the parameter setting range : 100 ~ 200 (previously, 100 ~ 300) P70 - changed the parameter setting range : 10 ~ 100 (previously, 10 ~ 200)	V1.15.5	2.1
19	2015-12-21	1.18.5	Updated in order to use the data manager.	V1.15.5	2.1
20	2016 - 2 -2	1.18.6	paramter 115 added : front panel lock or unlock	V1.15.6	2.1

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