21st Aug, 2017

Operation Manual
Smart Screw Driver SDC-24 / SDC-40

INDEX

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 inflation 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 consists of DC Servo screwdriver and controller as a complete system.

1) Standard Item

Screwdriver

Cable_10P (2m)

SDC-24, SDC-40 controller

2) Option Accessories

U-2 Interface converter

AC adapter
(DC24V,1A)

USB cable

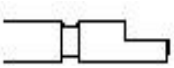
Bit socket Tray

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	Output 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	

5.2 Model for SDC-24 Series

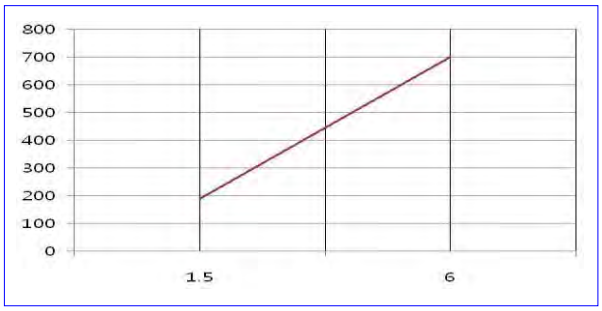
Type			Torque Kgf.cm	Speed (RPM) Auto change	Bit
Automation	Offset	Straight			
	SD120Z	SDA120	0.30 ~ 1.50	240 -1000	4mm half moon
	SD200Z	SDA200	0.50 ~ 2.00	420 - 1000	
	SD300Z	SDA300	1.00 ~ 3.00	360 - 890	
		SDA600	1.50 ~ 6.00	190 - 710	1/4" hex
		SDA1000	2.0 ~ 10.0	130 - 430	
Manual		SD070	0.10 ~ 0.70	340 - 930	4mm half moon
		SD120	0.3 ~ 1.50	240 - 1000	
		SD200	0.50 ~ 2.00	420 - 1000	4mm half moon, 1/4" hex
		SD300	1.00 ~ 3.00	360 - 890	
		SD400	1.50 ~ 4.00	293 - 591	
		SD600	1.50 ~ 6.00	190 - 710	
		SD1000	2.0 ~ 10.0	130 - 430	
		SD1500	3.0 ~ 15.0	120-400	1/4" hex

※ Automation type has 4mm bit cushion. / pressure 4 KG

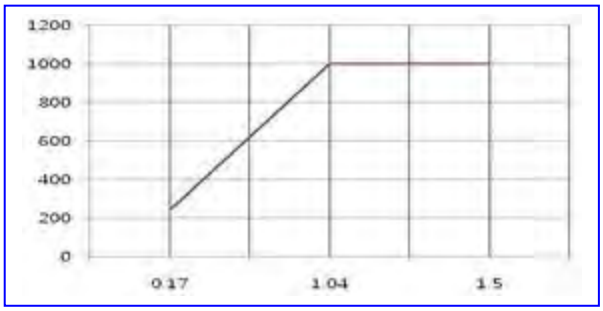
5.3 Model for SDC-40 Series

Type		Torque Kgf.cm	Speed (RPM) Auto change	Bit
Automation Straight type	SDA05N	1.00 ~ 5.00	400 - 1000	4mm half moon 1/4" hex
	SDA09N	1.50 ~ 9.00	300 - 1000	
	SDA18N	4.0 ~ 18.0	300 - 900	1/4" hex
	SDA28N	5.0 ~ 28.0	190 - 780	
Manual	SD05N	1.00 ~ 5.00	400 - 1000	4mm half moon 1/4" hex
	SD09N	1.50 ~ 9.00	300 - 1000	
	SD18N	4.0 ~ 18.0	300 - 900	1/4" hex
	SD28N	5.0 ~ 28.0	190 - 780	

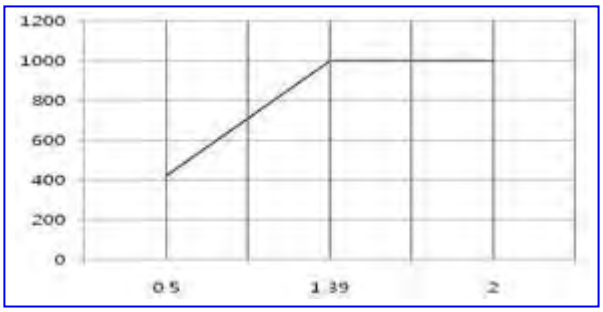
5.4 Auto Speed Change by Torque Setting



SD070



SD120



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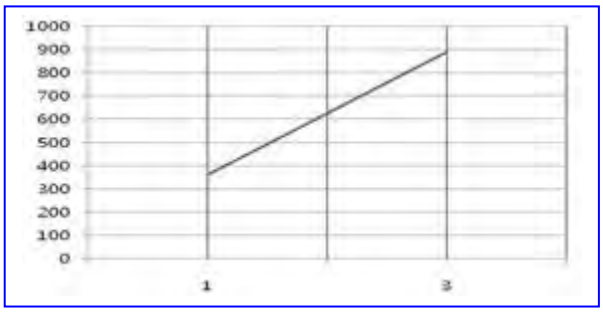

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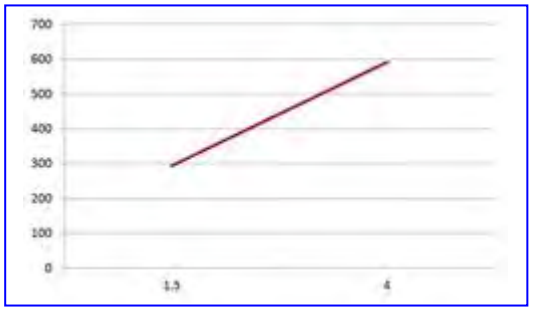

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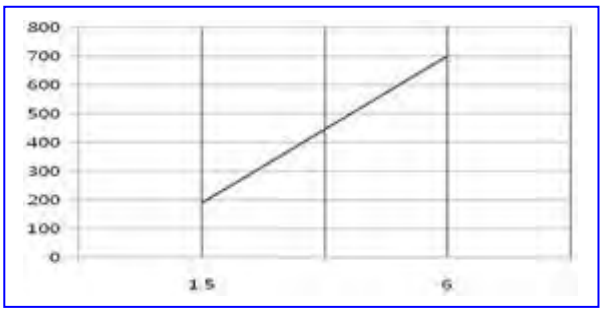
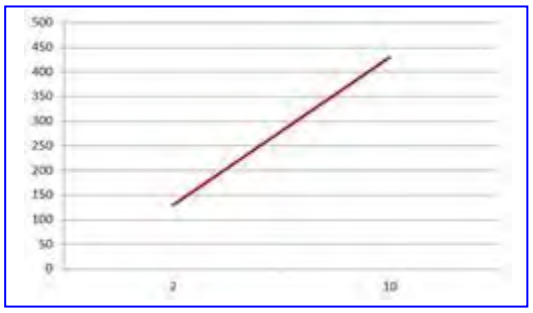


SD600



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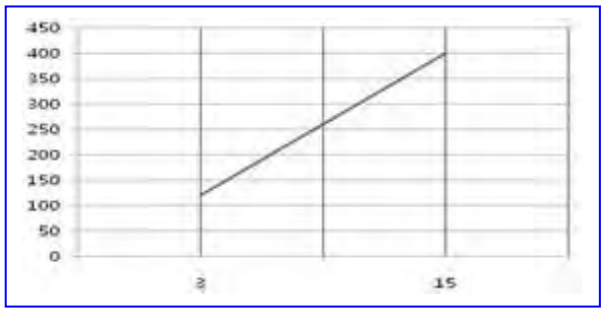

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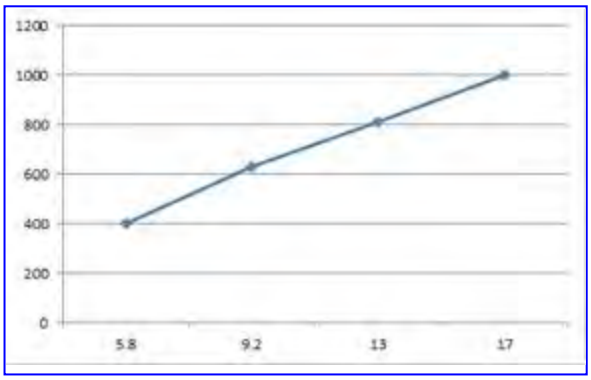
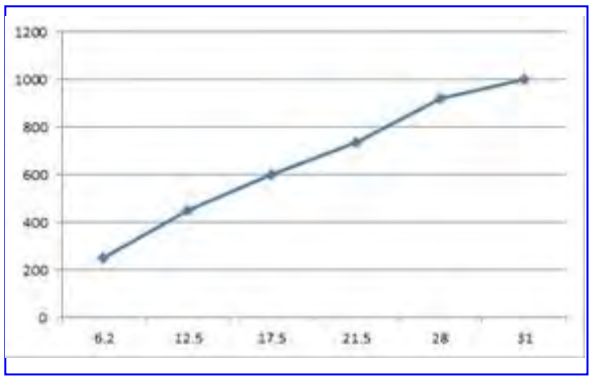


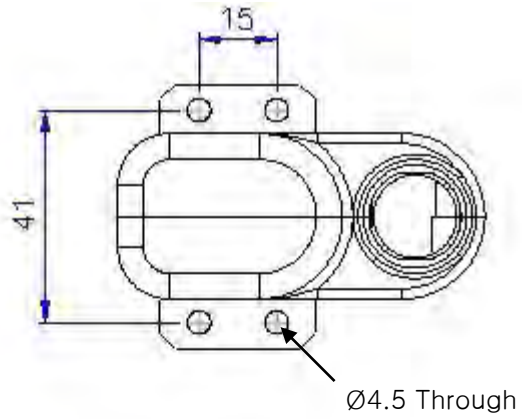
SD18N

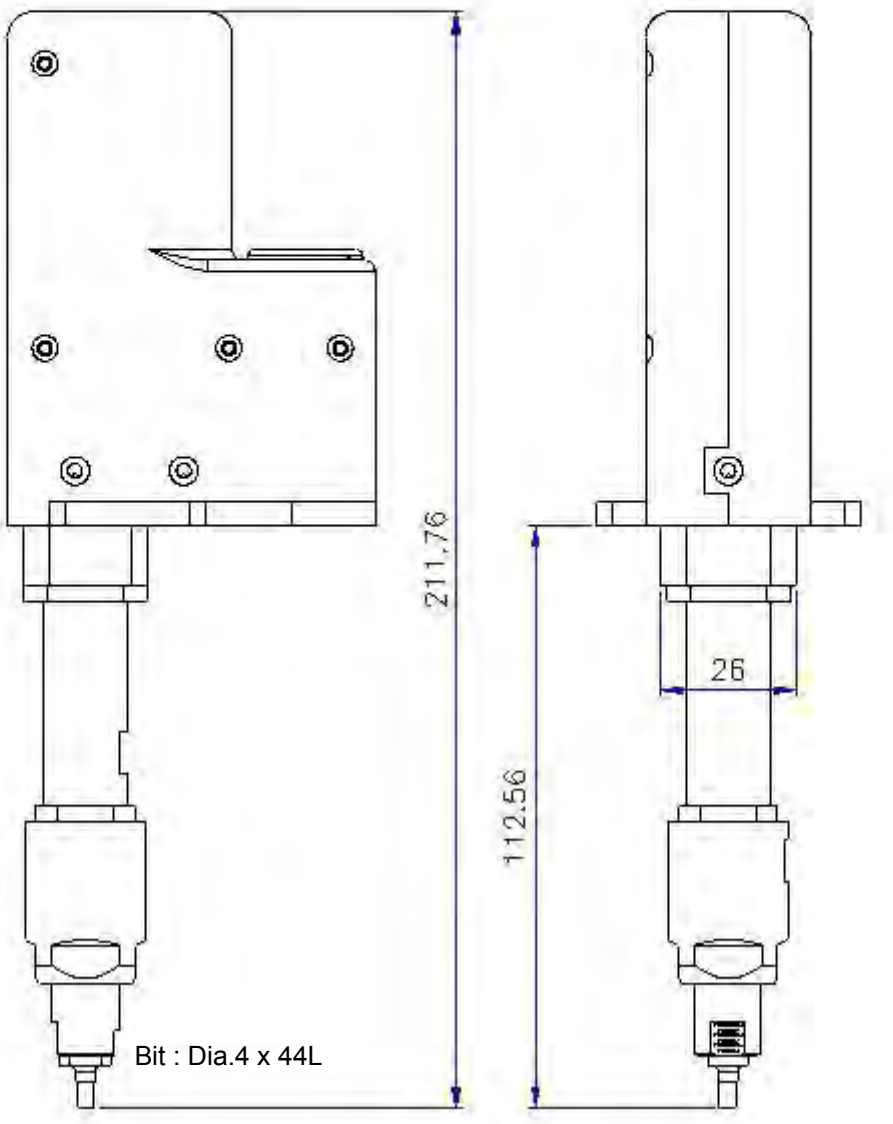


SD28N

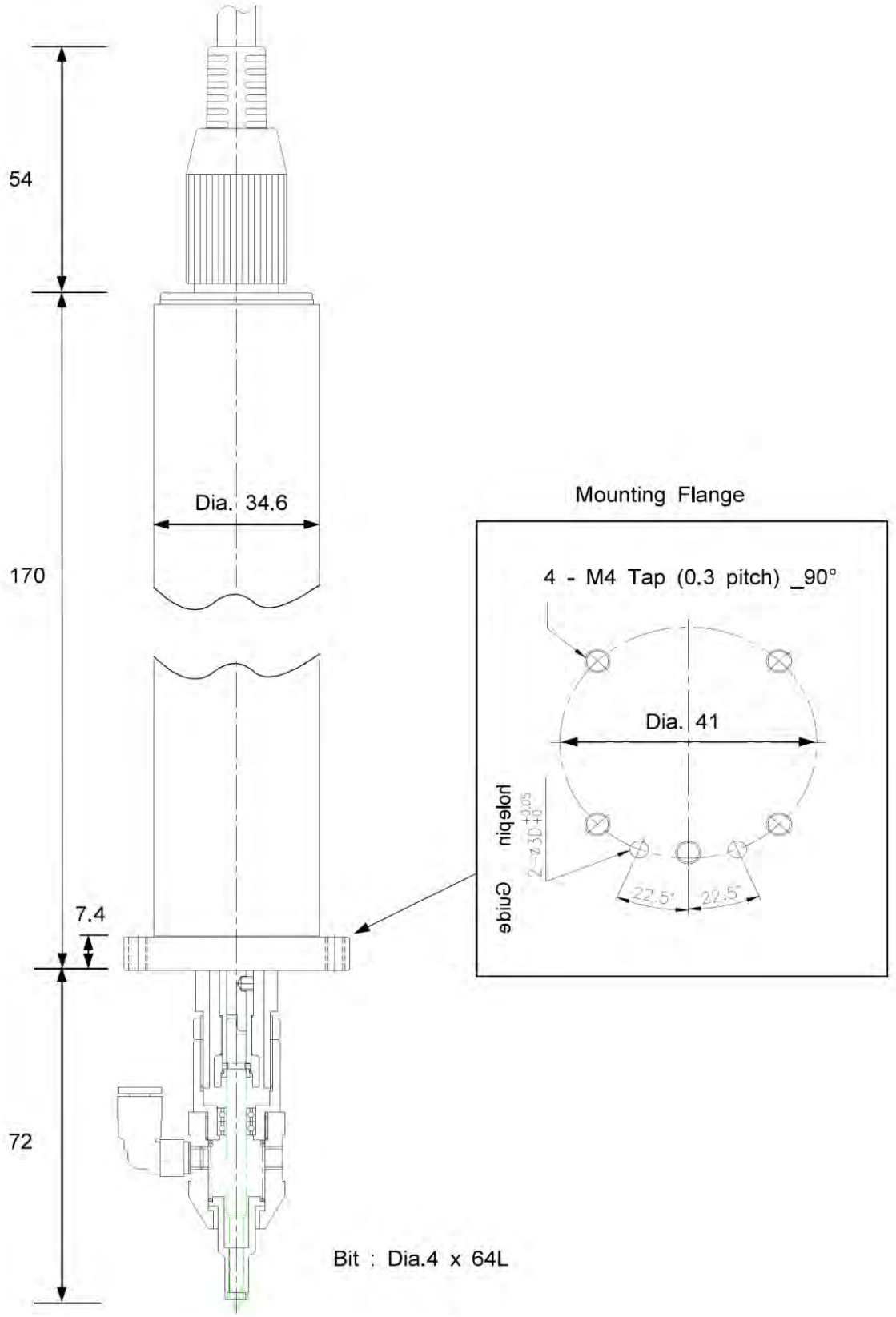
5.5 Screwdriver Dimension

■ **Offset Type (SD120Z, SD200Z, SD300Z)**

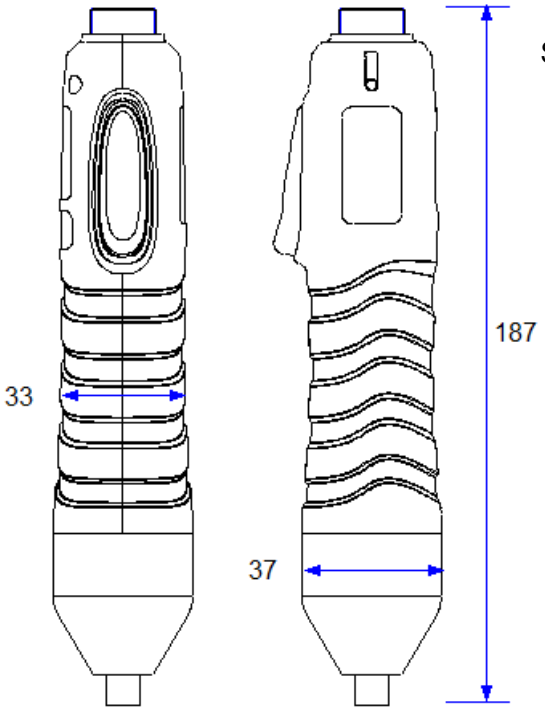




■ Straight Type (SDA120-FV, SDA200-FV, SDA300-FV)



■ Manual Hand Held Type

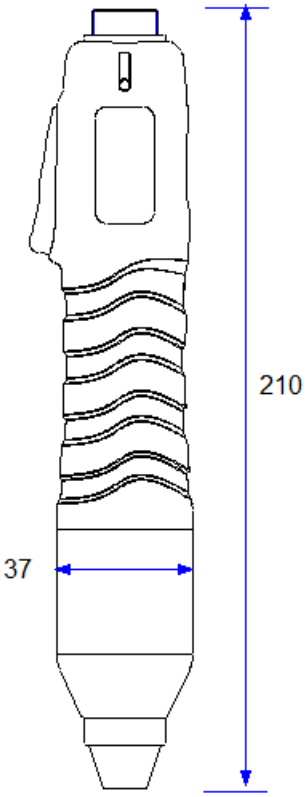


SD070, SD120, SD200, SD300

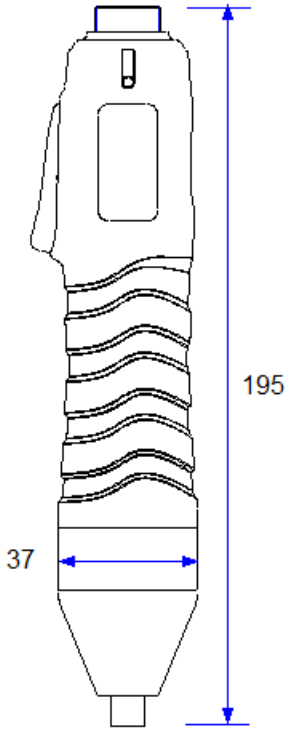
Weight

SD070 : 260 gr
SD120 : 260 gr
SD200 : 295 gr
SD300 : 295 gr
SD400 : 380 gr
SD600 : 340 gr
SD1000 : 380 gr

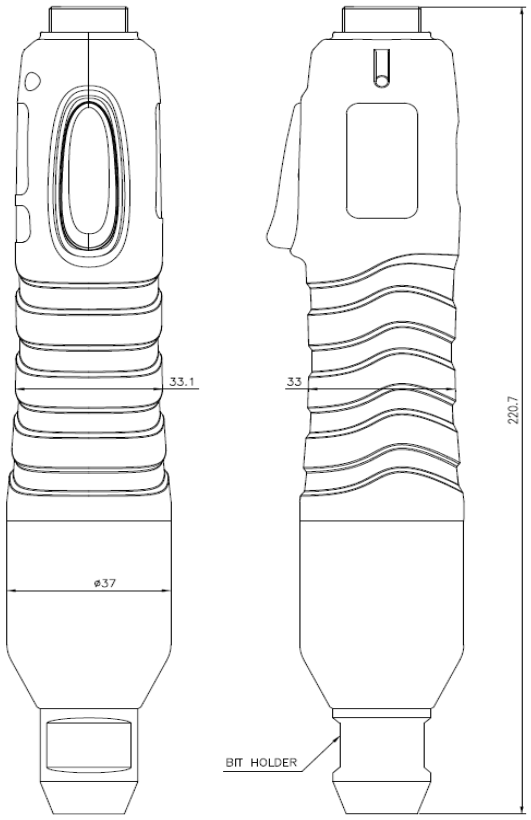
SD400



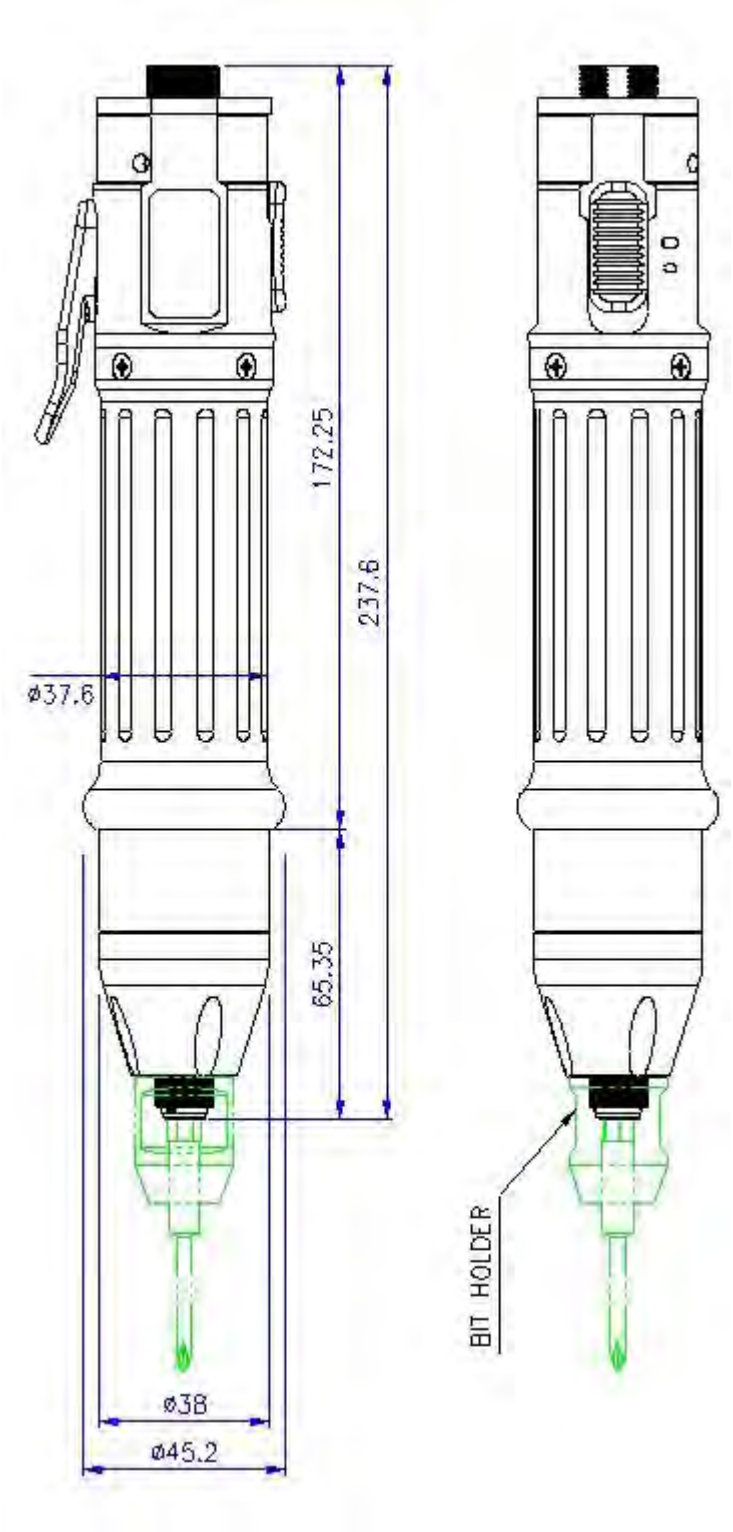
SD600



SD1000, SD1500



■ Manual Hand Held Type (SD05N, SD09N, SD18N, SD28N)

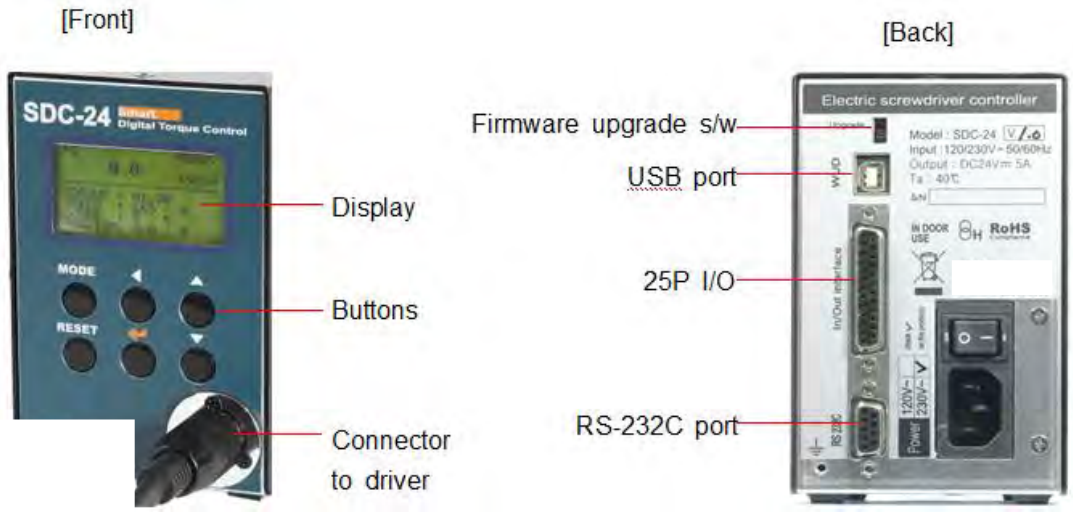


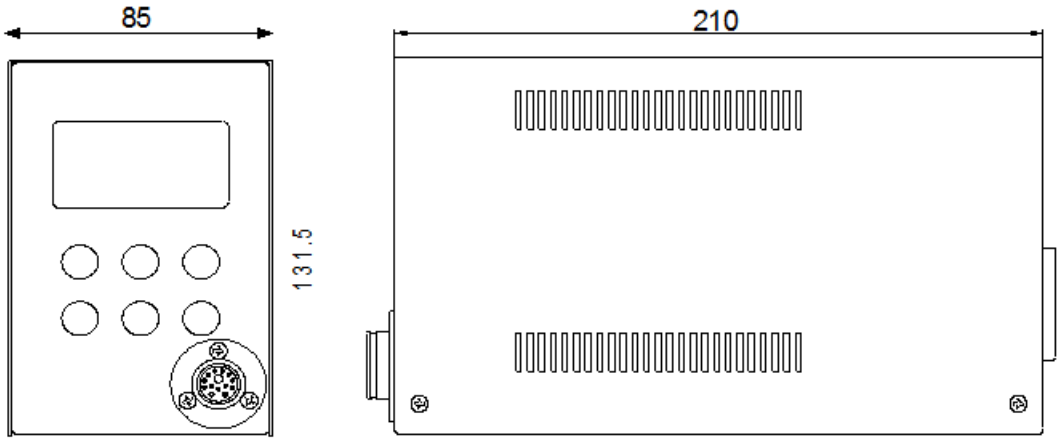
6. Controller

6.1 Specification

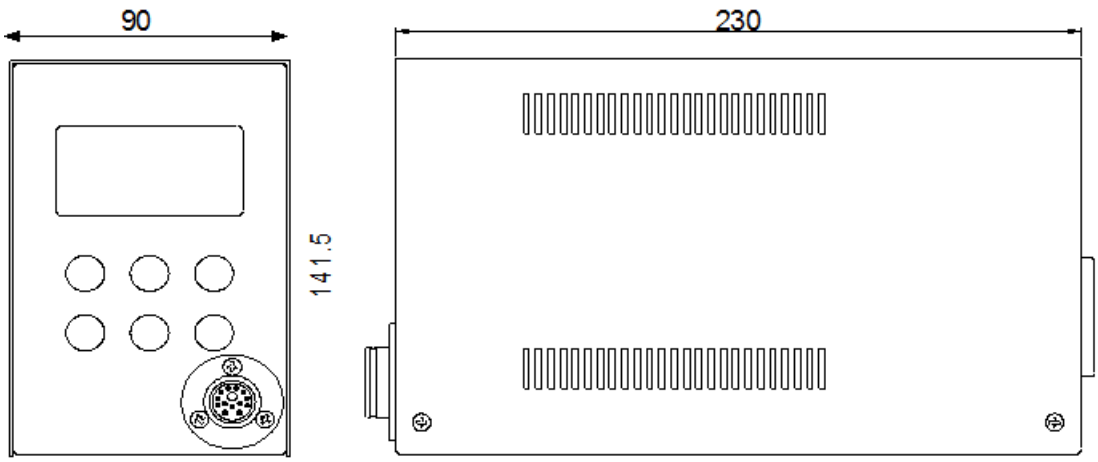
no	Item		Specification	
			SDC-24 series	SDC-40 series
1	Rated Input		AC120VC or AC220V, 50~60Hz	
2	Rated Output		DC24V, 5A	DC40V, 3A
3	Control Range	Torque	0.1 ~ 15.0 Kgf.cm	1 ~ 28.0 Kgf.cm
		Speed	100 - 1,000 rpm	300 - 1,000 rpm
		Angle	0.4° step	
4	Preset parameters		Torque, (Speed) & Angle	
5	Preset # 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





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

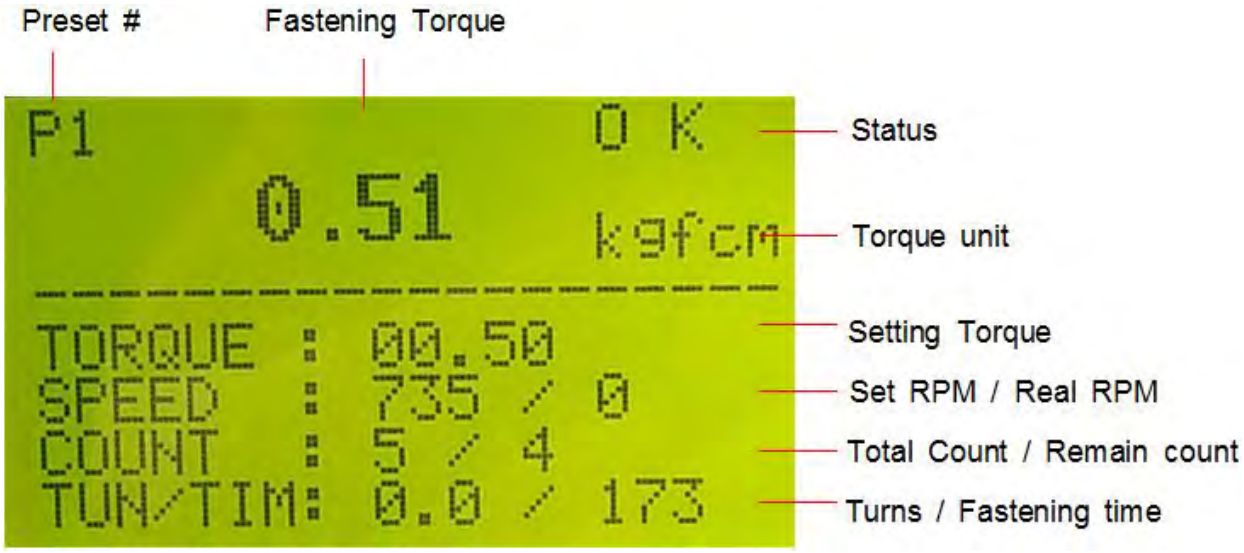


SDC-40	Dimension / Weight	90(w) 230(d) 141.5(h)mm / 2.3 Kg

7. Operation

7.1 LCD Display Details

1) Information of LCD



2) Key Buttons

MODE button :

By pressing the MODE button, it circulates **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 shifts up to left at the Parameter mode.

 **Button**

Auto(Work) Mode	Select the next preset number(when P115=1 is enable) or Model no. select. (when P138=1 is enable)
Log-in & Password	It increases the number up.

 **Button**

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

 **Enter button**

Parameter Mode	It selects or saves the chosen display.
Jog Mode	Manual start / stop in Forward rotation

 **Button**

It returns to the previous mode. Also it resets 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 stops at the limit number of turn and torque.)
41-48	Soft start time	Change time to the target speed.
51-58	Free speed angle (turn)	Screwdriver runs with the speed set on P84 as per the angle value on P51 - 58. And it changes to the original speed set on P11 – 18. "0" = Disable
61-89	Other parameters	Change of other parameters
130-137	Screw Counter	Screw counter related to pattern setting (Total count)
138-139	Model setting	Model related selecting model and auto sequence
140-179	Counter- Model	Parameters of fastening sequence of each model
180-199	Multi sequence	Multi sequence data
200-207	Error history	The latest error number record from P200 to 207
209	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	P14	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

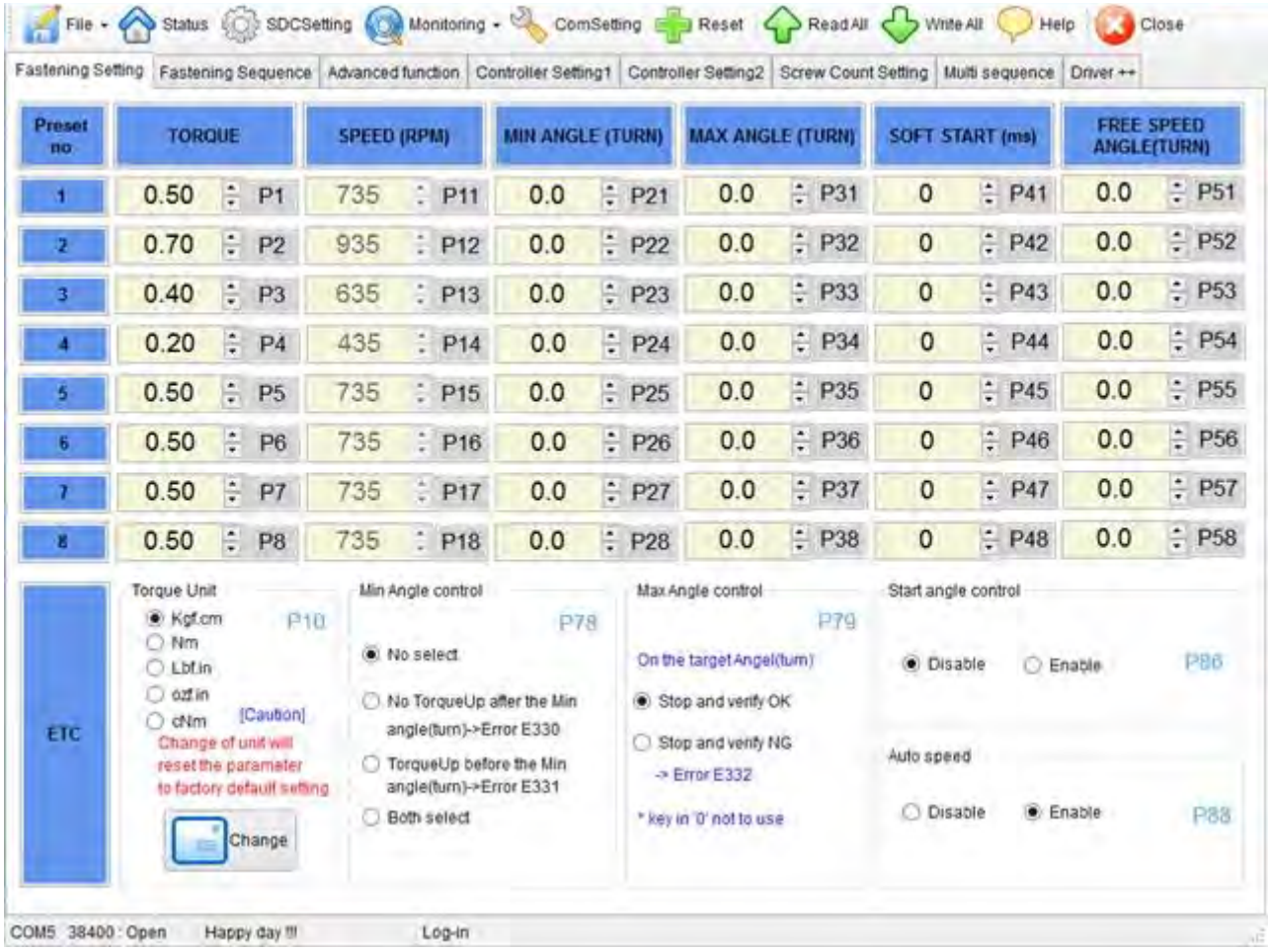
The data from 3rd to 4th are optional.
The 3rd and 4th data can be used for monitoring fastening quality.
They can be used or not.

7.4 Torque, Speed & Angle Setting (I) - by PC Program

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

Please refer the details to the article 10.3 PC program, Smart-Manager..

[PC program : Smart Manager]



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	P1 READY 0.0 kgfcm TORQUE : 00.60 SPEED : 555 / 0 COUNT : 5 / 5 TUN-TIM: 0.0 / 0	Auto(Work) mode
1	MODE	[PASSWORD] [0000]	**Log-in** **Factory setting password "0000"**
2	↵	[PASSWORD] [LOGIN]	Log-in message
3	MODE	[PARAMETER] Please enter..	Parameter mode
4	↵	[PARAMETER] [P001] [00.50] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4	P1 : Torque 1
5	↵	[PARAMETER] [P001] [00.50] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4	Value : 0.5
6	◀ ▲ ↵	[PARAMETER] SAVING.. [P001] [00.60] [01] Torque 1 [02] Torque 2 [03] Torque 3 [04] Torque 4	New Value Save new
7	RESET	[PARAMETER] Please enter..	Parameter mode
8	MODE	P1 [JOG] STATUS : READY TORQUE : 00.60/00.00 SET key : Fastening DOWN key: Loosening	Jog mode
9	MODE	P1 READY 0.0 kgfcm TORQUE : 00.60 SPEED : 555 / 0 COUNT : 5 / 5 TUN-TIM: 0.0 / 0	Auto(Work) mode

7.6 Details of Each Parameter Numbers

7.6.1 Fastening Setting

1) Torque

Number	Unit	Range	Initial
P1~8	**0.01 (Kgf.cm)**	**Different depending on Model**	
Description	Each numbers 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)Torque Unit

Number	Unit	Range	Initial
P10		**1 ~ 5**	**1**
Description	It selects one of the torque units below ; "1" : Kgf.cm "2" : N.m "3" : lbf.in "4" : Ozf.in "5" : cN.m **[Caution] Change of unit will reset every parameter to factory initial setting. The torque unit should be selected first before parameter setting.**		

3) Rotation Speed (Not recommended)

Number	Unit	Range	Initial
P11~18	**1 rpm**	**Different depending on Model**	
Description	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. Preset #1 has the torque of P1 and speed of P11. (ref. article 5.2, 5.3, 5.4) The speed is automatically changed on the torque setting. Changing speed higher than auto setting is not recommended. Otherwise the torque can be over by the inertia. If P88=0, speed can be changed manually		

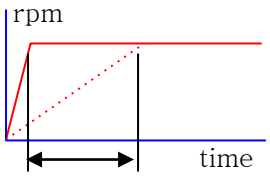
4) Min. Angle Control for Fastening Quality monitoring

Number	Unit	Range	Initial
P21~28	**0.1 turn**	**0 ~ 30.0**	**0**
Description	Minimum angle can be set as a threshold point for fastening quality control by different setting on P78. **"0" : No use "0.1~30.0" : Value of rotating angle (turn)** P78 Min angle control setting should be one of below 0 : No use 1 : No torque up after Min angle on P78 - Er330 2 : Torque up before Min angle on P78 - Er331 3 : Both (1+2) If the driver stops without torque up after the min angle, it provides fastening NG output signal with the error code E330. It is the most serious mistake by operator which is often found but difficult to be recognized.. 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. If the driver stops with torque up before the min angle, it provides fastening NG output signal with the error code E331. It is useful to detect the wrong aligned, engaged screw or floating screws.		

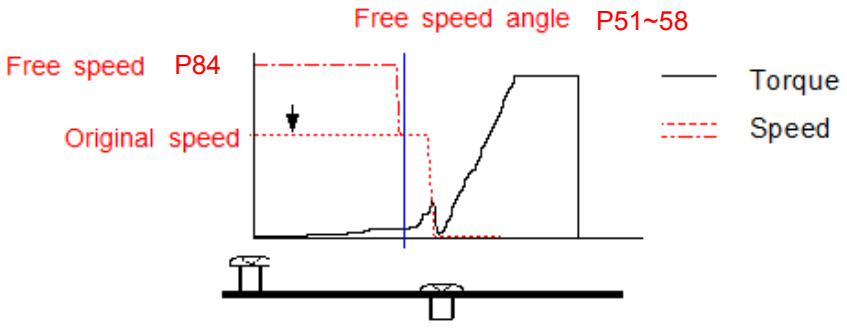
5) Max Angle Control

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

6) Soft Start Setting

Number	Unit	Range	Initial
P41~48	**1 ms**	**0 ~ 300ms**	**0**
Description	Soft start time to the target speed is selectable from 0 - 300ms for each preset #. 		

7) Free Speed Angle Setting

Number	Unit	Range	Initial
P51~58	**0.1 turn (36°)**	**0 ~ 100.0 turn**	**0**
Description	For the screw tightening process, screwdriver has auto speed (A1) by system according to the torque setting. But operator can have a different speed on P84 (Free speed) within the angle on P51~58. And P102 should have to set to be enable. **Be sure that Free speed angle should be less 2 turns than A1 angle value (before SCREW SEATING).** **※ Free speed angle < Screw Seating angle** "0" = No use 		

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 changes speed to its auto speed. "0" = No use		

Number	Unit	Range	Initial
P102		0 or 1	0
Description	Free speed setting 0 : Disable 1 : Enable		

8) Min. Angle Setting on P21~28 and NG type Selecting

Number	Unit	Range	Initial
P78		0 ~ 3	0
Description	Select one of following type of NG with Min. angle setting on P21~28 "0" : No use "1" : No Torque-up NG after Min. angle. Error code 330 "2" : Torque up NG before Min. angle. Error code 331 "3" : Combined "1" and "2" ** Setting angle "0" means no use, too.		

9) Max Angle Setting on P31~38 and OK/NG Verification

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

10) Output Pin #5 Management (Driver Lock / Angle count reset)

Number	Unit	Range	Initial
P86		0 or 1	0
Description	During the operation of a driver, the function on pin#5 can be chosen. “0” : Driver Lock(stop operating) “1” : Angle count reset to 0 turn In/Out for PLC (1) should be selected on P20.		

11) 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		

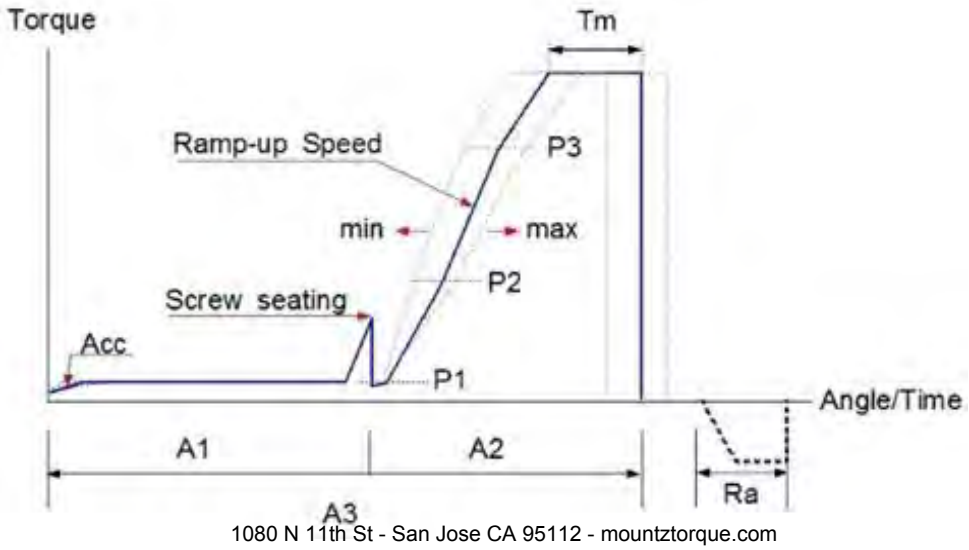
7.6.2 Fastening Sequence

12) Torque Control Profile Setting (P63~73)

The graph below is divided to two sections related to torque control profile as below;

A1 (Speed primary) : Speed is controlled with the target setting and 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 controls motor current to target setting (target torque) with limited speed.



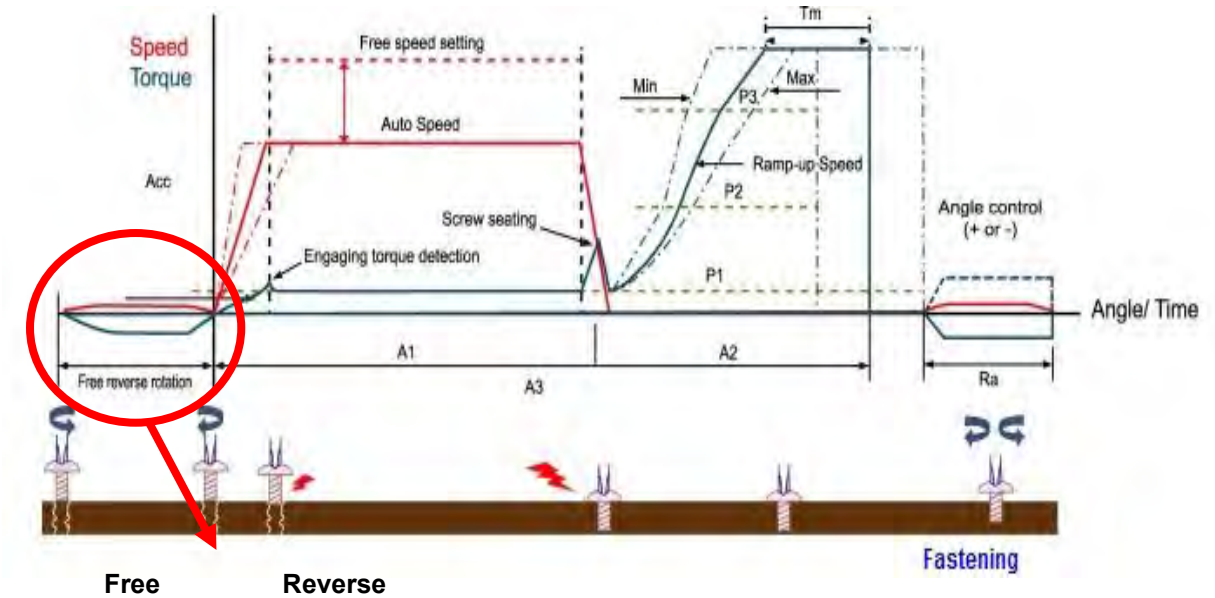
Number	Unit	Range	Initial
P63~73			
Description	P63 Screw Seating Point (Factory setting : 50 %) Setting : 10 ~ 90 % of the target torque P64 P1 setting in A2 process (Factory setting : 40 %) Setting : 10 ~ 60 % of the target torque P65 P2 setting in A2 process (Factory setting : 60 %) Setting : 40 ~ 80 % of the target torque P66 P3 setting in A2 process (Factory setting : 80 %) Setting : 60 ~ 95 % of the target torque P67 Ramp up speed setting in A2 process with percentage of the target speed (Factory setting : 50 %) Setting : 10 ~ 100 % of the target speed P68 Torque rising time in ramp up process (Factory setting : 100 mS) Setting : 100 ~ 200 mS P69 Start point of ramp up speed on P67 Selecting : P1, P2, or P3 (Factory setting : P3) P70 Target torque holding time (Tm) Setting : 10 ~ 100 mS (Factory setting : 20 mS) P72 Angle limit during torque holding(Tm) (E303) (Factory setting : 0) Setting : 0 ~ 360° (0 = No use) P73 Angle limit during Ramp-up process (E302) (Factory setting : 0) Setting : 0 ~ 10 turns (0 = No use)		

13) Motor Acceleration

Number	Unit	Range	Initial
P40	1ms	10 ~ 1000	200
Description	The motor increases the rotation speed up to the target in the set time. It works for all preset #.		

7.6.3 Advanced Function

14) Free Reverse Rotation



Free Reverse Rotation

Number	Unit	Range	Initial
P85		0 ~ 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)		

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		

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

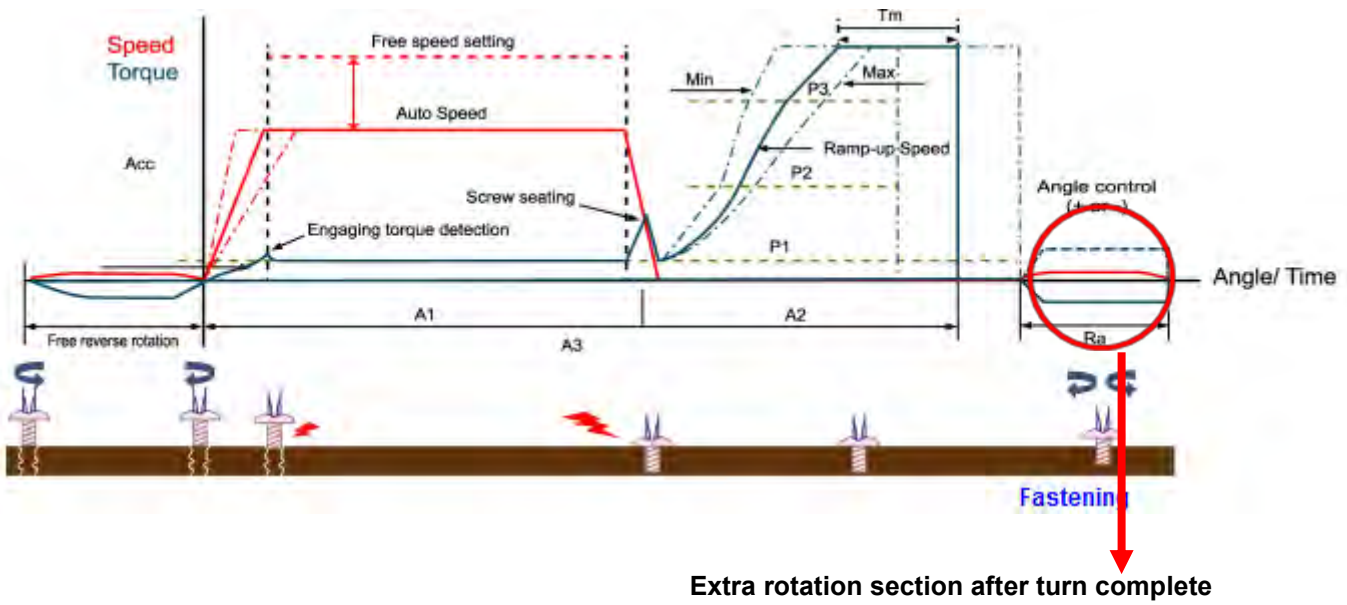
15) Engaging Torque Detection Setting

Number	Unit	Range	Initial
P103		0 or 1	0
Description	Selectable Engaging torque detection (Enable/Disable) 0 : Disable 1 : Enable		
Number	Unit	Range	Initial
P104	rpm	0 ~ 1,000	0
Description	Engaging torque detection speed setting 0 : No use 1 ~ 1,000 : Free reverse speed		
Number	Unit	Range	Initial
P105	%	0 ~ 50	0
Description	Engaging torque value setting Setting : 0 ~ 50% (0 = No use)		
Number	Unit	Range	Initial
P106	turn	0 ~ 20.0	0
Description	Engaging torque detection angle limit (0 = No use) Setting : 0 ~20 turn : Engaging torque can be detected before the angle limit		
Number	Unit	Range	Initial
P107	sec	0 ~ 10.0	0
Description	Engaging torque detection time limit (0 = No use) Setting : 0~10sec : Engaging torque can be detected before time limit		

Number	Unit	Range	Initial
P108		0 ~ 255	0
Description	Engaging torque detection is available for screw tightening process by selecting one or more preset #. 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)		

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

16) Auto Reverse Setting



Extra rotation section after turn complete

Number	Unit	Range	Initial
P110		0 or 1	0
Description	Auto reverse rotation after tightening process Enable/Disable 0 : Disable 1 : Enable		
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		
Number	Unit	Range	Initial
P112		0 or 1	0
Description	Auto reverse rotation 0 : Loosening 1 : Fastening		
Number	Unit	Range	Initial
P113	degree	0 ~ 3600	0
Description	Auto reverse rotation angle setting 0 : No use 1 ~ 3600˚(degree) : Auto reverse angle		

Number	Unit	Range	Initial
P114	turn	0 ~ 255	0
Description	Auto reverse feature is available after screw tightening process by selecting one or more preset #. 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)		

7.6.4 Controller Setting

17) 25P I/O Interface Setting

Number	Unit	Range	Initial
P20		**0 ~ 5**	**0**
Description	Each pin no. of 25P I/O interface can be used with one of following function. "0" : Direct preset no. select IN : preset # selecting through pin no.1 to 8 OUT : Selected preset # display through pin 10 to 17 "1" : Remote control by PLC with 25P I/O port IN / OUT : for PLC "2" : Combined IN/OUT IN : Direct preset # selecting through 1 to 8 OUT : for PLC "3" : Optional remote control by PLC with 25P I/O port IN / OUT : for PLC (except Start, For/Rev selection on the screwdriver) "4" : Connected to " Socket Tray " “5” : Optional remote control by PLC with 25P I/O port IN / OUT : for PLC (except Start)		

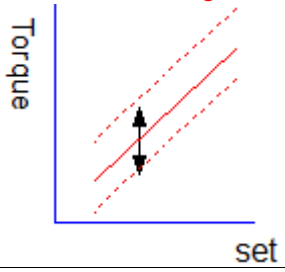
18) FND Display (for FND version-produced before march, 2014 only)

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

19) Auto Fastening Data Output

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

20) Torque Compensation

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

21) 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) of SDC back panel. 0 : USB (converted from RS-232C) 1 : RS-232C		

22) Initial Loosening Speed

Number	Unit	Range	Initial
P50	rpm	50 ~ 1000	1000
Description	Initial speed for 1 turn of reverse is selectable. Setting : 50 ~ 1000 rpm		

23) Converted Torque Limit

Number	Unit	Range	Initial
P59	%	0 ~ 25	0
Description	If the converted torque is over than the setting value(%), NG (Er 335) will be displayed "0" : No use " ±25%" : +/- tolerance limit from target		

24) Time Limit for Fastening, Loosening and Motor Stall

Number	Unit	Range	Initial
P60~62	0.1 sec	0 ~ 60	
Description	It prevents 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 provides the pattern NG with the error code below; P60 : Limit of fastening run time error code - E300 P61 : Limit of loosening run time error code - E301 Initial value = 10.0 sec Also it prevents the continuous time going against the motor stall for over heat protection. P62 : Limit of motor stall time error code - E304 Initial value = 1.0 sec		

25) Error Display Time Setting

Number	Unit	Range	Initial
P74	sec	0 ~ 10.0	1
Description	Error displays and resets after the below set time. "0" : Manual reset by RESET button "0.1 ~10.0 sec" : Auto reset after set time		

26) Beep Sound ON/OFF

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

27) No Torque Complete Error

Number	Unit	Range	Initial
P89		0 or 1	0
Description	If operator releases the trigger lever and stops operation of screwdriver after screw seating point without completing cycle, it gives an error alarm E333 "0" : Disable "1" : Enable Fastening process only		

28) Fastening Complete Signal Out Time Setting

Number	Unit	Range	Initial
P90		0 or 500	0
Description	Fastening complete signal time set Setting : 0 ~ 500 ms (0 = No use)		

29) Reverse Lock Setting (Hand held driver only)

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

30) Trigger Start Setting (Hand held driver only)

Number	Unit	Range	Initial
P92		0 ~ 1	0
Description	Trigger (⎍) start Enable/Disable with start lever Until the fastening complete, a driver keeps rotating even if a lever is released. 0 : Disable 1 : Enable		

31) Reverse Start Setting (Hand held driver only)

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		

32) Bit socket Tray Program Select

Number	Unit	Range	Initial
P94		0 ~ 255	255

Description

Preset no for Bit socket tray is selectable.

Setting	**Preset no**
1	Preset #1
2	Preset #2
4	Preset #3
8	Preset #4
16	Preset #5
32	Preset #6
64	Preset #7
128	Preset #8
3	Preset #1 & 2 (1 + 2)
96	Preset #6 & 7 (32 + 64)
148	Preset #3, 5 & 8 (4 + 16 + 128)

33) 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		

34) Preset # Selecting by Front Panel Key 

Number	Unit	Range	Initial
P115		0 or 1	1
Description	Selecting Preset # or Model #(P138=1) by up key (on Front panel) 0 : Disable 1 : Enable		

7.6.5 Screw Counter Setting

35) Count Start(IN) & Finish(OUT) Signal Type I

Number	Unit	Range	Initial
P80		0 ~ 3	0
Description	For monitoring and qualifying the number of screws, SDC should receive the count START signal and STOP(Finish) signal in some application. SDC provides the count complete signal out when it reaches to the target number. SDC provides 4 different types of signal to be selected. The sensor or switch can be connected to SDC directly for Start signal. "**0**" : Auto reset. The count number is reset to the target number automatically after "0" . "**1**" : If the count number shows "0" during the ON status of the count Start signal, it provides the count COMPLETE OUT signal. If the Start signal is turned OFF before the count number "0", it provides the count NG OUT signal "**2**" : It starts count with a pulse type of signal till the set time on P81. If the count does not reach to the target within the set time, it is NG. If there is no time set on P81, there is no time limit to count stop. (finish) "**3**" : It starts counting with a pulse type of signal. If the count does not reach to the target before 2nd pulse type of signal, it is NG. (ref. article 7.13.2)		

36) Count Start(IN) & Finish(OUT) Signal Type II

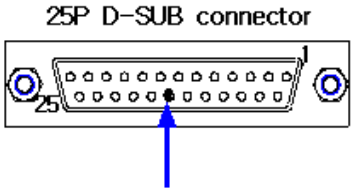
Number	Unit	Range	Initial
P81	0.1 sec	0 ~ 999.9	0
Description	The fastening time limit from Count START for NG judgment. The fastening work should be finished within the set time. Otherwise, the work-piece will leave the working area. * Refer to the article 7.13.2 for details		

37) COUNT Complete Signal Type at Count Port (pin 20)

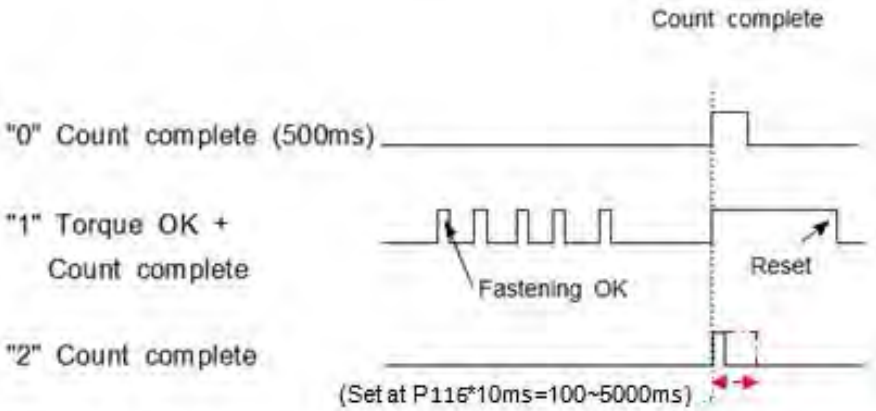
Number	Unit	Range	Initial
P82		0 ~ 3	0

Description

Select the type of Count complete signal output on P20 of 25P I/O port.



Pin no.20 Count cycle complete



"0" : It provides 500ms of pulse type count complete signal after fastening all set numbers.

"1" : It provides every pulse(0.5s) signal of torque OK and count complete signal after fastening all set numbers. The count complete signal will be off after a reset of count number when a next work piece comes in.

"2" : It provides 100~5000ms of pulse type count complete signal after fastening all set numbers.(Ex-P116=10->10*10ms=100ms)

"3" : It provides 100ms of pulse type alarm signal when a screw is missed in a cycle.

38) 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 becomes ON till the total count is completed. Signal types on P82 are ignored on this feature. "0" : No use " 1~99" : Middle count number		

39) Input Pin #19 Sensor Signal Delay Time Setting

Number	Unit	Range	Initial
P95		0 ~ 100	0
Description	Count stat/stop signal delay time setting. Setting : (0 ~ 100) x (10)ms (0 = No use)		

40) P82=2 Count Complete Time Setting

Number	Unit	Range	Initial
P116	ms	100~5000ms	10ms
Description	When P82=2, set the output time of count complete signal. (Pin no. 20) Output time of count complete=P116 setting value*10ms		

7.6.6 Model Setting

41) Screw Count Number Setting for Each Model

Number	Unit	Range	Initial
P130~137		0 ~ 99	
Description	Screw numbers on each model 1 to 8 is saved on P130 to 137. P130 : Screw # of Model 1 P131 : Screw # of Model 2 P132 : Screw # of Model 3 P133 : Screw # of Model 4 P134 : Screw # of Model 5 P135 : Screw # of Model 6 P136 : Screw # of Model 7 P137 : Screw # of Model 8 Maximum screw number is 99 for each model.		

42) Select Model by 25P I/O Enable/Disable

Number	Unit	Range	Initial
P138		0 or 1	0
Description	8 of screw counter model can be selected on SDC by external signal and each model can be programmed a sequence including 20 presets in one cycle. *Model can be chosen by 25P I/O Pin no.7,23,24 which is SDC input or SDC front key. ▲ 0 : Disable 1 : Enable Preset No. Model No.  TTL Count Qt'ty/Remaining Count Qt'ty		

43) Auto Sequence Enable/Disable

Number	Unit	Range	Initial
P139		0 or 1	0
Description	Total 20 preset # can be programed for automatic sequential fastening when Model feature on P138 is enabled. "0" : Disable "1" : Enable		

7.6.7 Driver Setting

44) 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]		

45) Screw Type (Clockwise or Counter-clockwise)

Number	Unit	Range	Initial
P19		**1 or 2**	**1**
Description	It selects one of the screw type below ; "1" : Clockwise "2" : Counter-clockwise The initial value is "1" for "Clockwise" After selection change, power off the controller and on again.		

46) 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 P75.		

46) Parameter Initialization 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. To use and clear error, SDC should be reset. When different model of driver is connected, SDC should be rest on P76.		

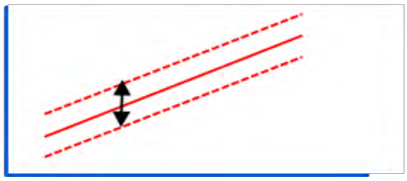
47) Converted Torque Display for Real Time Monitoring

Number	Unit	Range	Initial
P128		0 or 1	0
Description	Converted torque is shown in real time through the SDC front LCD window and C-torque value is output via communication port after driver run regardless of torque-up. 0 : Disable 1 : Enable		

48) Error History (except the pattern error)

Number	Unit	Range	Initial
P200~207			
Description	The total 8 latest errors except the pattern error is recorded from P200 to P207. If stored data is more than 8, the last 8 are stored. P200 : The last error P201 : Before the last error P202 : The last error -2nd P203 : The last error -3rd P204 : The last error -4th P205 : The last error -5th P206 : The last error -6th P207 : The last error -7th		

49) Torque Tuning

Number	Unit	Range	Initial
P211~218	1%	-10~+10%	0
Description	When the values of target torque and converted torque are different, it can compensate each presets for the differences. Each compensation is saved at controller. If connected driver is changed, converted torque could be different. 		

50) Others

No	Description
P140-179	Model sequence data
P180-199	Multi-sequence data
P219	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 cannot recognize the connected screwdriver.	Power Off →On
115	Controller recognition error	Program itself cannot 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 EEP-ROM 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 provides alarm for set time(P74) and displays 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 each 8 preset numbers through 25P I/O interface. These ports are designed for sensors to be wired directly.

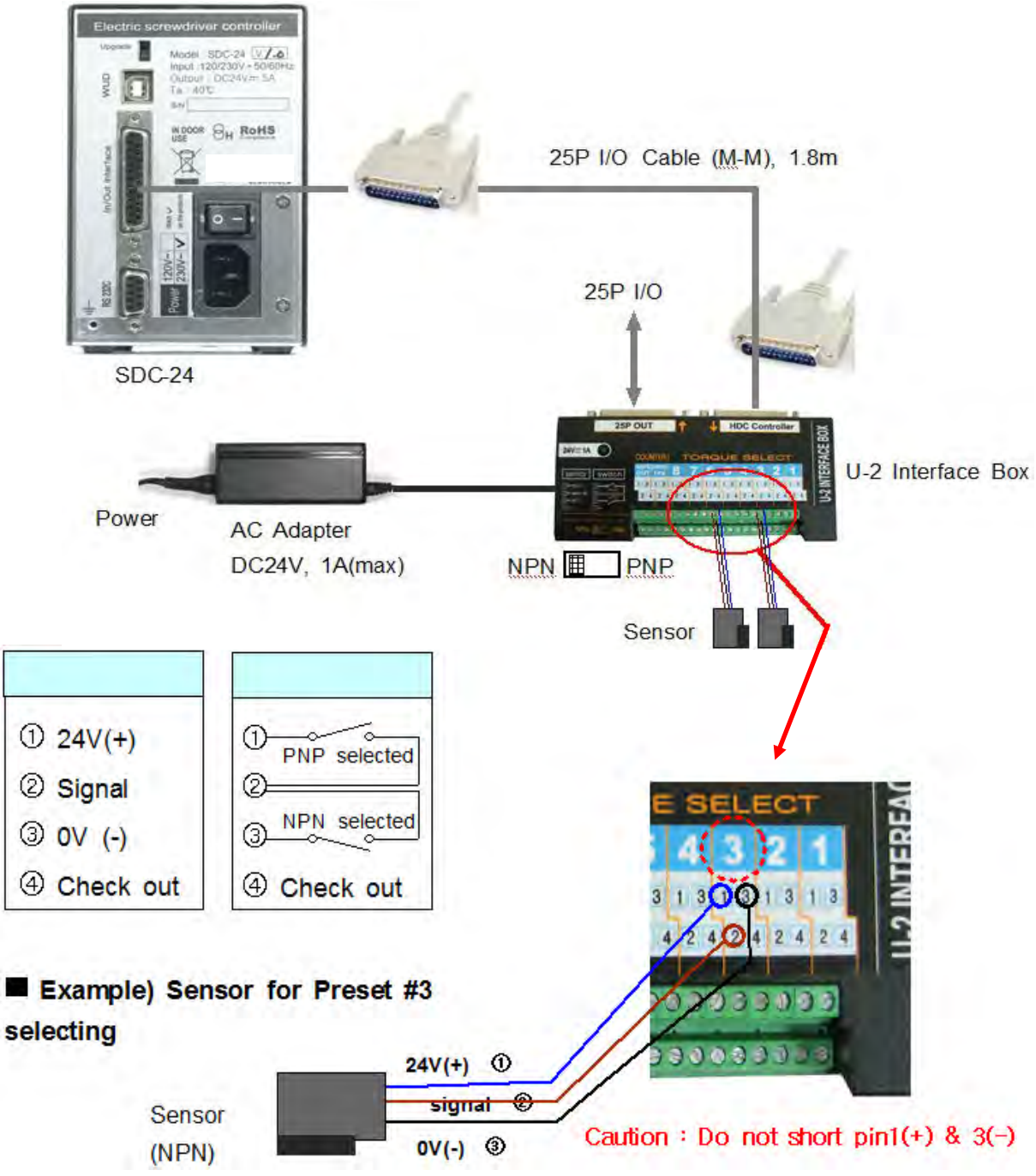
When the sensor 1 is activated, the preset no.1 is selected accordingly.

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)

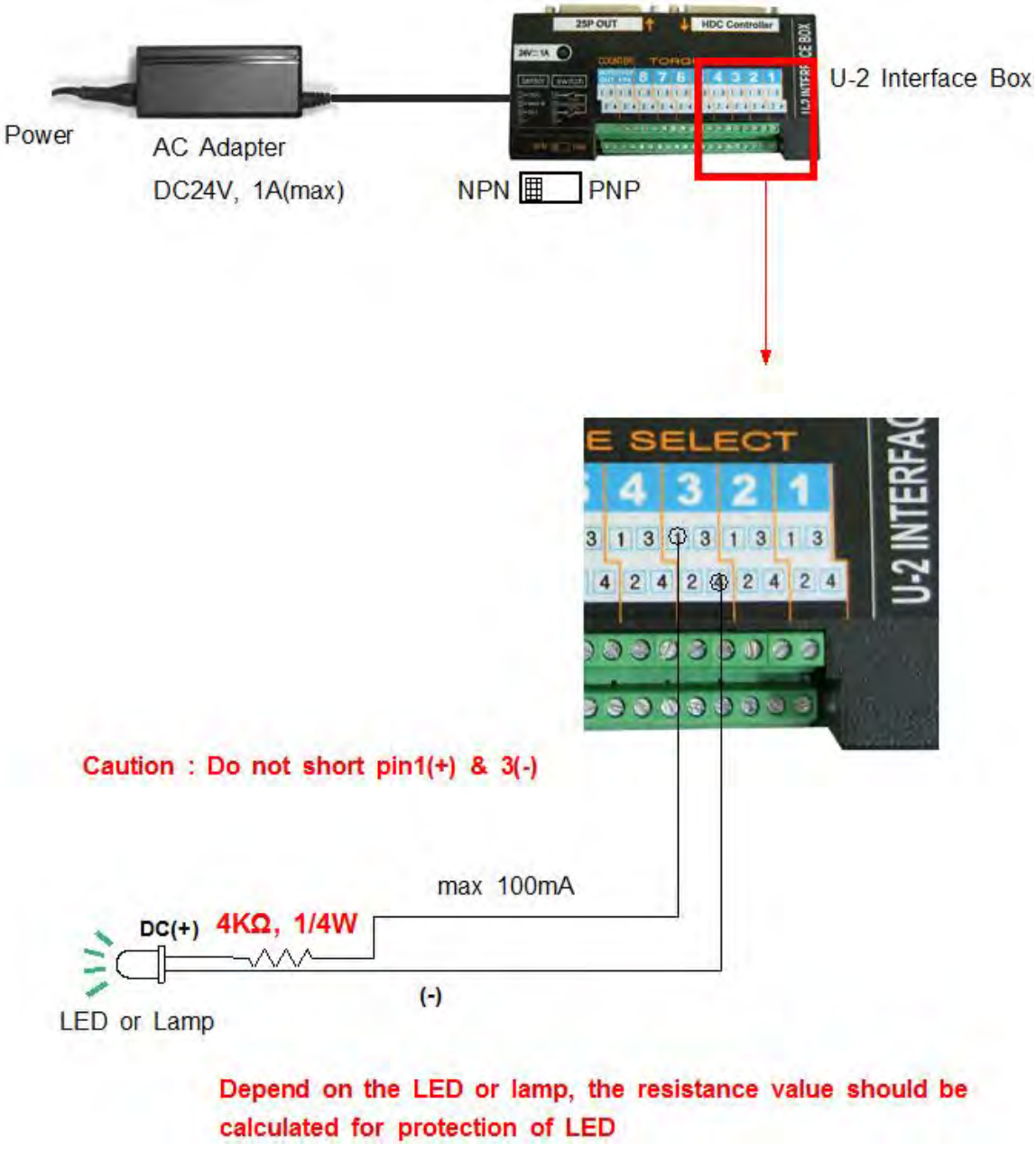


7.9 Wiring example of check out signal output

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 "



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 cannot be used together with the direct sensor port.

For selecting a parameter using 25P I/O port, choose "1", “3” or “5” on the parameter P20.

By binary coding with 3 pins (pin no.1,2 and 3) among 25 pins, it makes 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

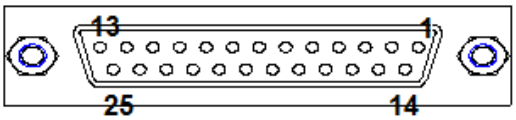
The configuration of 25P I/O port is different by the setting on P64.

[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 (I) - for Sensors (Selecting Preset #)

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

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	
24	Model select IN2	
10	Status of torque select OUT1	OUTPUT (to Controller) 
11	Status of torque select OUT2	
12	Status of torque select OUT3	
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 (II) - for PLC

[P20 Setting] " 1 " : Remote Control I/O for PLC
" 3 " : Remote Control I/O for PLC (Except Pin no.4 and no.6)
" 5 " : Remote Control I/O for PLC (Except Pin no.4-by manual operation)

PIN no.	Configuration	IN / OUT
1	Torque select IN1	INPUT (to Controller) 
2	Torque select IN2	
3	Torque select IN3	
4	START (only for P20=1)	
5	Driver Lock (P86 : 0) Angle count start by signal (P86 : 1)	
6	F/R (For: 0, Rev: 1) (only for P20=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 (P80 "3" selected)	
19	Work-piece move IN to area	
23	Model select IN1	
24	Model select IN2	
10	Error code OUT1	OUTPUT (to Controller) 
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 (III) – for Sensor + PLC

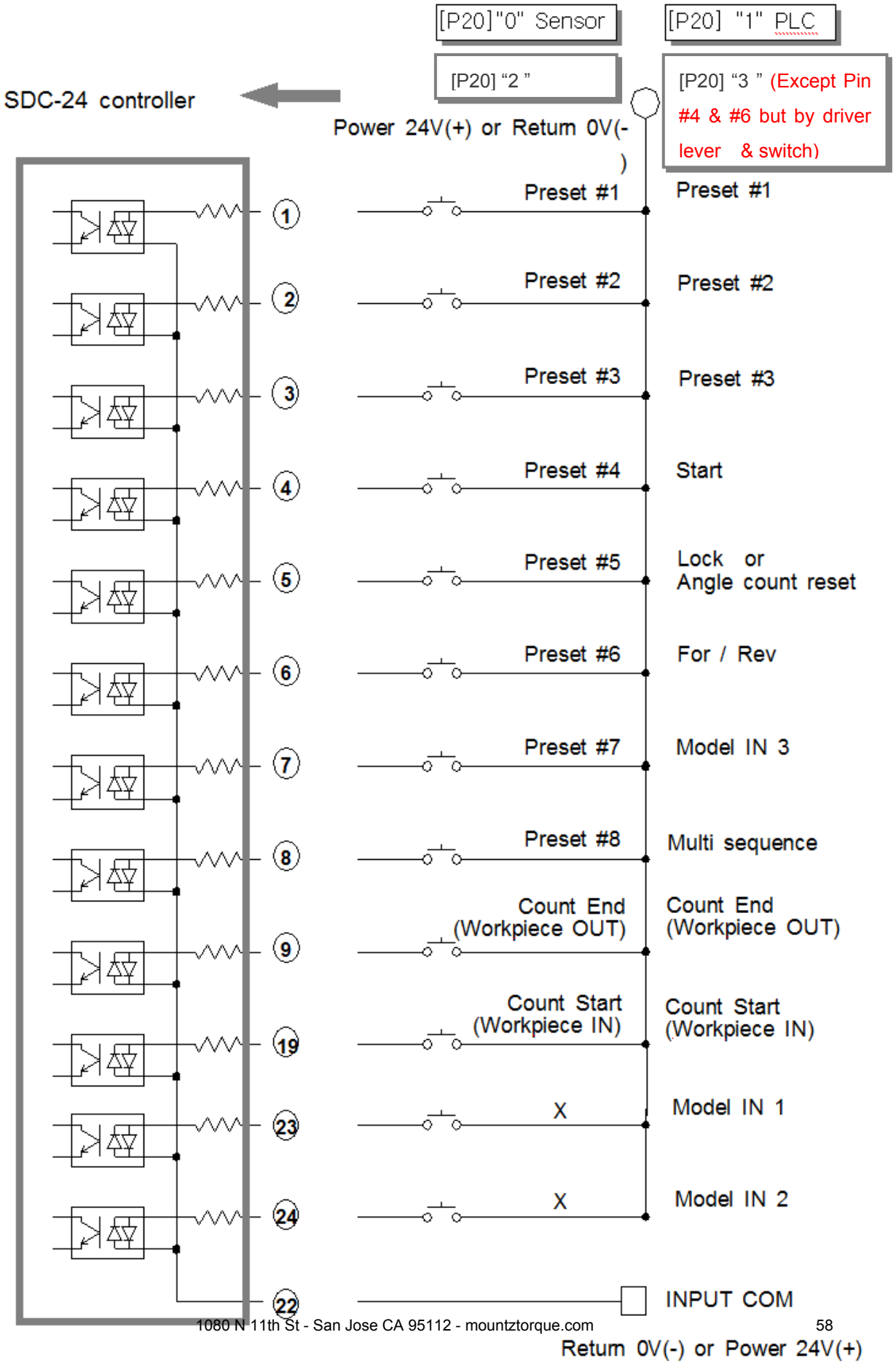
Torque selector by Sensor (Input) + PLC (Output)

[P20 Setting] - " 2 " : Combined

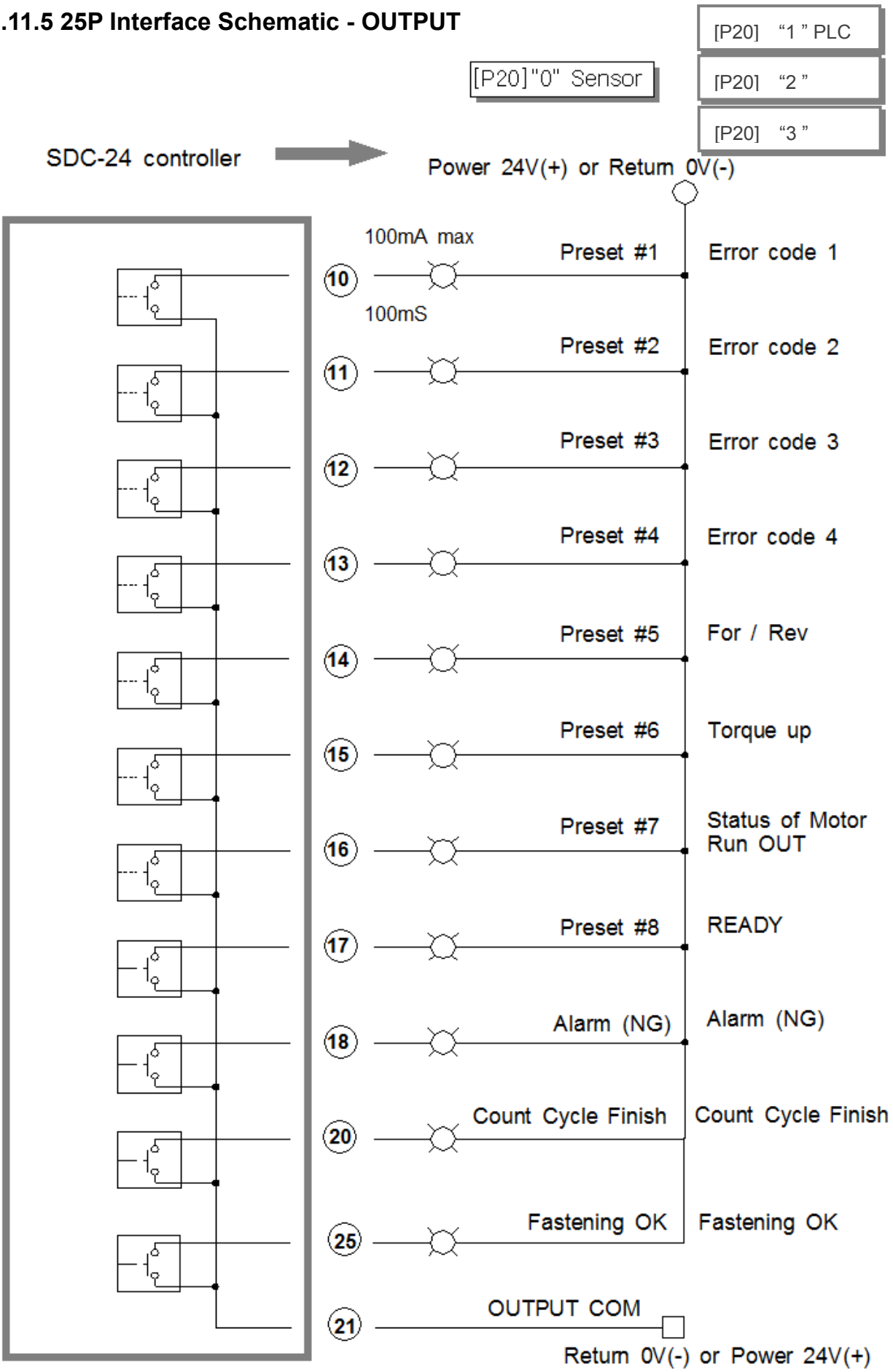
PIN no.	Configuration	IN / OUT
1	Torque select IN1	INPUT (to Controller) 
2	Torque select IN2	
3	Torque select IN3	
4	Torque select IN4	
5	Torque select IN5	
6	Torque select IN6	
7	Torque select IN7	
8	Torque select IN8	
9	Reset (include cycle reset) or Work-piece move OUT from area (P80 "3" selected)	
19	Work-piece move IN to area	
23	Model select IN1	
24	Model select IN2	
10	Error code OUT1	OUTPUT (to Controller) 
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	

21	Output COM	
22	Input COM	

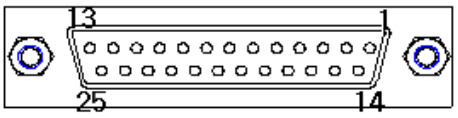
7.11.4 25P Interface Schematic – INPUT



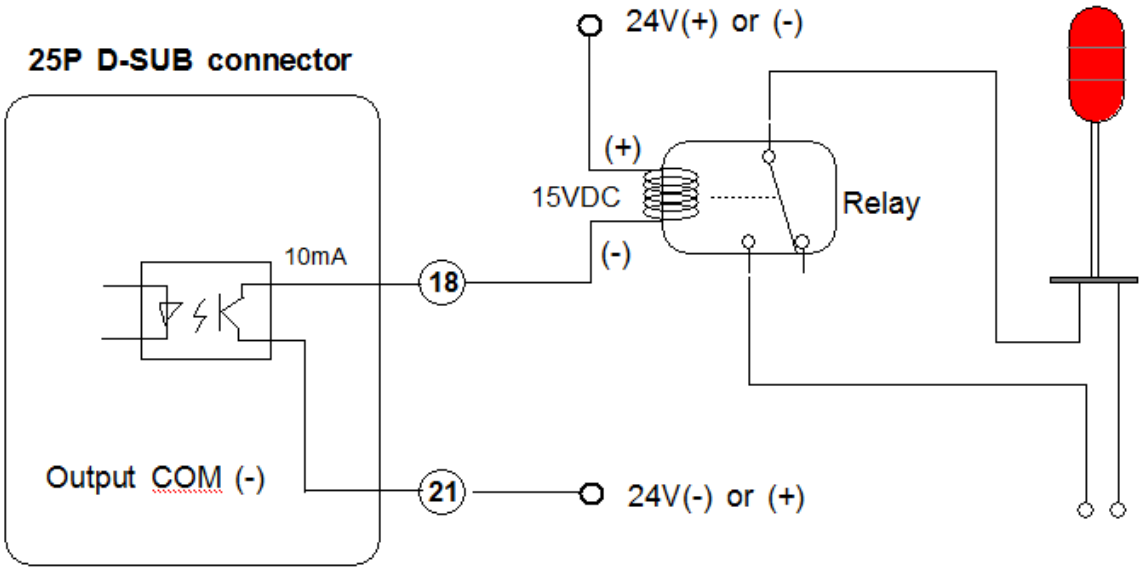
7.11.5 25P Interface Schematic - OUTPUT



7.11.6 Wiring of the Alarm Signal to the Tower Lamp



25P D-SUB connector
18 - Alarm
21 - Output COM

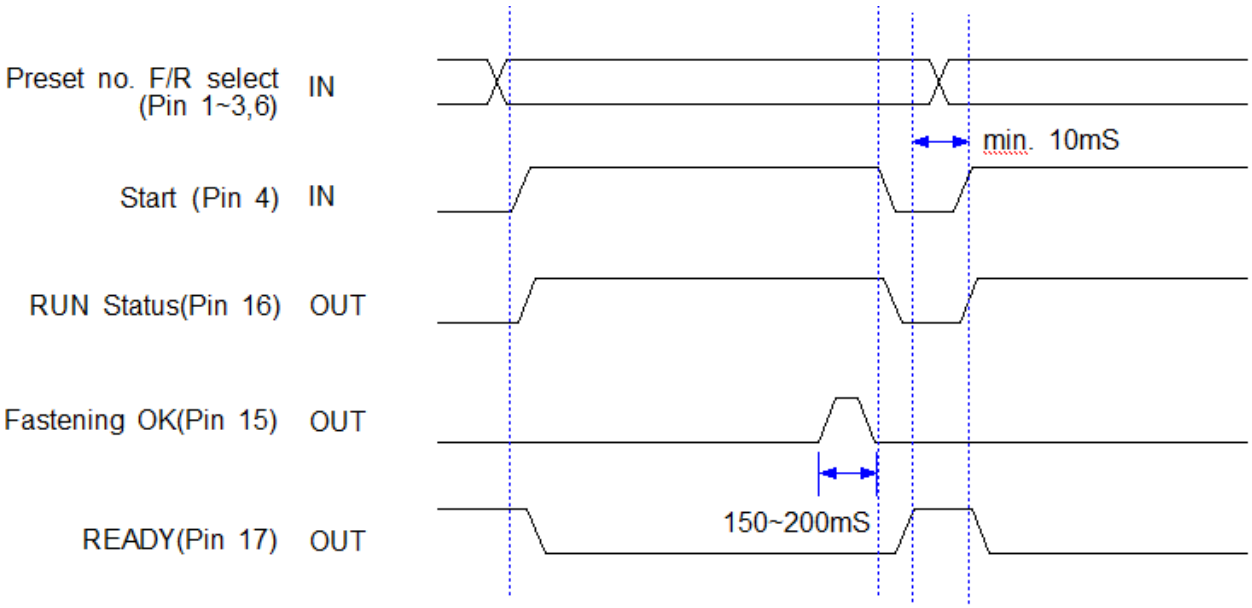


7.11.7 Error Code Pin Composition on 25P Output _ [P20] "1"PLC

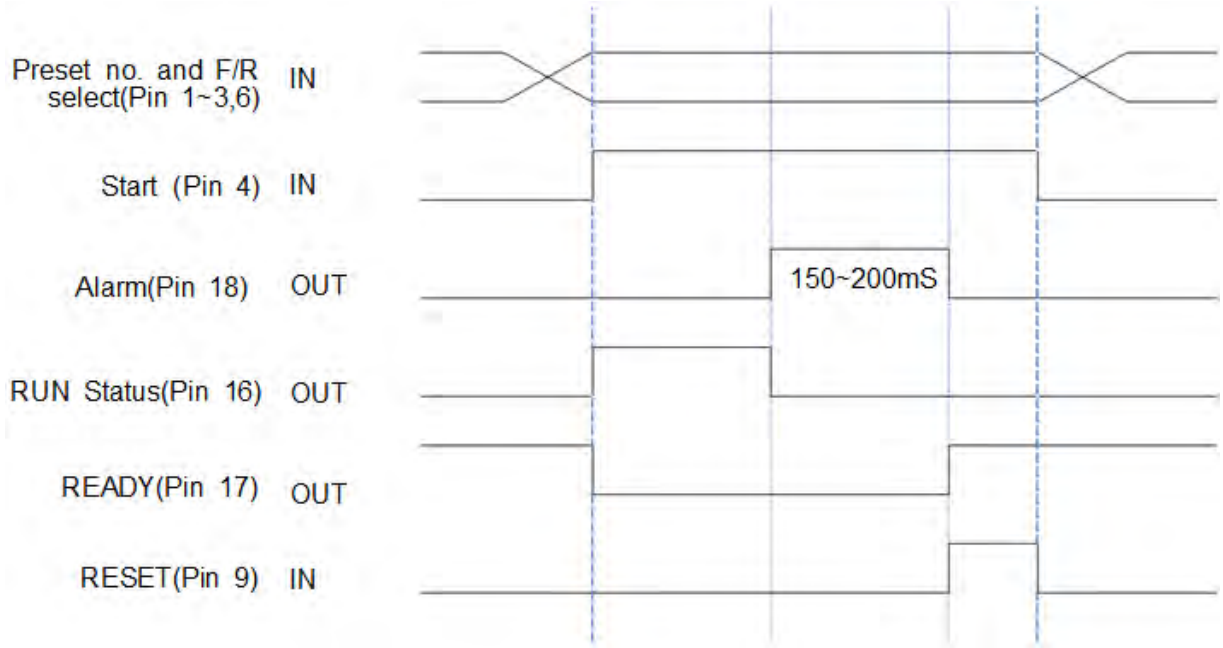
Error code	pin 10	pin 11	pin 12	pin 13
110	0	0	0	1
111	0	0	1	0
112	0	0	1	1
113	0	1	0	0
114,115,200,201	0	1	0	1
330, 333	0	1	1	0
331	0	1	1	1
332	1	0	0	0
220	1	0	0	1
300, 301	1	0	1	0
311	1	0	1	1
302	1	1	0	0
303	1	1	0	1
304	1	1	1	0
310	1	1	1	1

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;

4 different type of Count Start and Finish signals. (selectable)

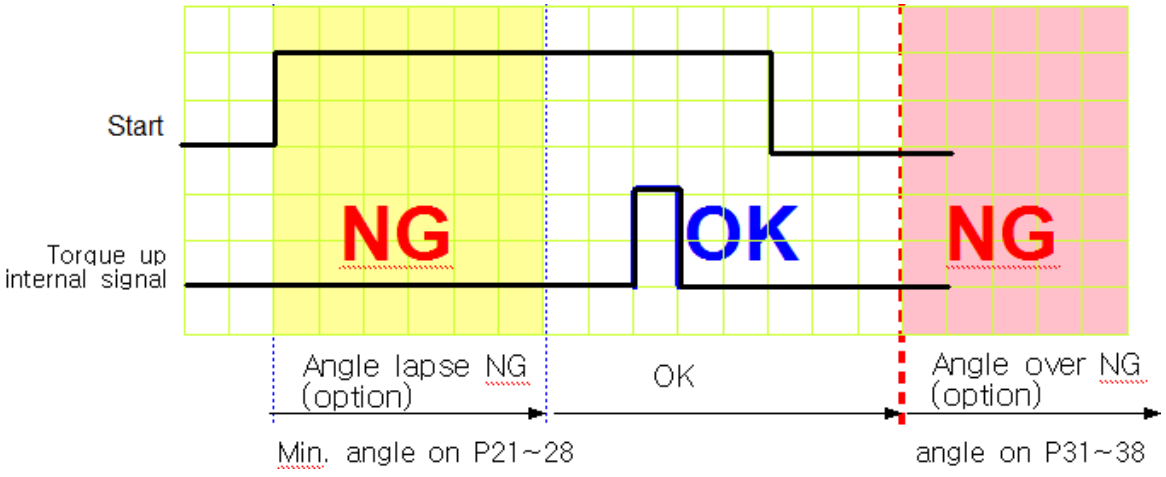
② Real time monitoring by PC program

③ Error code display and monitoring basic data including fastening time, angle

7.13.1 Fastening quality verification (OK/NG)

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

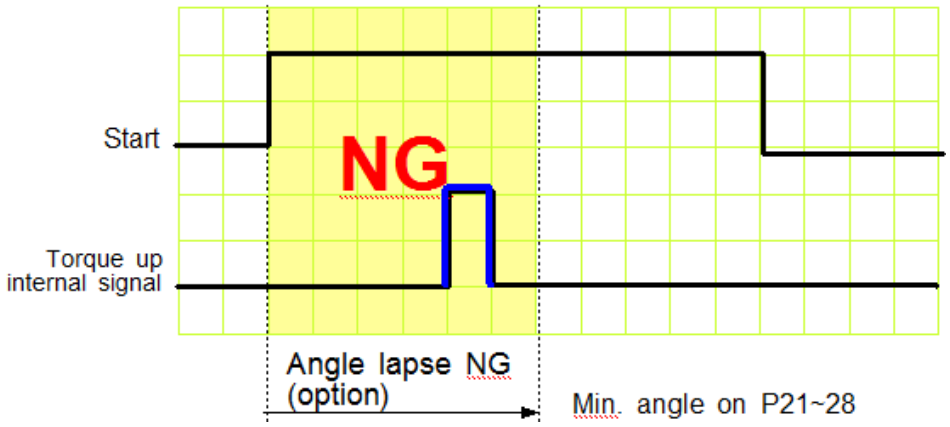
1) Fastening OK



- The driver is designed to stop automatically when the torque reaches 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 verifies it as NG with error code **E332.**

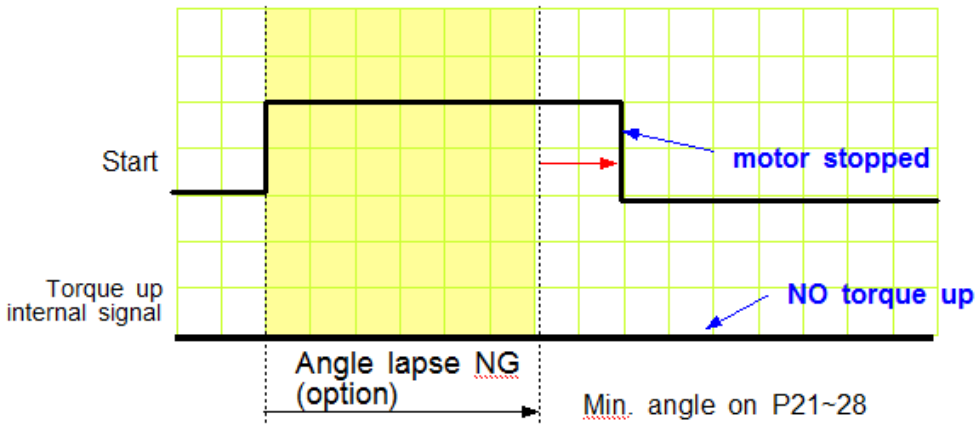
2) Fastening NG (Angle lapse) Error Code Display : E r 3 3 1



If the driver reaches to the target torque before the Min. angle setting on P21 ~ 28, it is NG. (Angle lapse)
Even the torque reaches 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 : E r 3 3 0

If fastening is cancelled over Min. angle on P21 ~ 28, it displays error code 330 when this NG verification is selected on P78



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

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

For SDC 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 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.

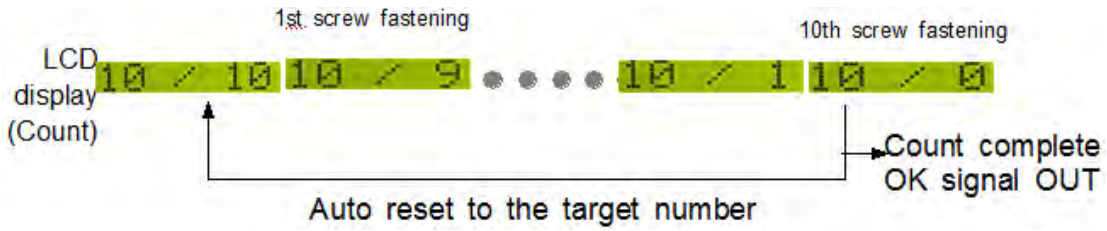
The signal port for Count Start and Count complete OK is located on Count port of the back panel of SDC.

*** Refer to the page 68,69 for wiring.
It is same as the preset no. selecting by sensor

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

When the count number reaches to the target, it displays " 0 " (remaining number) on LCD and resets the number to the target immediately.

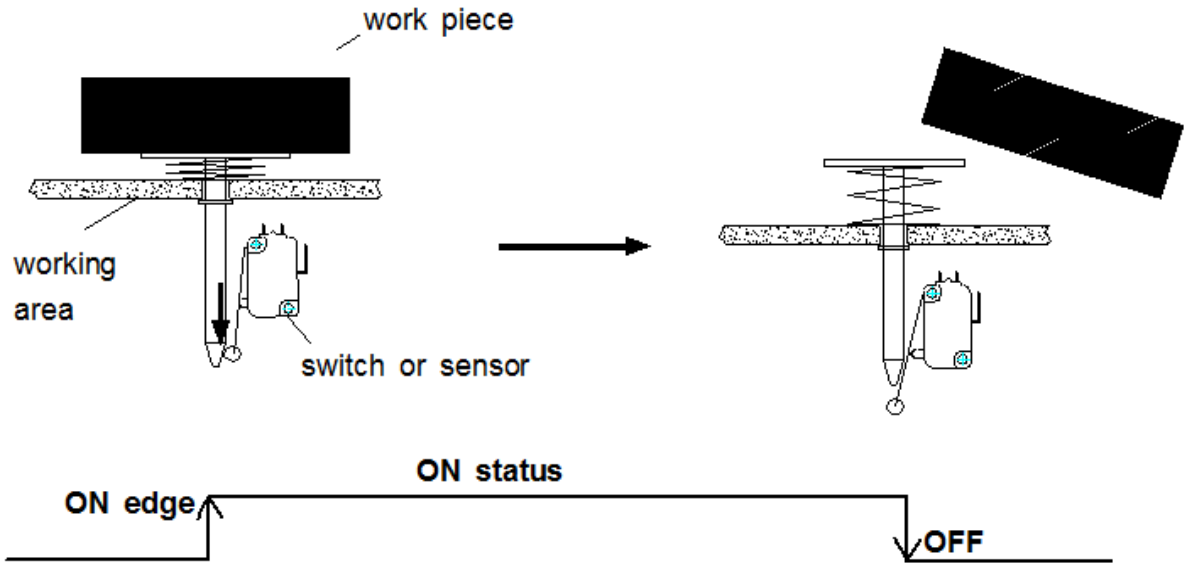
Example) the target screw number is "10"



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

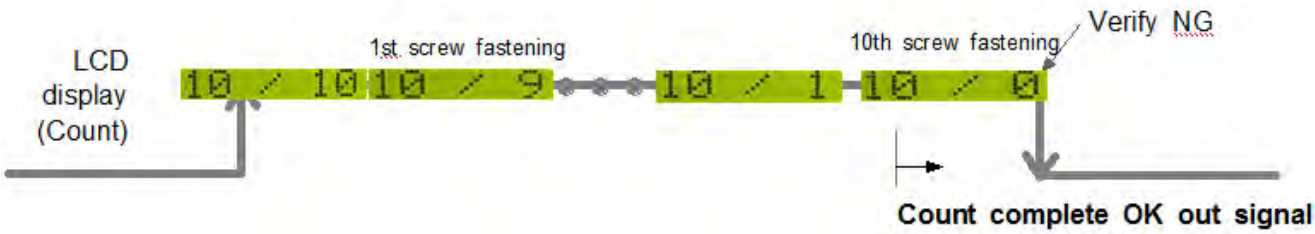
2) One continuous pulse type signal (select "1" on P80)

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 provides the Count complete OK out signal. It verifies the NG when turning ON and OFF which means that the fastening work is finished, because the work piece leaves the working area. If the**re** is still number remaining over 1 on LCD, it verifies NG with error code Er311

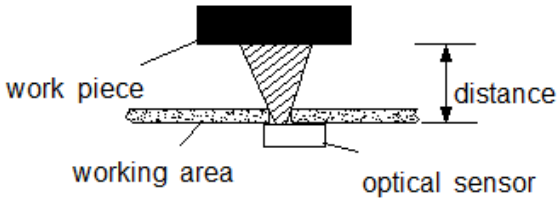


The display resets to the target number when the Count Start signal is turned ON again

Example) the target screw number is "10"



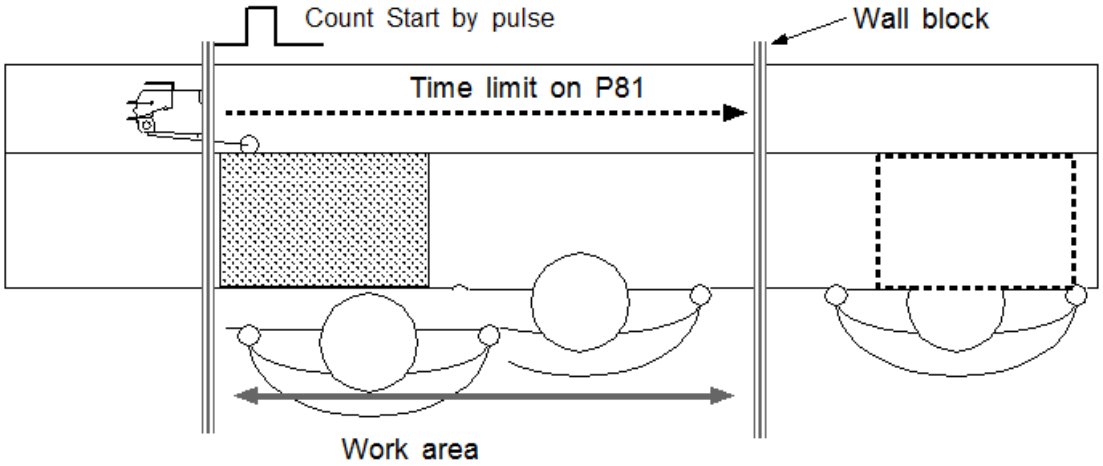
The above switch can be replaced to the sensor as shown on right.



3) One Pulse Type Signal (select "2" on P80)

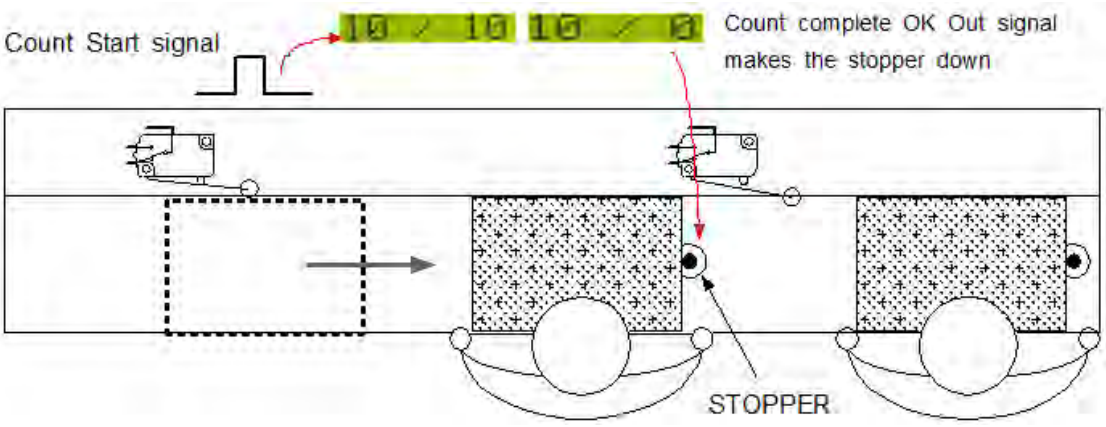
It starts counting number of screw on receipt of pulse signal. There is no Count Stop signal. When the counting reaches to the target, it will provide the count complete OK output signal.
But if the time after start is limited on P81, SDC will verify NG at the set time.
If the fastening is not complete till the set time, it will verify NG with the error code E r 3 1 1 for 3 seconds and will display the remaining number.
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.

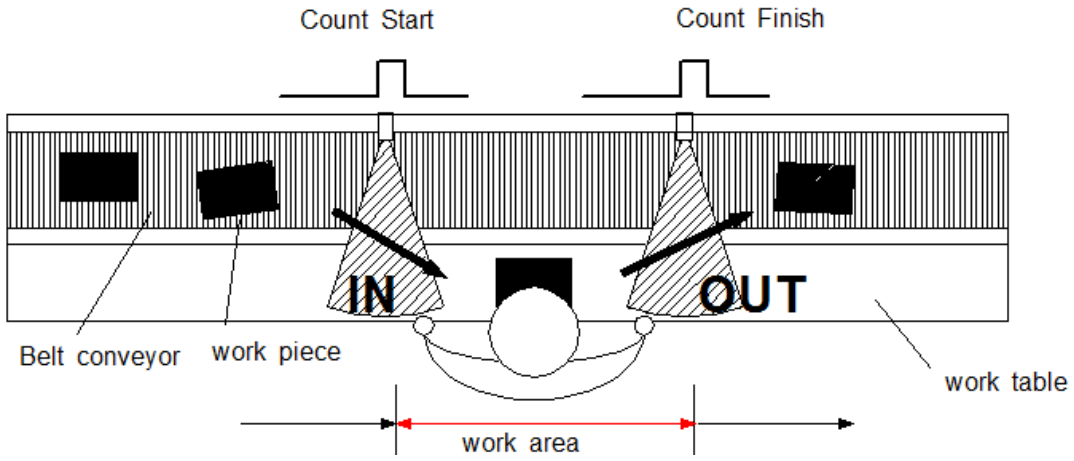


4) Two Pulse Type Signal (select "3" on P80)

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 E r 3 1 1

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 68, 69 for wiring.
It is the same as the preset no. selecting by sensor

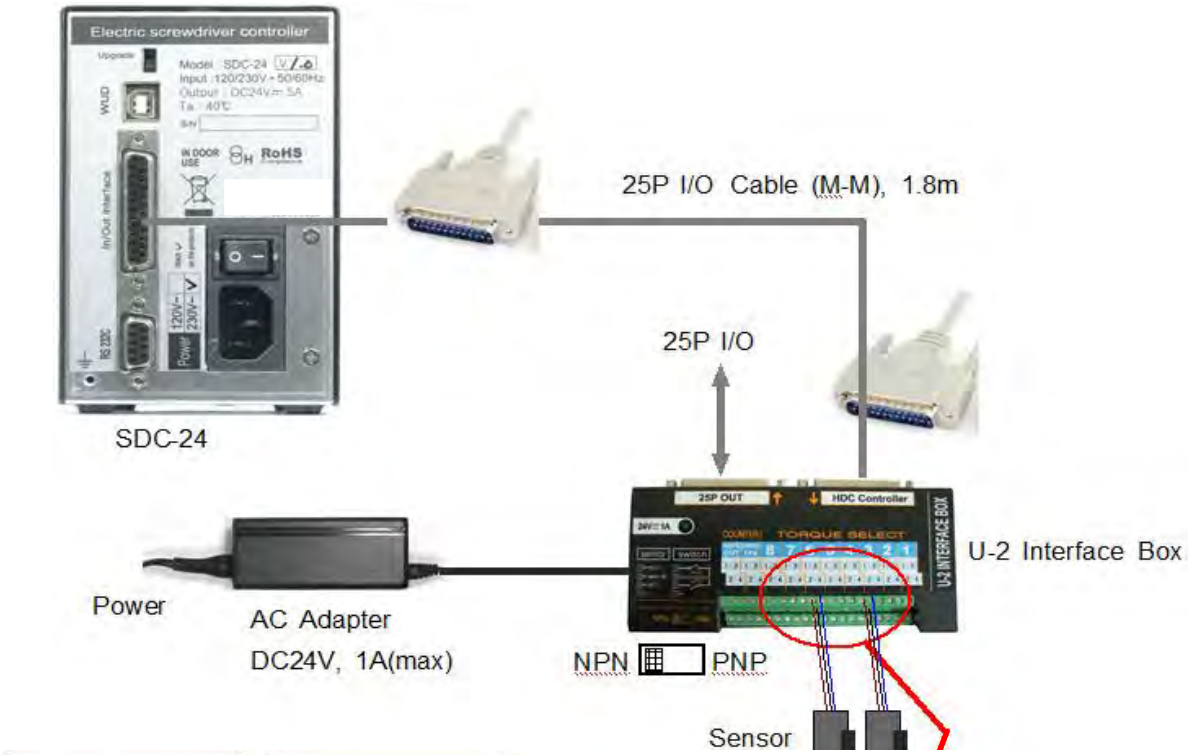


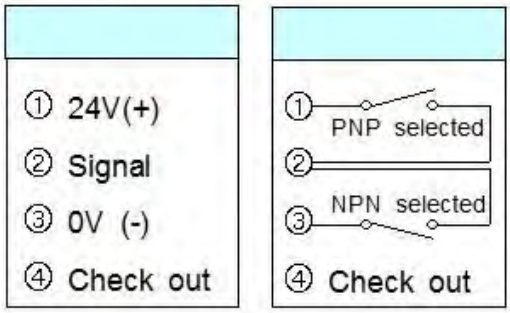
The above two sensors can be replaced to switches.

7.13.3 Wiring of Count Start & Stop

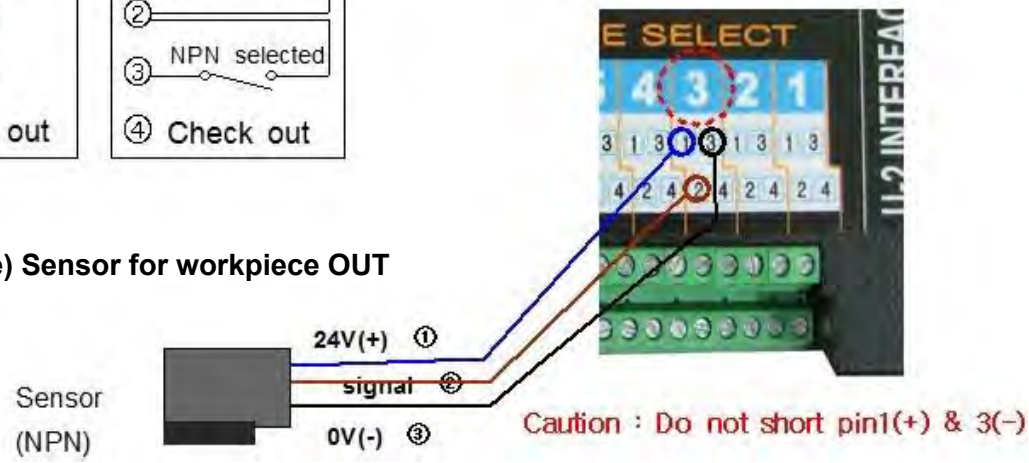
1) Count Start & Stop signal through U-2 Interface Box

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

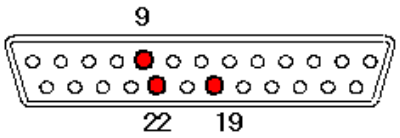




■ **Example) Sensor for workpiece OUT**

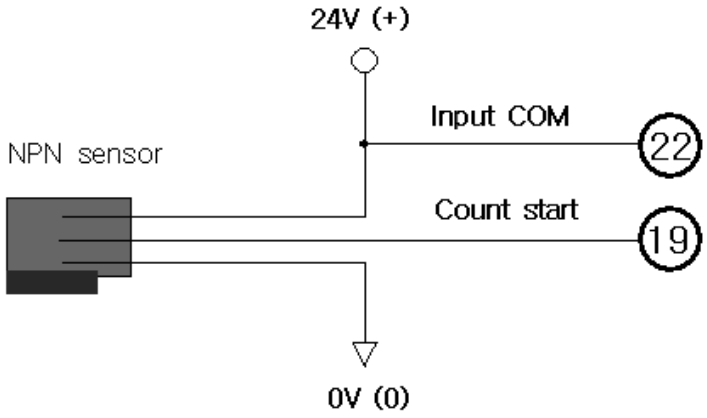


2) Direct Wiring to 25P I/O Interface Port

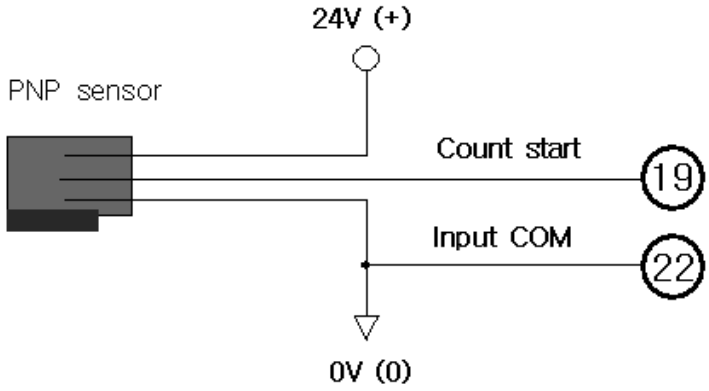


25P I/O D-Sub connector

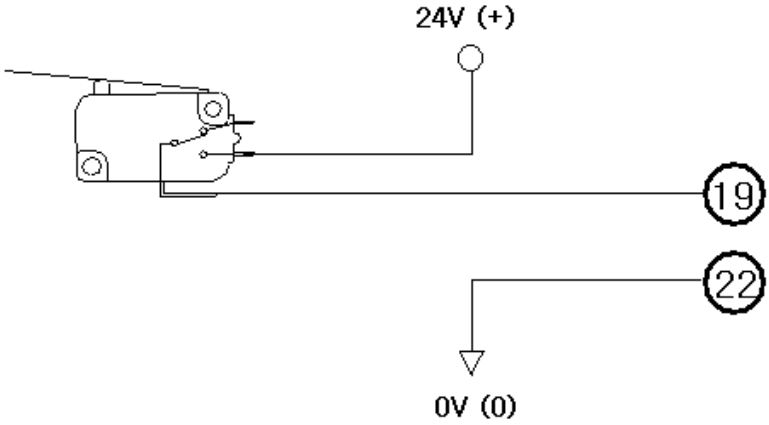
■ SENSOR (NPN type)



■ SENSOR (PNP type)



■ Switch



7.13.4 Operation of Screw Counter on SDC

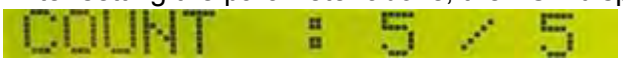
The screw counter function of SDC controller can be used as a single fastening quality monitoring device.

■ 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.
※	P130	Key in the numbers of screw to count. ex) Key in "5" on P130 --> 5 screws
※	P80	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.

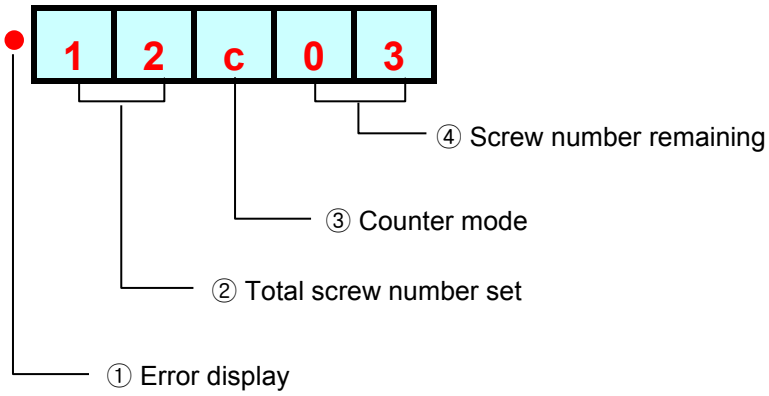
After setting the parameter above, the LCD display will show



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".

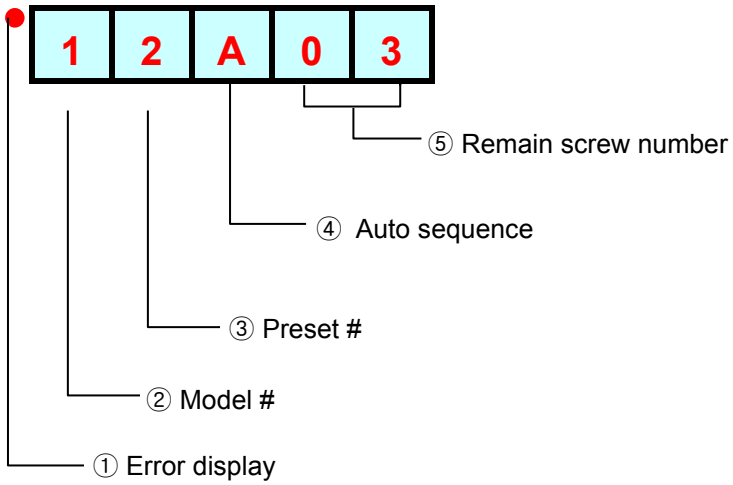
7.13.5 FND Display for Counter Mode (select "4" on P29)

(for FND version only)



7.13.6 FND Display for Model Selecting

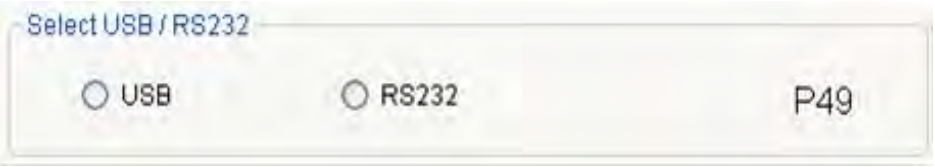
(for FND version with firmware v1.06 or lower)



8. USB Communication (Option)

SDC controller has the 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.(=0)



8.1 Port and Cable

USB COM Cable [A-B] type 1.8M (code number 518-0020)

8.2 USB Driver Installation

Before driver installation on PC, disconnect the USB cable.

Install file : CP210x_VCP_Win_XP_S2K3_Vista_7.zip

Extract the provide file, and double click " CP210x_VCP_Win_XP_S2K3_Vista_7.exe" for auto installation on PC.

9. RS-232C Communication

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

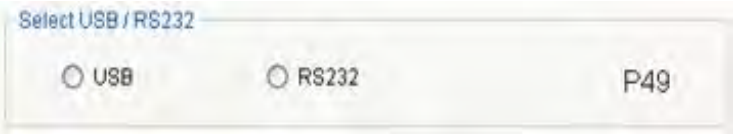
Operator should choose one of communication port between USB or RS-232C on P49.

These two communication ports cannot be used together at same time.

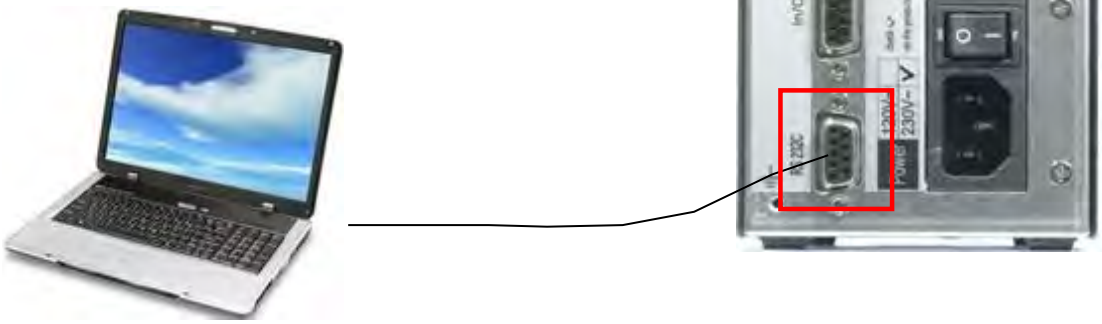
The initial value is 1, RS232C.

9.1 Connection

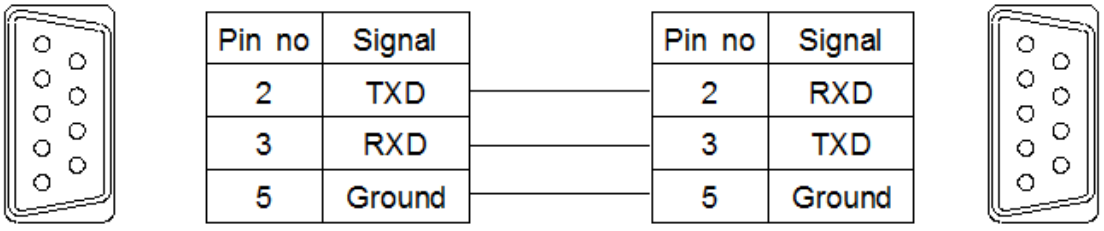
1) Select RS232 on P49.



2) Cable Details



RS232C cable 2M Female-male



A side (SDC-24)

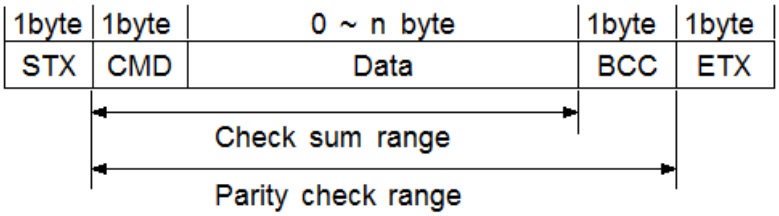
Pin no	Signal
2	TXD
3	RXD
5	Ground

B side

Pin no	Signal
2	RXD
3	TXD
5	Ground

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 as two blocks of long message.

9.2.3 Command

The command for data request and response are the 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 (ACK ←)
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 adds all binary numbers within Check sum range and converts to 1 Byte of ASCII code. The "36H" is Check sum result (BCC) at the example below.

STX	CMD	Data	BCC	ETX

The hexadecimal of the last number, 6 of 146 is 36.

Example)

STX	V		1		0	0	1	BCC	ETX
02	56	00	31	2E	30	30	31	146	03

----ASCII Code

02	56	00	31	2E	30	30	31	146	03

----Hexa Code

5 6 H
0 0 H
3 1 H
2 E H
3 0 H
3 0 H
+ 3 1 H

1 4 6 H ------- Hexa Code

31H 34H 36H ---------- Hexa value of "6" 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 P130 (Model #1) (00 - 99)

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

3 : Current Speed set (0000 - 1800)

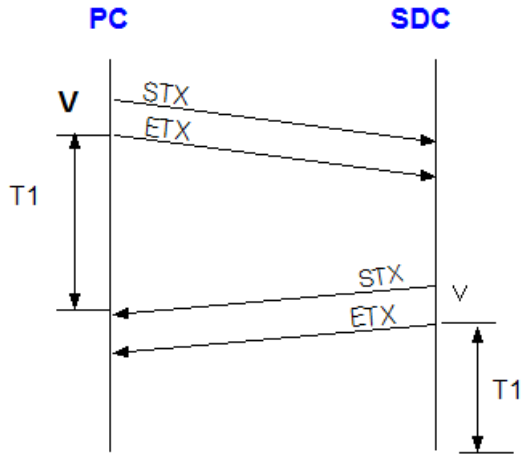
4 : Current Torque set / unit 0.1 (000 - 150)

5 : Fastening status

"0" : On fastening

"1" : Fastening OK

"2" : Fastening NG



T1 < 500 msec

T1 > 1 sec : time out

2) Parameter Data Request and Response

Request

STX	P	1	1	1	BCC	ETX

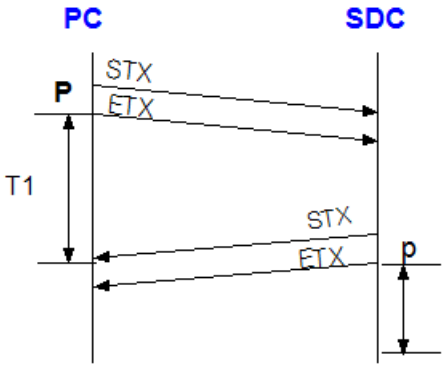
Response

STX	p	2	2	2	2	BCC	ETX

1 : Parameter no. / ex) key in "001", it 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



T1 < 500 msec

T1 > 1 sec : time out

3) Save Parameter Data

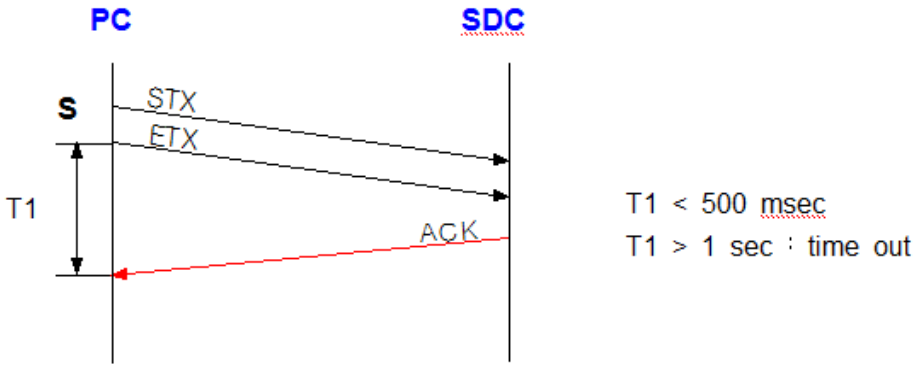
Transmit

		Parameter #			Data					
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) "0100" for 1.0 Kgf.cm in SD120 selected



4) Monitoring Data Request

Request

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

Response

STX	m	monitoring data as below	BCC	ETX

■ **Monitoring data**

Fastening time(99999ms) & Preset(1) & Torque(999)/10 & RPM(9999) & A1,A2,A3 Angle(999)/10 & Error no(999) & Count(99) & F/L(1) & OK(1)

5) Torque Graph Data Request

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	comm and	data type	Sampling Rate	Fastening Time	Torque	Converted torque	RPM	A1	A2	Data(200 data)	Check Sum data	ETX
ㄱ	g	T	2	01000	085	084	0700	0330	0010	xx, ... vv,zz,	8	ㄴ

Data field

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

1. Start of Text (STX) : ㄱ
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 : Refer to article 9.2.4.
13. End of Text (ETX) : ㄴ

6) Screwdriver Information Data Request and Response

Request

STX	D	1	1	1	BCC	ETX

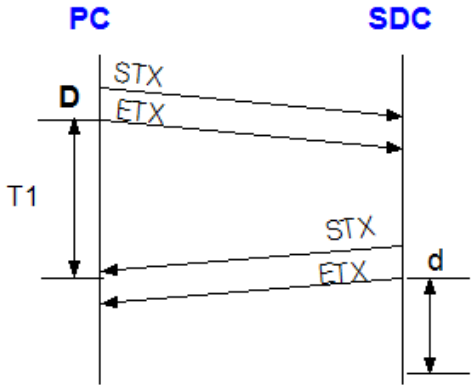
Response

STX	d	2	2	2	2	BCC	ETX

1 : Driver Parameter no. / ex) key in "001", it means driver parameter is no.1.

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

Example) "1009" for version 1.00.9



T1 < 500 msec

T1 > 1 sec : time out

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(3nd 2byte)	
11	S/N #3(2rd 2byte)	
12	S/N #4(1st 2byte)	
13	Torque compensation data	P39 on SDC

Screwdriver Model Table			
1	SDA120Z	19	SD600MS
2	SDA200Z	20	SD1000M
3	SDA600	21	SDA070
4	SDA200	22	SDA1000
5	SDA150ZM	23	SD400M
6	SDA200ZM	24	SDA300
7	SDA300M	25	SDA071
8	SDA200M	26	SDA150ZM_ing
9	SDA600M	27	SD09nM
10	SD1500	28	SDA18nM
11	SD120	29	SDA28Nm
12	SD200	30	SDA071T
13	SD300	31	SDA060
14	SD600		
15	SD070		
16	SD05nM		
17	SD18nM		
18	SD28nM		

7) Driver LOCK (L)

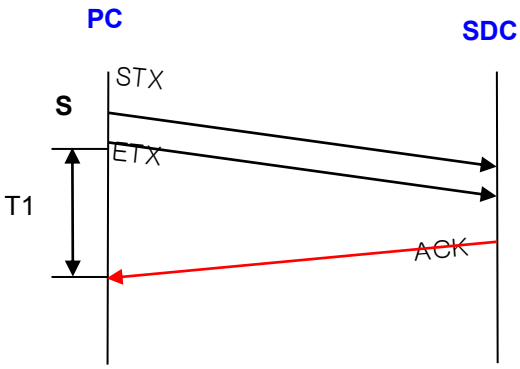
Transmission Data (0 ~ 3)

STX	L	2	BCC	ETX

1 : This command performs a locking function to prevent the rotating an electric screwdriver, such as, for emergency stop. If SDC power on again, this feature is turned off.

2 : Data

(0: Release lock, 1: Two-way lock, 2: Loosening lock, 3: Fastening lock)



T1 < 500 msec

T1 > 1 sec : time out

9.3 Auto fastening data output

If selecting “Enable” on P30 (=1, auto fastening data output), then every fastening data will be out at every events through RS-232(or USB) without data request command.

The output data consists 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
ㄱ	m	9039000001	01350	1	0120	0122	1700	0330	0010	0340	101	02	1	1	8	ㄴ

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

example) ㄱ **m9039001,01350,1,085,084,1700,0330,0010,0340,101,02,1,1,8** ㄴ

1. Start of Text (STX) : ㄱ
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 : Fastening Complete (1), - Idling or Fastening Incomplete (0)
16. Data check sum : Refer to article 9.3.4.
17. End of Text (EXT) : ㄴ

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.

10.1 Software Installation

- PC Operating System : MS Windows (2000, XP, Vista, 7 and 10)
- Display : 1024 x 768 (Optimized)

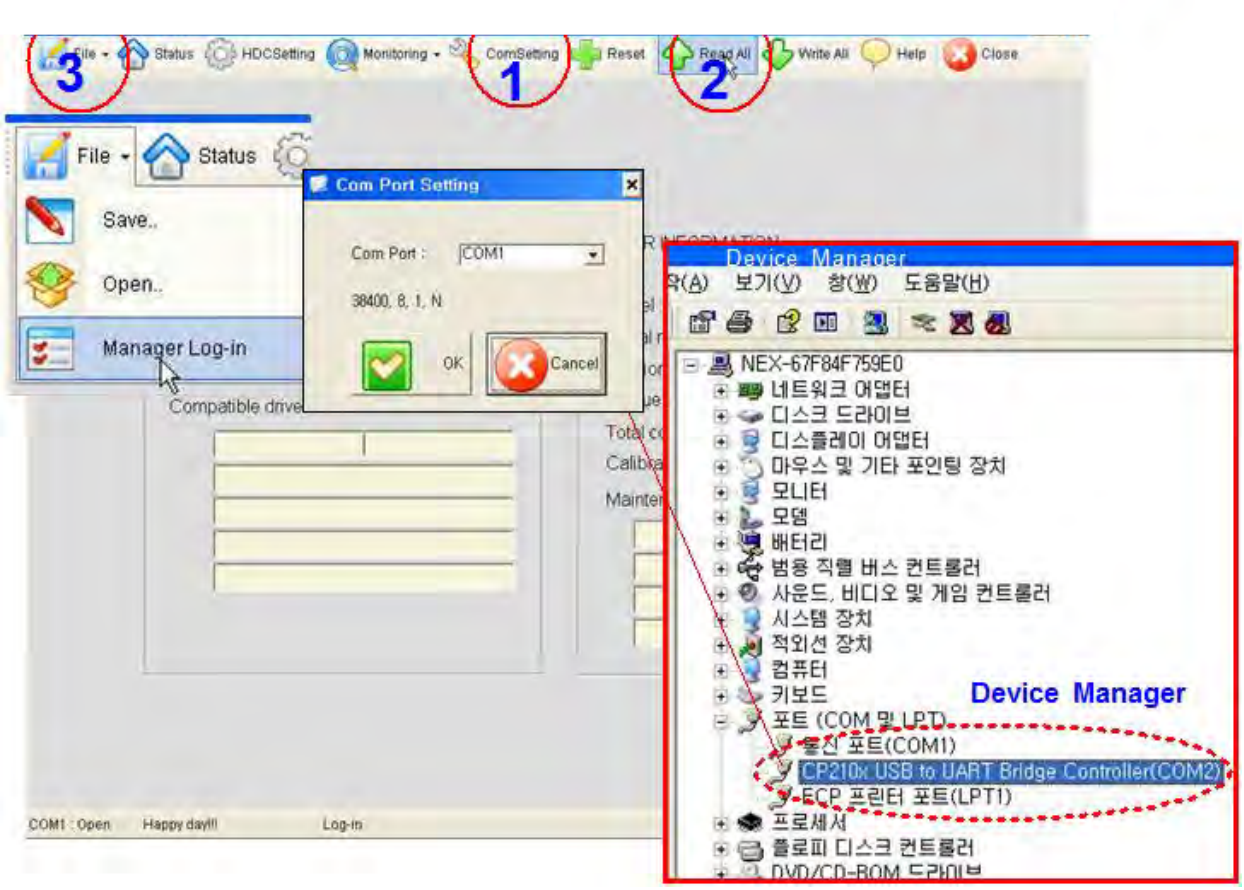
The Hi-Manager software requires MS Dot Net framework v 4.0 or higher on your OS before installation.
Windows 2000, XP, 7 and 10 can be updated with Dot Net framework on the download center of Microsoft web site. (www.microsoft.com).

Microsoft .NET Framework

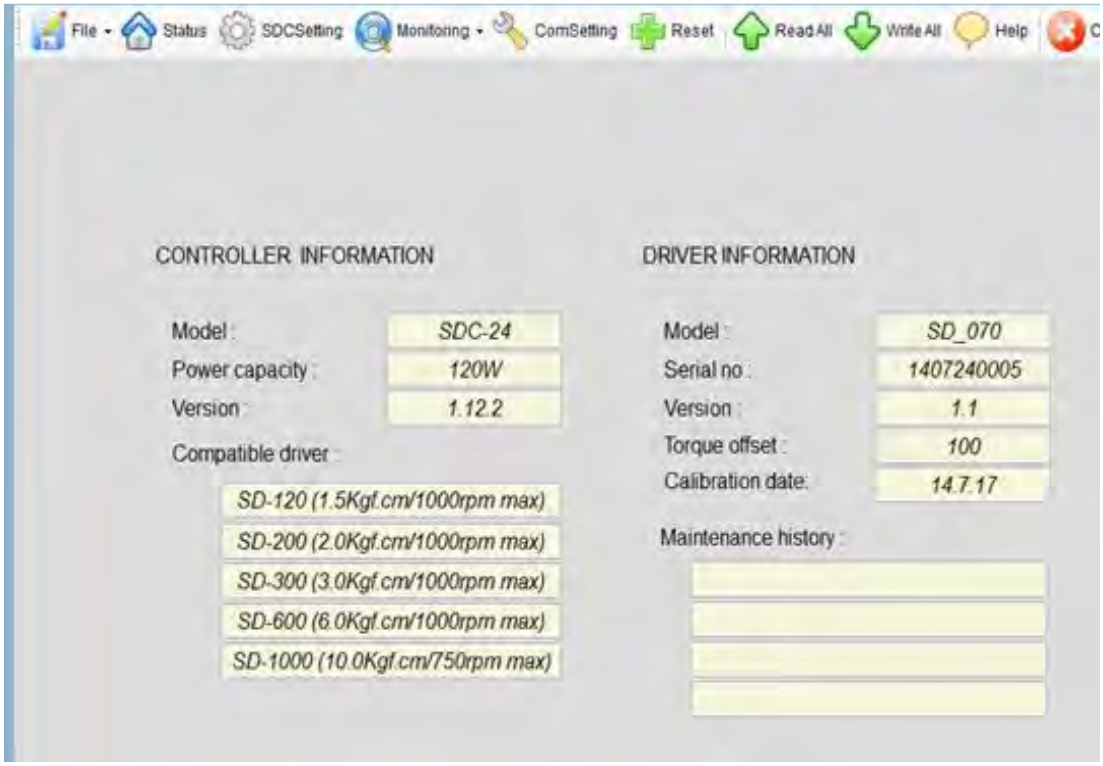
For installation of Hi-Manager, just copy the file (Smart-Manager.exe) on your PC, and double click for open.

10.2 How to use

- Install the provided USB driver (SDC USB driver) on your PC.
- Connect the SDC controller to PC, and power on.
- Check COM port no. for SDC 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 reading all parameters from the connected SDC controller.



If the information of Controller and Driver is indicated on the opening page as below, it means the communication is successful.



10.3 Parameter setting on *Smart-Manager*

1) Fastening Setting (SDC Setting -->)

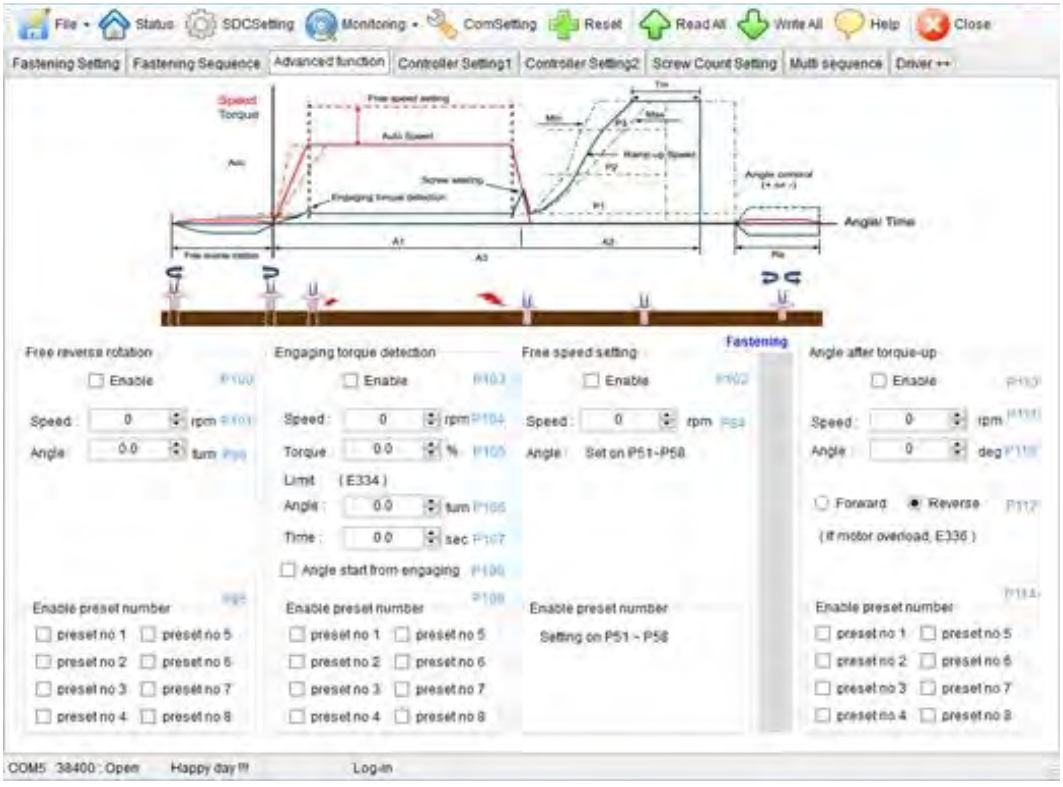
- Selection the torque unit must precede before setting other parameters. Otherwise, all parameters can be changed to the factory setting. After click the button “Change”, the power of SDC should be off and on.

- After changing or selecting parameters, click "WRITE ALL" menu to write new settings on the connected SDC controller.

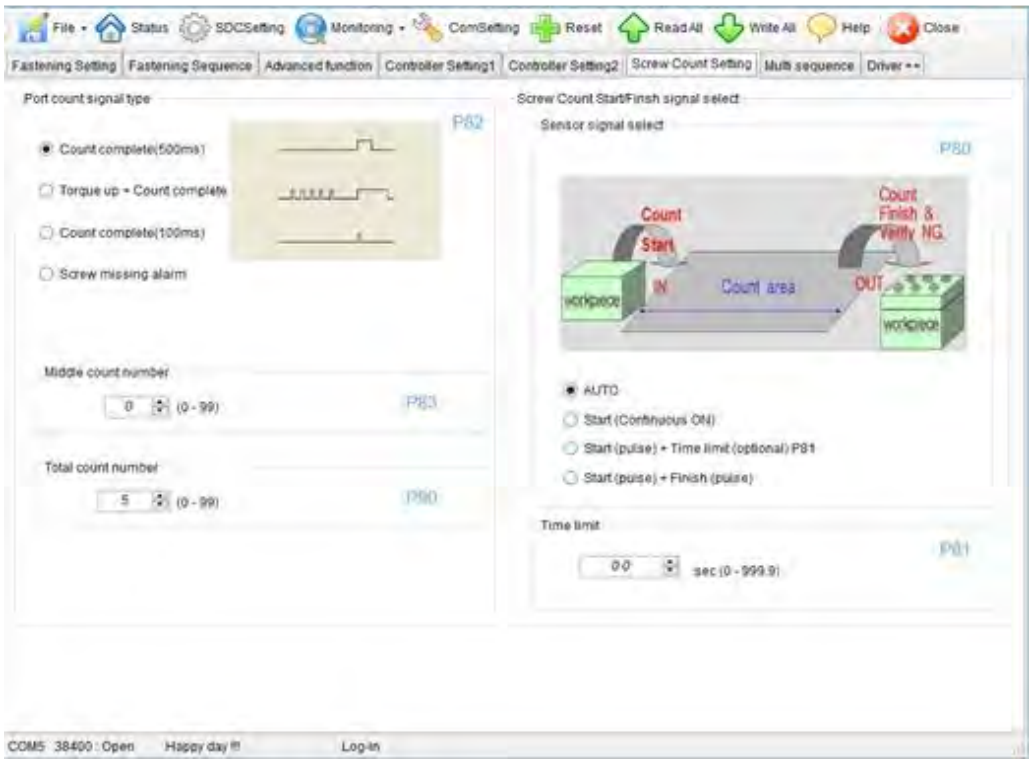
2) Fastening Sequence Setting (Profile of fastening process)

** Refer to 7.6 Parameter details

3) Advanced Function Setting (Fastening process)



4) Screw Count Setting



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

** Mode A, B comes after preset # 8 with displaying of mA, mB on SDC. Fastening OK signal outputs after sequence completes and torque up signal after each fastening step.

※ Detailed Explanation of JUMP, COUNT VALUE=A, SUB IF(A) Commands

■ Example of Multi Sequence Program

The multi sequence starts from STEP 1 in a low. The above multi sequence shows 10 times repeat of STEPs from step 2 to 7, and
finishes a cycle completely.

- Count Value = A

  Count the number of step selected or operated.

- Sub If (A)

  If the counted number of cycle is not 10 (on Step 1, Count Value=A), is not 10, go to the next Step 8.

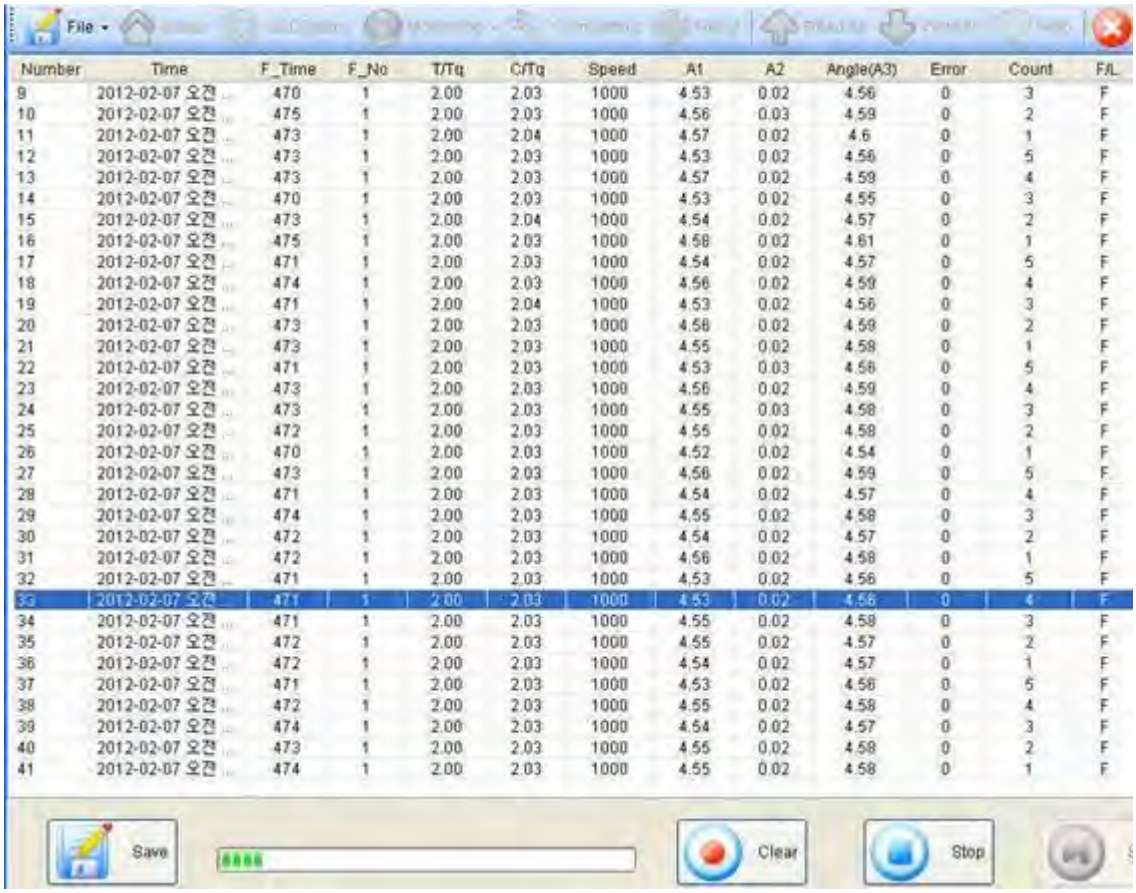
  If the counted number of cycle is 10 (on Step 1, Count Value=A), go the next Step 9.

- Jump

  Move to the set Step 2.

6) Driver ++ Setting

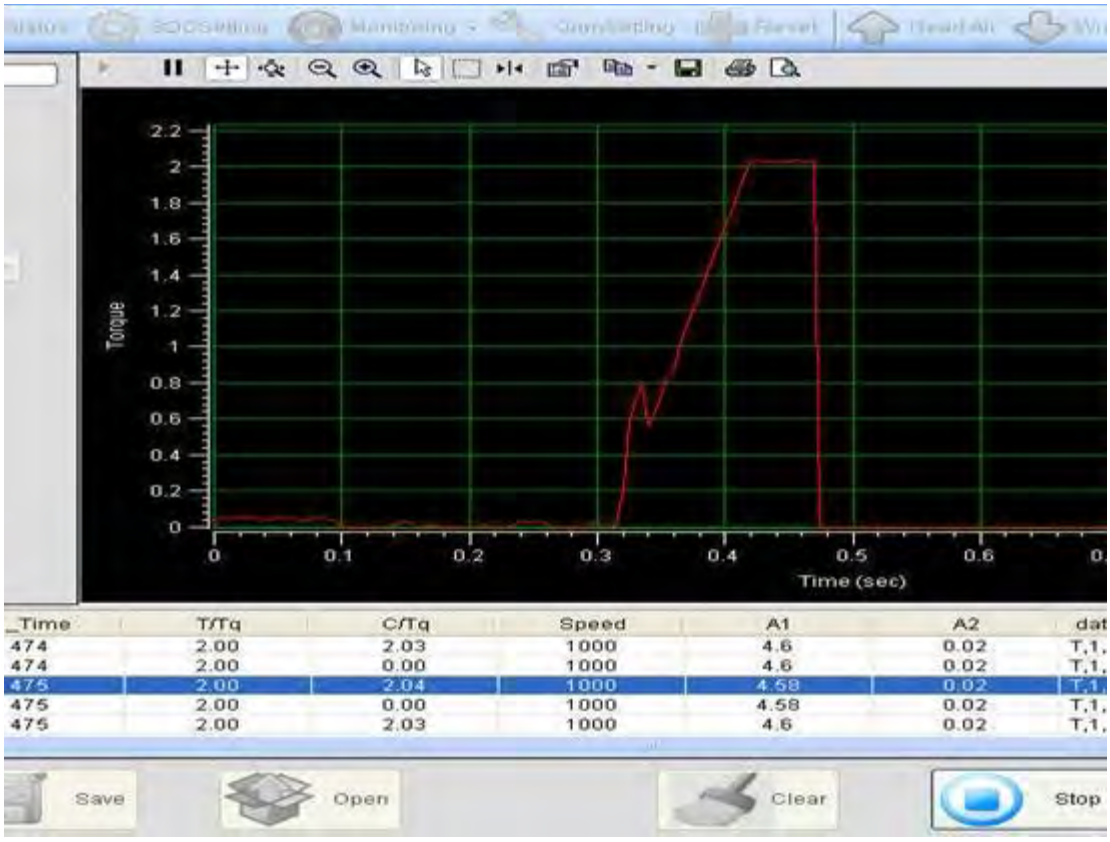
7) Real-time Monitoring Data



** Monitoring starts pushing “Start” button and monitored data can be saved as CSV format.

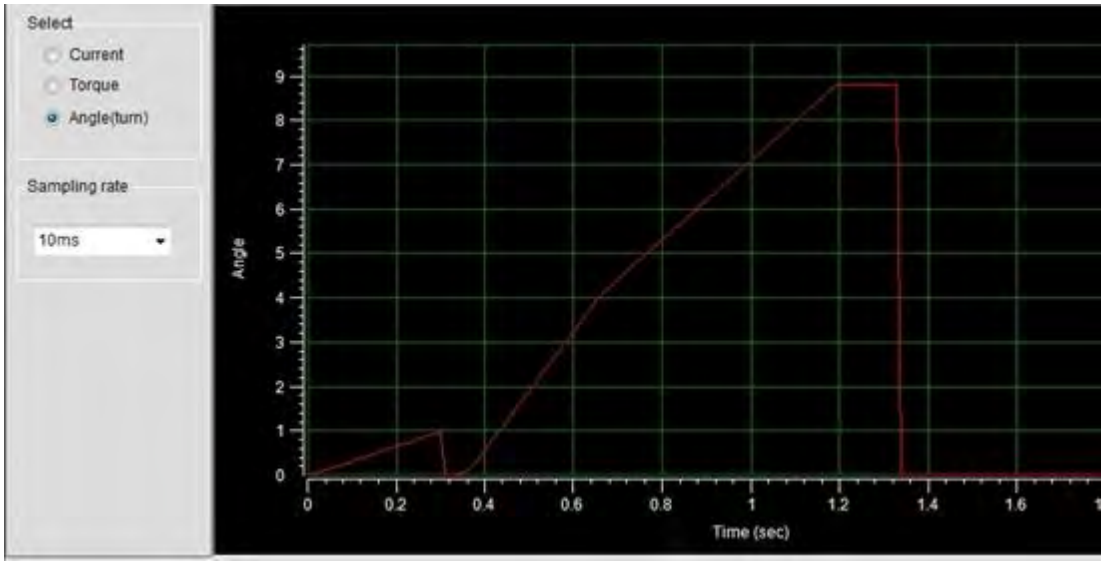
8) Real-time Monitoring for Torque or Angle Curve

■ Torque curve



- Data sampling rate : 5, 10, 15mS (selectable)
- Data and graph can be saved as a file. (*.cgd).
- Graph data selection : Torque, current or angle (selectable)

■ Angle curve



9) Screw Count Monitoring – Single

11. *Smart-Manager* Program Version vs. Controller Firmware Version

Use the right match of the version between controller & Smart-Manager.

NO	Date	Version	SDC Firmware file	Smart-Manager
1	2012.01.30	V1.02.5	SDC_V1.02.5_120130.out	SmartManager1.02.5
2	2012-02-02	V1.02.6	SDC_V1.02.6_120202.out	
3	2012-03-08	V1.02.8	SDC_V1.02.8_120308.out	SmartManager1.02.8
4	2012-03-12			SmartManager1.02.9
5	2012-03-27	V1.03.0	SDC_V1.03.0_120327.out	SmartManager1.03.0
6	2012-04-06	V1.03.3	SDC_V1.03.3_120406.out	
7	2012-05-09	V1.03.6	SDC_V1.03.6_D_DataFixSDA200.out	
8	2012-06-08	V1.03.8	SDC_V1.03.8_120608.out	
9	2012-07-02	V1.03.8	SDC_V1.03.8_120702.out	
10	2012-07-03	V1.04.0	SDC_V1.04.0_120703.out	
11	2012-07-11	V1.04.1	SDC_V1.04.1_120711.out	SmartManager1.04.1
12	2012-08-14	V1.04.2	SDC_V1.04.2_120814.out	
13	2012-10-17	V1.05.0	SDC_V1.05.0_121017.out	SmartManager1.05.2
14	2012-11-06	V1.05.5	SDC_V1.05.5_121106.out	SmartManager1.05.5
15	2012-11-06	V1.05.6	SDC_V1.05.6_121106.out	SmartManager1.05.6
16	2012-11-14	V1.05.7	SDC_V1.05.7_121114.out	SmartManager1.05.7
17	2012-11-14	V1.05.7		SmartManager1.05.7a
18	2012-11-26	V1.05.8	SDC_V1.05.8_121126.out	
19	2012-12-03	V1.05.9	SDC_V1.05.9_121203.out	
20	2013-01-02	V1.06.0	SDC_V1.06.0_120102.out	SmartManager1.06.0
21	2013-01-07	V1.06.1	SDC_V1.06.1_130107.out	
22	2013-01-09	V1.06.1	SDC_V1.06.1_130109.out	
23	2013-07-16	V1.07.01	SDC_V1.07.1_130716_TestVersion.out	SmartManager1.07.1_TestVersion
24	2013-07-26	V1.07.1	SDC_V1.07.1_130726.out	SmartManager1.07.1
25	2013-09-16	V1.08.0	SDC_V1.08.0_130916_TestVersion.out	
26	2013-10-21	V1.08.0	SDC_V1.08.0_131021.out	SmartManager1.08.1a
27	2013-12-06	V1.08.2	SDC_V1.08.2_131205_forFND.out	SmartManager1.08.2
28	2013-12-09	V1.08.2	SDC_V1.08.2_131205_forFNDa.out	
29	2013-12-09	V1.08.2	SDC_V1.08.2_131205_forFNDb.out	

NO	Date	Version	SDC Firmware file	Smart-Manager
30	2013-12-26	V1.09.0	SDC_V1.09.0_131226_forFND.out	SmartManager1.09.0
31	2014-02-18	V1.11.0	SDC_V1.11.0_140218.forFND.out SDC_V1.11.0_140218_forLCD.out	SmartManager1.10.0
32	2014-03-06	V1.11.1	SDC_V1.11.1_140306_forFND.out SDC_V1.11.1_140306_forLCD.out	
33	2014-03-06	V1.11.2	SDC_V1.11.2_140306_forFND.out SDC_V1.11.2_140306_forLCD.out	
34	2014-06-03	V1.12.0	SDC_V1.12.0_140603_forFND.out	
35	2014-06-11	V1.12.2	SDC_V1.12.2_140611_forLCD.out	
36	2014-09-03	V1.13.0	SDC_V1.13.0_140903_forFND.out SDC_V1.13.0_140903_forLCD.out	
37	2014-09-12	V1.14.0	SDC_V1.14.0_140912_forFND.out SDC_V1.14.0_140912_forLCD.out	
38	2014-09-19	V1.14.1	SDC_V1.14.1_140919.forLCD.out	
39	2014-09-30	V1.15.0	SDC_V1.15.0_140930_forFND.out SDC_V1.15.0_140930_forLCD.out	SmartManager1.12.0
40	2014-09-30			SmartManager1.12.0_b
41	2014-10-01	V1.15.0	SDC_V1.15.0_141001_forFND.out SDC_V1.15.0_141001_forLCD.out	
42	2014-10-23	V1.15.1	SDC_V1.15.1_141023_forLCD.out	SmartManager1.12.1
43	2014-11-10	V1.15.2	SDC_V1.15.2_141110_forLCD.out	SmartManager1.12.2
44	2015-01-05	V1.16.0	SDC_V1.16.0_150105_forLCD.out	SmartManager1.13.0
45	2015-01-27	V1.16.3	SDC_V1.16.3_150123_forLCD.out	
46	2015-01-28	V1.16.3	SDC_V1.16.3_150128_forLCD.out	
47	2015-01-29	V1.16.3	SDC_V1.16.3_150129_forLCD.out	
48	2015-02-03	V1.16.5	SDC_V1.16.5_150203_forLCD.out	
49	2015-03-12	V1.16.6	SDC_V1.16.6_150312_forLCD.out	
50	2015-03-30	V1.16.7	SDC_V1.16.7_150330_forFND.out SDC_V1.16.7_150330_forLCD.out	SmartManager1.13.6
51	2015-07-16	V1.17.1	SDC_V1.17.1_150716_forLCD.out	SmartManager_SDC_V1.14.0
52	2015-08-14	V1.17.2	SDC_V1.17.2_150814_forLCD.out	
53	2015-09-14	V1.18.0	SDC_V1.18.0_150914_forLCD.out	SmartManager_SDC_V1.15.0_150914
54	2015-10-26	V1.18.4	SDC_V1.18.4_151026_forLCD.out	SmartManager_SDC_1.15.5_151026
55	2015-12-21	V1.18.5	SDC_V1.18.5_151221_forLCD.out	
56	2016-01-26	V1.18.6	SDC_V1.18.6_160126_forLCD.out	SmartManager_SDC_1.15.6_161026
57	2016-02-03	V1.18.6	SDC_V1.18.6_160203_forLCD.out	SmartManager_SDC_1.15.6_161026
58	2016-03-09	V1.18.7	SDC_V1.18.7_160309_forLCD.out	
59	2016-05-19	V1.20.0	SDC_V1.20.0_160518_forLCD.out	SmartManager_SDC_1.16.0_160518
60	2016-09-23	V1.21.0	SDC_V1.21.0_160923_forLCD.out	SmartManager_SDC_1.16.2

NO	Date	Version	SDC Firmware file	Smart-Manager
61	2016-11-14	V1.22.0	SDC_V1.22.0_161114_forLCD.out	
62	2016-11-24	V1.22.0		SmartManager1.16.3
63	2016-12-07	V1.23.0	SDC_V1.23.0_161207_forLCD.out	SmartManager1.16.4_161207
64	2016-12-14	V1.23.0	SDC_V1.23.0_161207_forLCD.out	SmartManager1.16.4_161214
65	2016-12-15	V1.23.0		SmartManager1.16.4_161215
66	2017-01-25	V1.24.0	SDC_V1.24.0_170125_forLCD.out	SmartManager1.16.6_170125
67	2017-02-06	V1.24.0		SmartManager1.16.5_170206

- Parameter Changing History

2012.12.27 V1.06
Added parameters
- P51~58 : Free speed angle setting
- P84 : Free speed setting before screw seating
- P85 : Preset # selecting for Free reverse rotation before screw tightening process
- P90 : Screw count number
- P91 : Reverse rotation Lock in hand held screwdriver
- P92 : Trigger(pulse signal) start by Lever in hand held screwdriver
- P93 : Reverse start by Forward/Reverse switch in hand held screwdriver
- P98 : Free reverse rotation angle setting before screw tightening process

Deleted parameters
- P91~97, P100~137 : Deleted (Model selecting feature is not available)

2013.04.25 Page 20 / correction of Enter key and ↓ key
2013.06.20 Page 69-71 / correction of protocol details
2013.07.26 V1.07
1) Added parameters for Advanced function (tap menu on Smart Manager)
- P98 ,P100, P101, P102, P103, P104, P105, P106, P107, P108, P109, P110, P111, P112, P113, P114
2) Program install window language in English, not in Korean
3) Removed parameter (P59 --> feature is remained on P105)
2013.10.21 V1.08
1) Added parameters
- P59 : Converted torque limit (0 or 1~10%) for E335
- P97 : Baud rate of RS232C selecting (0:9600, 1:19200, 2:38400, 3: 57600)
2014.02.18 V1.11
Added speed function in graph monitoring
2014.03.14 SD120Z, SDA120 Torque range correction (0.3~1.5 Kgf.cm)
2014.09.12 Default setting of P59 (Communication port) is changed by 1 (RS232c)
2014.09.30 V1.12
Added SD model SDA1000, SDA300, SD400
Default setting of P49 (communication port select) is RS232c (P49=1)
2014.12.11 page 41, P86 parameter description only added
2015.01.05 V1.16
Added model selecting function P138, P139 ….
Added P115 Enable Model # changed by front panel key
2015.04.24 page 60, Timing chart of Fastening NG is corrected
2015.05.13 page 12, SD400 model is added
2016.01.25 page 16, SDA600, SDA1000 drawing added
2016.03.18 P71 Auto reverse angle is replaced by P110~P114
P160~167 Error history is replaced by P200~P207
P169 Firmware version is replaced by P209
2015.12.21 V1.18
Applicable for Data manager (7” touch screen for data monitoring)
2016.03.22 Correction driver layout
2016.04.20 P94 Bit socket tray program select
P115 Preset # and Model # changed by front panel key enable/disable
P128 Converted torque display for real time monitoring
2016.09.29 V1.21.0
1) Changed parameters
- P59 : Converted torque limit (0 or 1~25%) for E335

2016.11.03 Page 94 add Smart-Manager program version vs controller firmware version
2016.12.14 P211~P218 Torque tuning function is added.
2016.12.24 P20 25P I/O Interface setting value “5” is added.
2017.01.25 P82=2 Cycle complete signal time setting(P116setting value x 10ms)