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# Operation Manual - MDC-26 / MDC-32



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## 1. GENERAL SAFETY RULES

ENGLISH

**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.**

## 1. RÈGLES DE SÉCURITÉ GÉNÉRALÉS

**AVERTISSEMENT ! Vous devez lire et comprendre les instructions.** Le non-respect, même partiel, des instructions ci-près entraîne un risque de choc électrique, d'incendie et/ou de blessures graves

### CONSERVEZ CES INSTRUCTIONS

#### 1.1 Aire de travail

- **Veillez à ce que l'aire de travail soit propre et bien éclairée.** Le désordre et le manque de lumière favorisent les accidents.
- **N'utilisez pas d'outils électriques dans une atmosphère explosive, par exemple en présence de liquides, de gaz ou de poussières inflammables.** Les outils électriques créent des étincelles qui pourraient enflammer les poussières ou les vapeurs.
- **Tenez à distance les curieux, les enfants et les visiteurs pendant que vous travaillez avec un outil électrique.** Ils pourraient vous distraire et vous faire une fausse manœuvre.

#### 1.2 Sécurité électrique

- **Les outils mis à la terre doivent être branchés dans une prise de courant correctement installée et mise à la terre conformément à tous les codes et règlements pertinents. Ne modifiez jamais la fiche de quelque façon que ce soit, par exemple en enlevant la broche de mise à la terre. N'utilisez pas d'adaptateur de fiche. Si vous n'êtes pas certain que la prise de courant est correctement mise à la terre, adressez-vous à un électricien qualifié.** En cas de défaillance ou de défectuosité électrique de l'outil, une mise à la terre offre un trajet de faible résistance à l'électricité qui autrement risquerait de traverser l'utilisateur.
- **Évitez tout contact corporel avec des surfaces mises à la terre (tuyauterie, radiateurs, cuisinières, réfrigérateurs, etc.).** Le risque de choc électrique est plus grand si votre corps est en contact avec la terre.
- **N'exposez pas les outils électriques à la pluie ou à l'eau.** La présence d'eau dans un outil électrique augmente le risque de choc électrique.
- **Ne maltraitez pas le cordon. Ne transportez pas l'outil par son cordon et ne débranchez pas la fiche en tirant sur le cordon. N'exposez pas le cordon à la chaleur, à des huiles, à des arêtes vives ou à des pièces en mouvement.**  
**Remplacez immédiatement un cordon endommagé.** Un cordon endommagé augmente le risque de choc électrique.
- **Lorsque vous utilisez un outil électrique à l'extérieur, employez un**

**prolongateur pour l'extérieur marqué "W-A" ou "W".** Ces cordons sont faits pour être utilisés à l'extérieur et réduisent le risque de choc électrique.

### 1.3 Sécurité des personnes

- **Restez alerte, concentrez-vous sur votre travail et faites preuve de jugement. N'utilisez pas un outil électrique si vous êtes fatigué ou sous l'influence de drogues, d'alcool ou de médicaments.** Un instant d'inattention suffit pour entraîner des blessures graves.
- **Habillez-vous convenablement. Ne portez ni vêtements flottants ni bijoux. Confiner les cheveux longs. N'approchez jamais les vêtements ou les gants des pièces en mouvements.** Des vêtements flottants, des bijoux ou des cheveux longs risquent d'être happés par des pièces en mouvement.
- **Méfiez-vous d'un démarrage accidentel. Avant de brancher l'outil, assurez-vous que son interrupteur est sur ARRÊT.** Le fait de transporter un outil avec le doigt sur la détente ou de brancher un outil dont l'interrupteur est en position MARCHE peut mener tout droit à un accident.
- **Enlevez les clés de réglage ou de serrage avant de démarrer l'outil.** Une clé laissée dans une pièce tournante de l'outil peut provoquer des blessures.
- **Ne vous penchez pas trop en avant. Maintenez un bon appui et restez en équilibre en tout temps.** Une bonne stabilité vous permet de mieux réagir à une situation inattendue.
- **Utilisez des accessoires de sécurité. portez toujours des lunettes ou une visière.** Selon les conditions, portez aussi un masque antipoussière, des bottes de sécurité antidérapantes, un casque protecteur et/ou un appareil antibruit.

### 1.4 Utilisation et entretien des outils

- **Immobilisez le matériau sur une surface stable au moyen de brides ou de toute autre façon adéquate.** Le fait de tenir la pièce avec la main ou contre votre corps offre une stabilité insuffisante et peut amener un dérapage de l'outil.
- **Ne forcez pas l'outil. Utilisez l'outil approprié à la tâche.** L'outil correct fonctionne mieux et de façon plus sécuritaire. Respectez aussi la vitesse de travail qui lui est propre.
- **N'utilisez pas un outil si son interrupteur est bloqué.** Un outil que vous ne pouvez pas commander par son interrupteur est dangereux et doit être réparé.
- **Débranchez la fiche de l'outil avant d'effectuer un réglage, de changer d'accessoire ou de ranger l'outil.** De telles mesures préventives de sécurité réduisent le risque de démarrage accidentel de l'outil.
- **Rangez les outils hors de la portée des enfants et d'autres personnes inexpérimentées.** Les outils sont dangereux dans les mains d'utilisateurs

novices.

- **Prenez soin de bien entretenir les outils. Les outils de coupe doivent être toujours bien affûtés et propres.** Des outils bien entretenus, dont les arêtes sont bien tranchantes, sont moins susceptibles de coincer et plus faciles à diriger.
- **Soyez attentif à tout désalignement ou coincement des pièces en mouvement, à tout bris ou à toute autre condition préjudiciable au bon fonctionnement de l'outil. Si vous constatez qu'un outil est endommagé, faites-le réparer avant de vous en servir.** De nombreux accidents sont causés par des outils en mauvais état.
- **N'utilisez que des accessoires que le fabricant recommande pour votre modèle d'outil.** Certains accessoires peuvent convenir à un outil, mais être dangereux avec un autre.

## 1.5 RÉPARATION

- **La réparation des outils électriques doit être confiée à un réparateur qualifié.** L'entretien ou la réparation d'un outil électrique par un amateur peut avoir des conséquences graves.
- **Pour la réparation d'un outil, n'employez que des pièces de rechange d'origine. Suivez les directives données à la section Réparation de ce manuel.** L'emploi de pièces non autorisées ou le non-respect des instructions d'entretien peut créer un risque de choc électrique ou de blessures.

## 2. RÉGLE DE SÉCURITÉ PARTICULIÈRE

**2.1 Tenez l'outil par ses surfaces de prise isolées pendant toute opération où l'outil de coupe pourrait venir en contact avec un câblage dissimulé ou avec son propre cordon.** En cas de contact avec un conducteur sous tension, les pièces métalliques à découvert de l'outil transmettraient un choc électrique à l'utilisateur

**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 packing item



Screwdriver



Cable\_14P (3m)



MDC-26, MDC-32 controller

#### 2) Option accessories

44P I/O wiring box



AC adapter  
(DC24V,1A)



ParaMon Touch



RS-232C cable

Vacuum  
pick-up assy

Bit holder  
for long bit

### 4. Main features

- 1) Digital torque and angle program in 15 preset numbers and 2 multi step sequence programs
- 2) 15 Models managing variable presets with counting no. and I/O in sequential 10 steps
- 3) Color LCD touch screen with easy control
- 4) Auto speed setting by torque
- 5) Monitoring fastening quality and count of screw numbers
- 6) Error information by code display
- 7) Easy parameter setting and monitoring by ParaMON (PC software)
- 8) Real time torque data and curve display
- 9) Real time fastening data output
- 10) Modbus protocol
- 11) RS232C, Ethernet communication port





● Pistol grip hand held (Trigger start)

Model	Torque(kgf.cm)	Max speed	Bit socket	Controller
MDP3201	1 ~ 12	2000	Hex1/4"	MDC-32
MDP3202	2 ~ 22	2000	Hex1/4"	
MDP3204	4 ~ 40	1500	Hex1/4"	
MDP3211	10 ~ 90	690	Hex1/4"	
MDP3216	20 ~ 140	470	Hex1/4"	
MDP3236	40 ~ 280	210	Hex1/4"	
MDP3264	80 ~ 500	115	SQ3/8	

● Angle head hand-held (Lever start)

Model	Torque(kgf.cm)	Max speed	Bit socket	Controller
MDH2604	2 ~ 14	1500	Hex1/4"	MDC-26
MDH2611	4 ~ 34	900	Hex1/4"	
MDH2616	5 ~ 50	620	Hex1/4"	
MDH3201	1 ~ 12	2000	Hex1/4"	MDC-32
MDH3202	2 ~ 22	2000	Hex1/4"	
MDH3204	4 ~ 40	1500	Hex1/4"	
MDH3211	10 ~ 90	690	Hex1/4"	
MDH3216	20 ~ 140	470	Hex1/4"	
MDH3236	40 ~ 280	210	SQ3/8	
MDH3264	80 ~ 500	115	SQ1/2	



MD26xx



MD32xx



MDP32xx



MDH32xx

● Spindle for automation (Remote start by I/O)

Model	Torque(kgf.cm)	Max speed	Bit socket	Controller
MDA2201	0.10 ~ 0.7	1000	dia.4 half moon	MDC-26
MDA2204	0.2 ~ 2.8	1000	dia.4 half moon	
MDA2601	0.3 ~ 4	2000	dia.4 half moon	
MDA2602	0.5 ~ 7	2000	Hex1/4" or dia.4	
MDA2604	2 ~ 14	1500	Hex1/4" or dia.4	
MDA2611	4 ~ 34	900	Hex1/4"	
MDA2616	5 ~ 50	620	Hex1/4"	
MDA3201	1 ~ 12	2000	Hex1/4"	MDC-32
MDA3202	2 ~ 22	2000	Hex1/4"	
MDA3204	4 ~ 40	1500	Hex1/4"	
MDA3211	10 ~ 90	690	Hex1/4"	
MDA3216	20 ~ 140	470	Hex1/4"	
MDA3236	40 ~ 280	210	SQ3/8	
MDA3264	80 ~ 500	115	SQ1/2	

★ Options

C : Bit cushion – rotating shaft has 4.5mm stroke sliding up cushion

V : Vacuum pick-up assy – screw pick-up by vacuum. It require custom design for mouthpiece



MDA2201-E+C



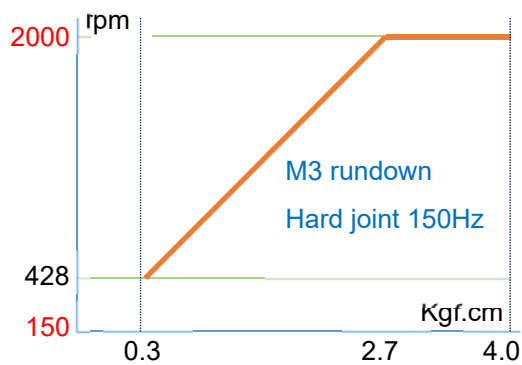
MDA2201-E+VC



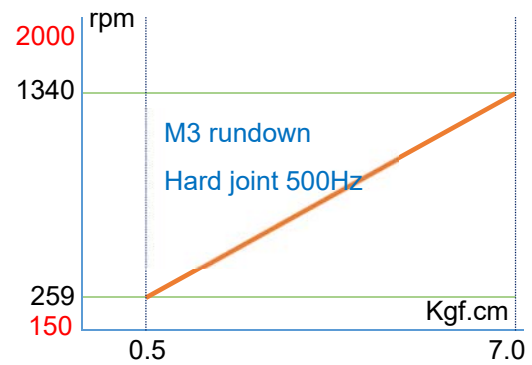
MDA32xx-A

### 5.3 Auto Speed by torque setting under the each test condition

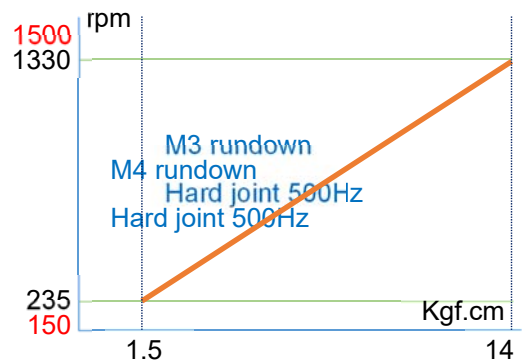
- ◆ **Speed range** : Available setting range by manual
- ◆ **Auto speed by torque setting** : Safe speed not exceeding over torque by rotation inertia under the testing conditions described on the chart



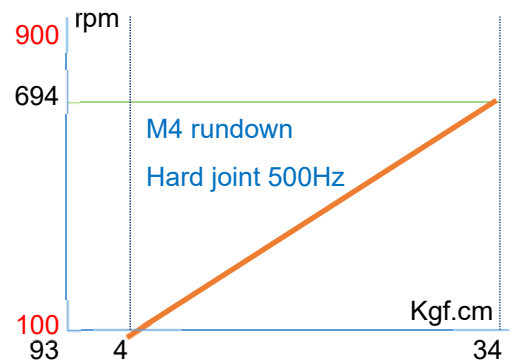
MD2601



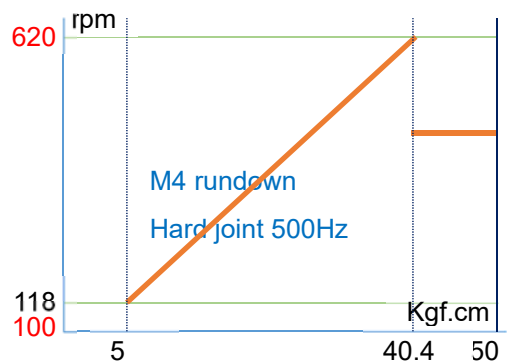
MD2602



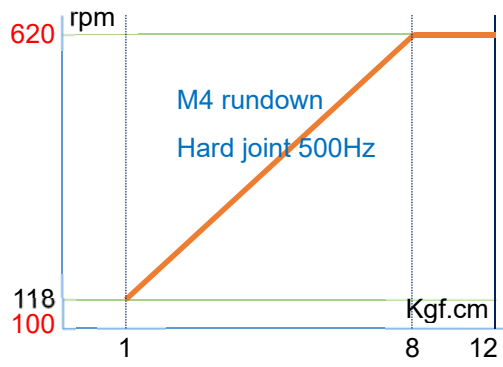
MD2604



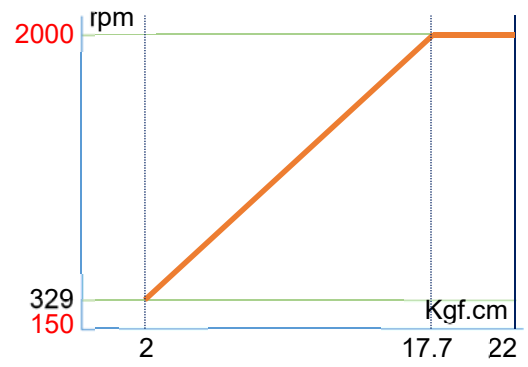
MD2611



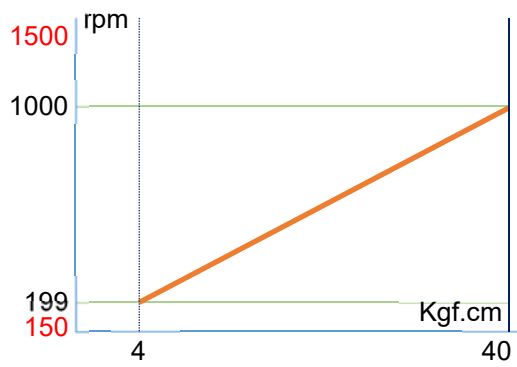
MD2616



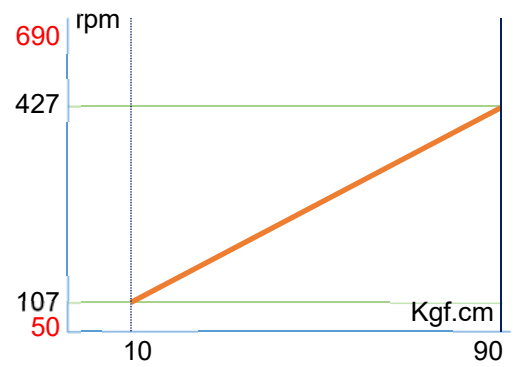
MD3201



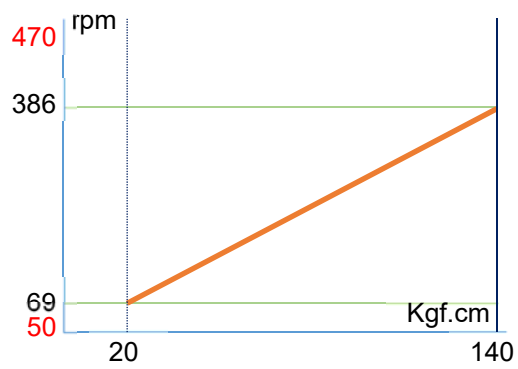
MD3202



MD3204



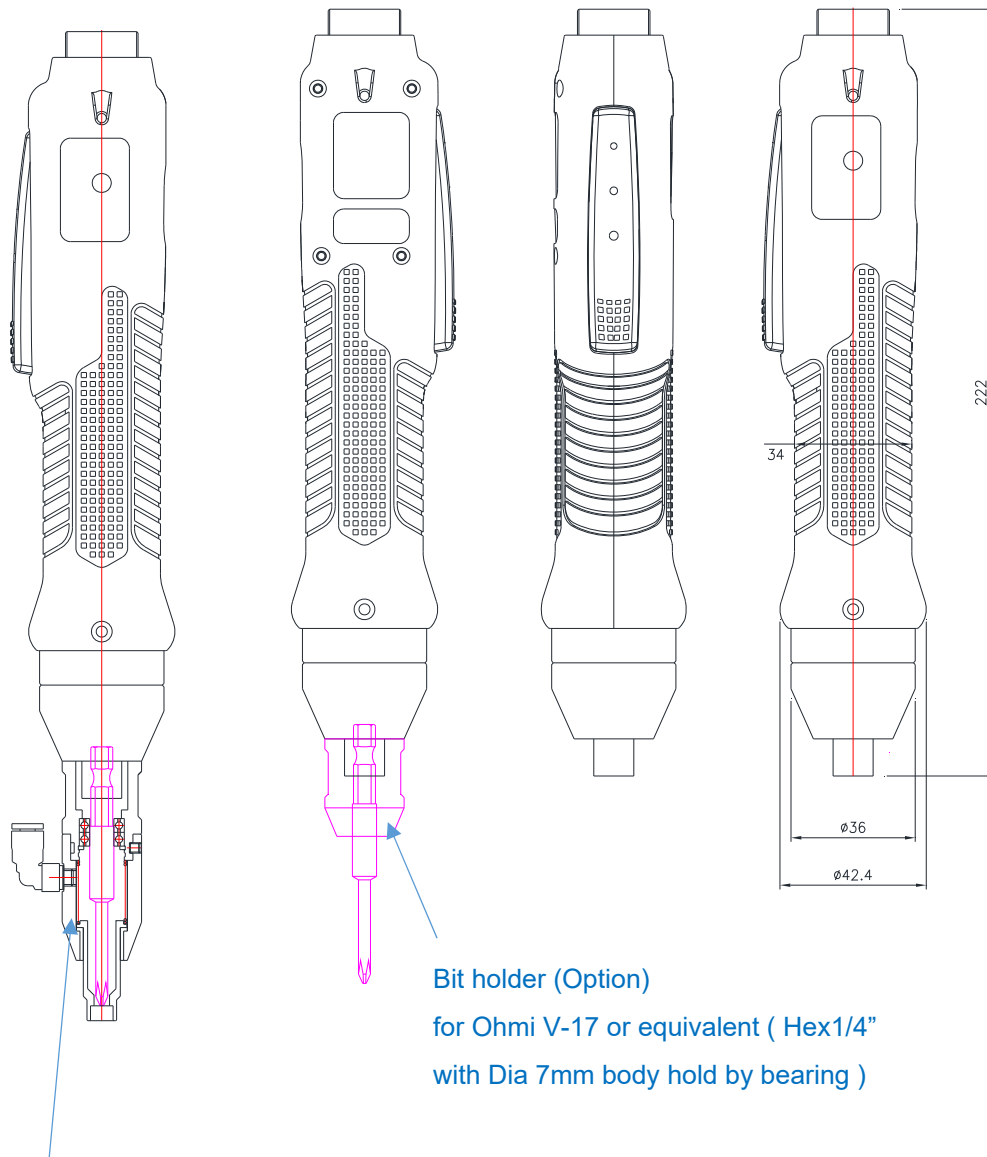
MD3211



MD3216

## 5.4 Screwdriver dimension

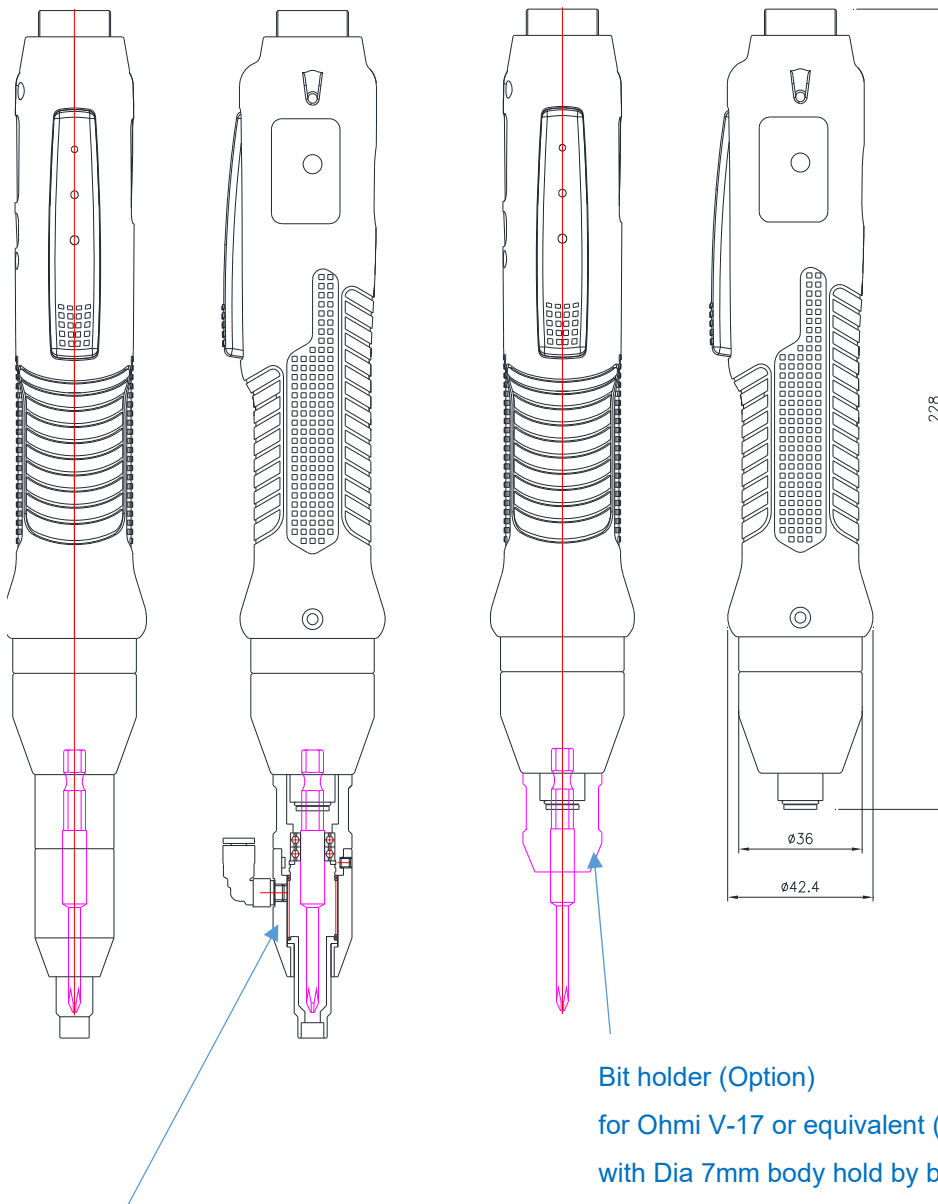
### ■ MD2601, MD2602



Bit holder (Option)  
for Ohmi V-17 or equivalent ( Hex1/4"  
with Dia 7mm body hold by bearing )

Vacuum pick-up assy (Option)  
for Ohmi V-17 or equivalent ( Hex1/4" with Dia 7mm body hold by bearing )  
Mouth piece is not included in the assy. It is custom designed for each  
screw size and applications. The above described vacuum pick-up assy is  
for one of the application. It doesn't work for all application.

■ MD2604, MD2611, MD2616

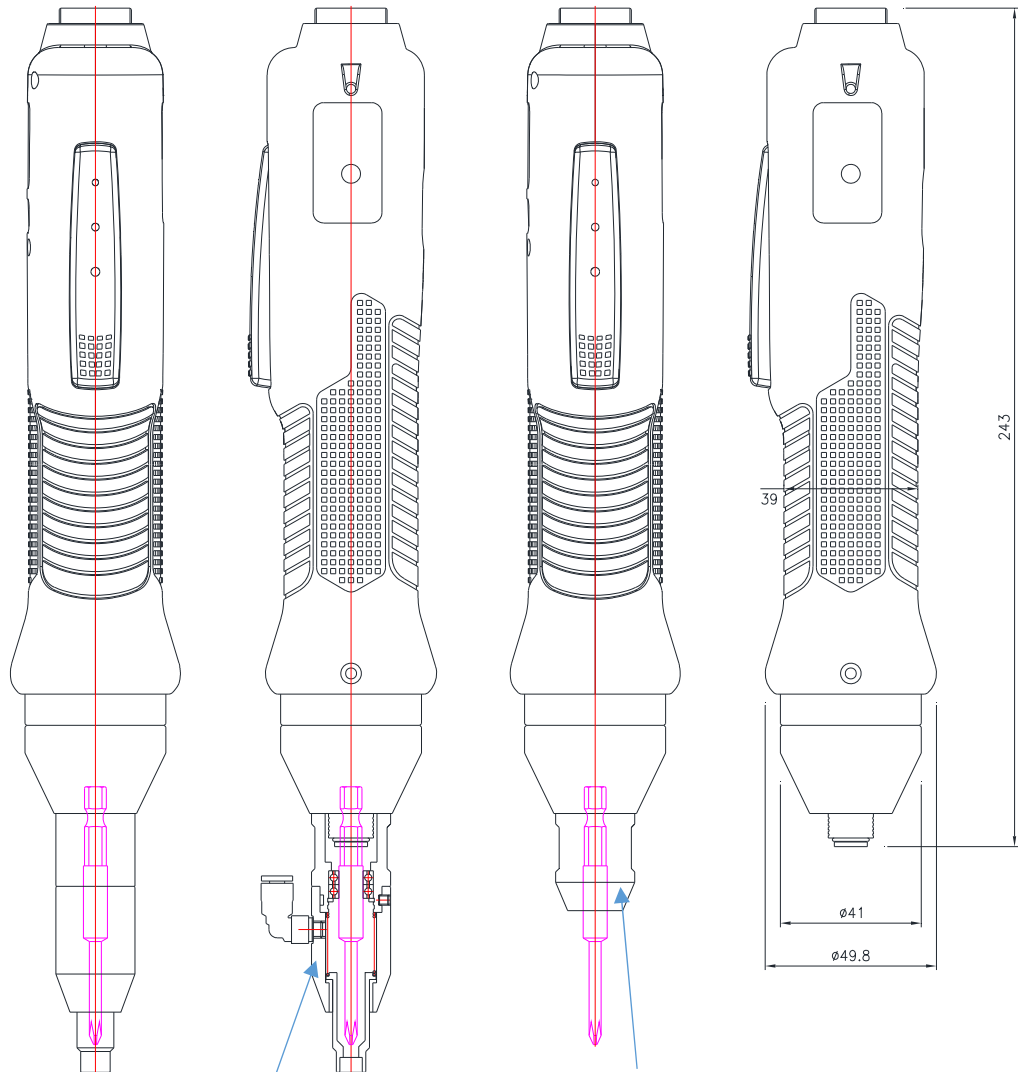


Vacuum pick-up assy (Option)

for Ohmi V-17 or equivalent ( Hex1/4" with Dia 7mm body hold by bearing )

Mouth piece is not included in the assy. It is custom designed for each screw size and applications. The above described vacuum pick-up assy is for one of the application. It doesn't work for all application.

■ MD3201, MD3202



Bit holder (Option)  
for Ohmi V-17 or equivalent ( Hex1/4"  
with Dia 7mm body hold by bearing )

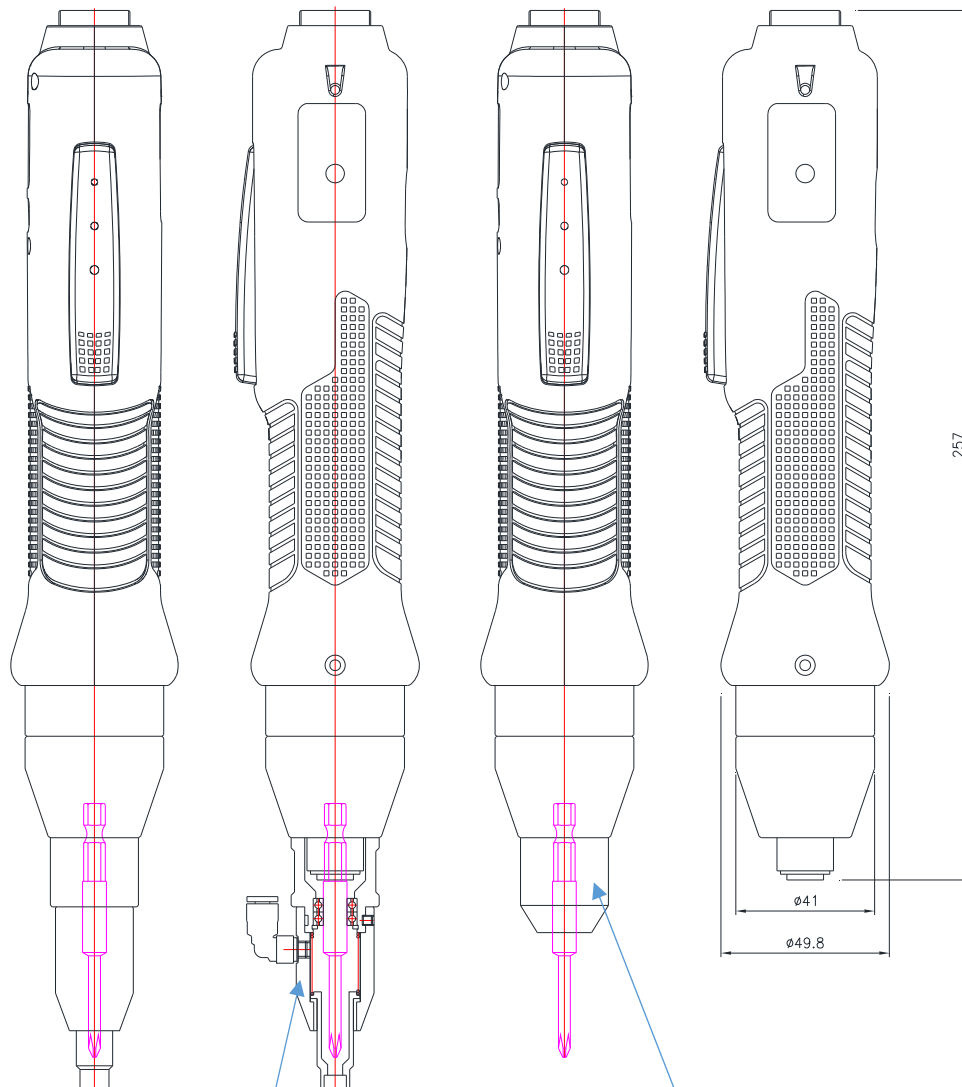
Vacuum pick-up assy (Option)

for Ohmi V-17 or equivalent ( Hex1/4" with Dia 7mm body hold by bearing )

Mouth piece is not included in the assy. It is custom designed for each screw size and applications. The above described vacuum pick-up assy is for one of the application. It doesn't work for all application.



■ MD3204, MD3211, MD3216



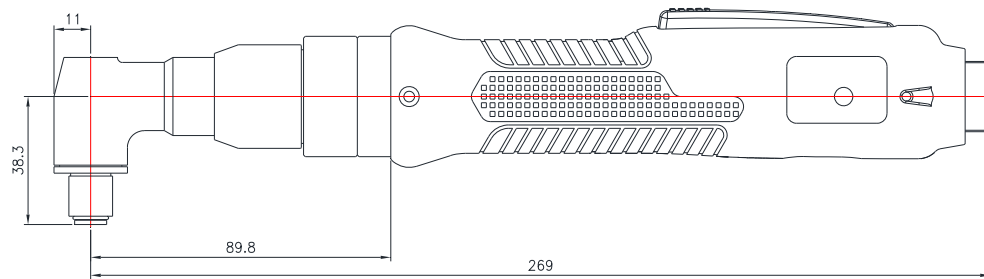
Bit holder (Option)  
for Ohmi V-17 or equivalent ( Hex1/4\"  
with Dia 7mm body hold by bearing )

Vacuum pick-up assy (Option)

for Ohmi V-17 or equivalent ( Hex1/4\" with Dia 7mm body hold by bearing )

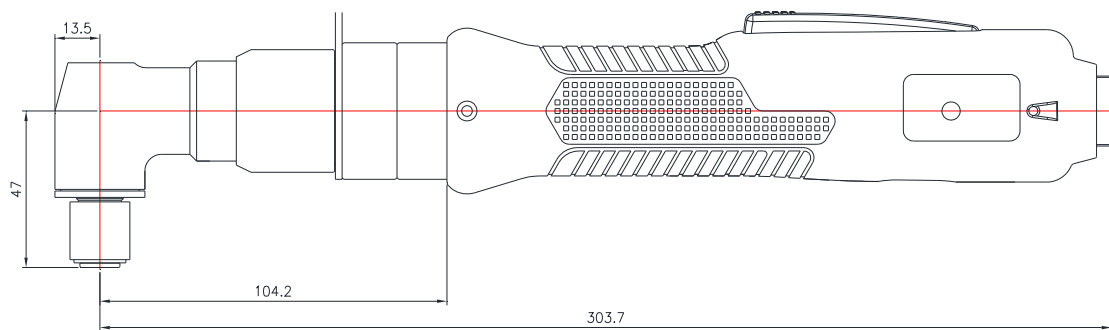
Mouth piece is not included in the assy. It is custom designed for each screw size and applications. The above described vacuum pick-up assy is for one of the application. It doesn't work for all application.

■ MD2604, MD2611, MD2616

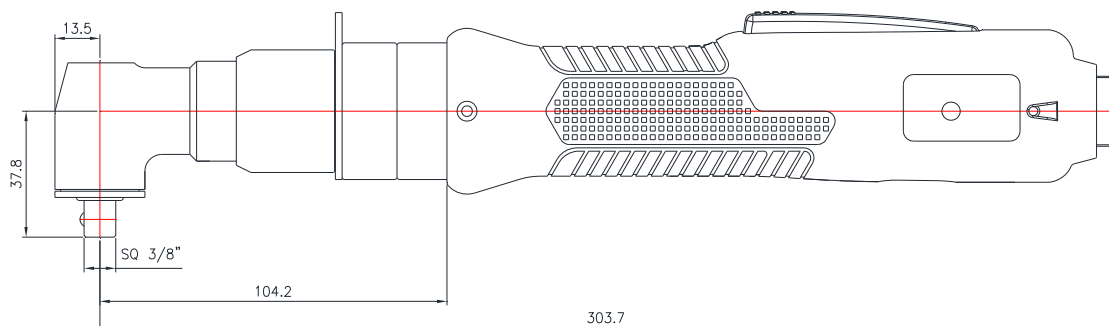


Bit socket : 1/4" hex female (quick change)

■ MD3201, MD3204, MD3211, MD3216



Bit socket : 1/4" hex female (quick change)



Bit socket : 3/8"SQ drive

■ MD2201-E +VC

MD2201-E +VC

Model

Bit type

A:1/4"Hex

E:Dia.4mm

Option accessory

V : Vacuum pick-up assy

C : Bit Cushion

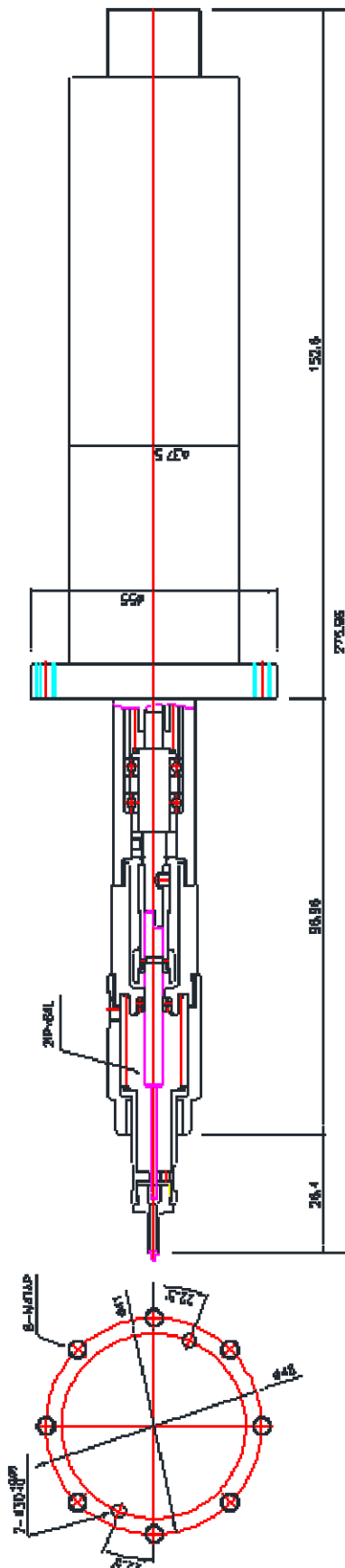
Vacuum pick-up + Bit cushion (Option)

Available model : MD2207-E

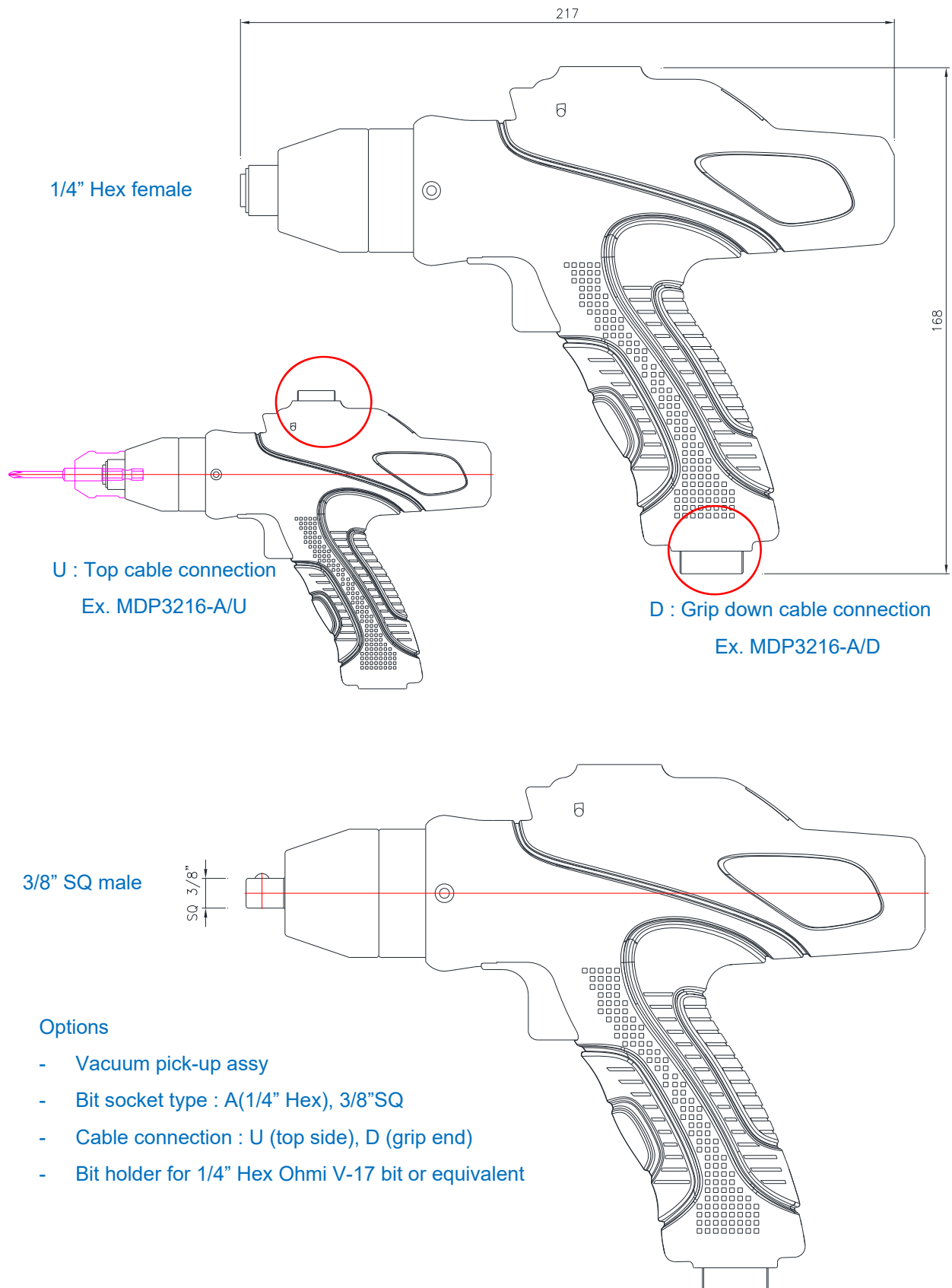
Bit socket : 4mm round half moon D-cut

Bit cushion : 5mm stroke

Mouthpiece : Custom design ( not included )



■ MDP3201, MDP3202, MDP3204, MDP3211, MDP3216

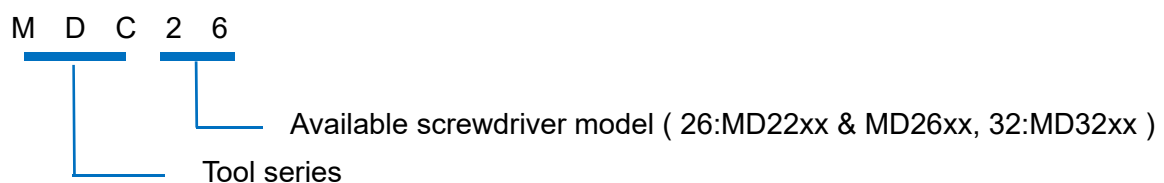


## 6. Controller

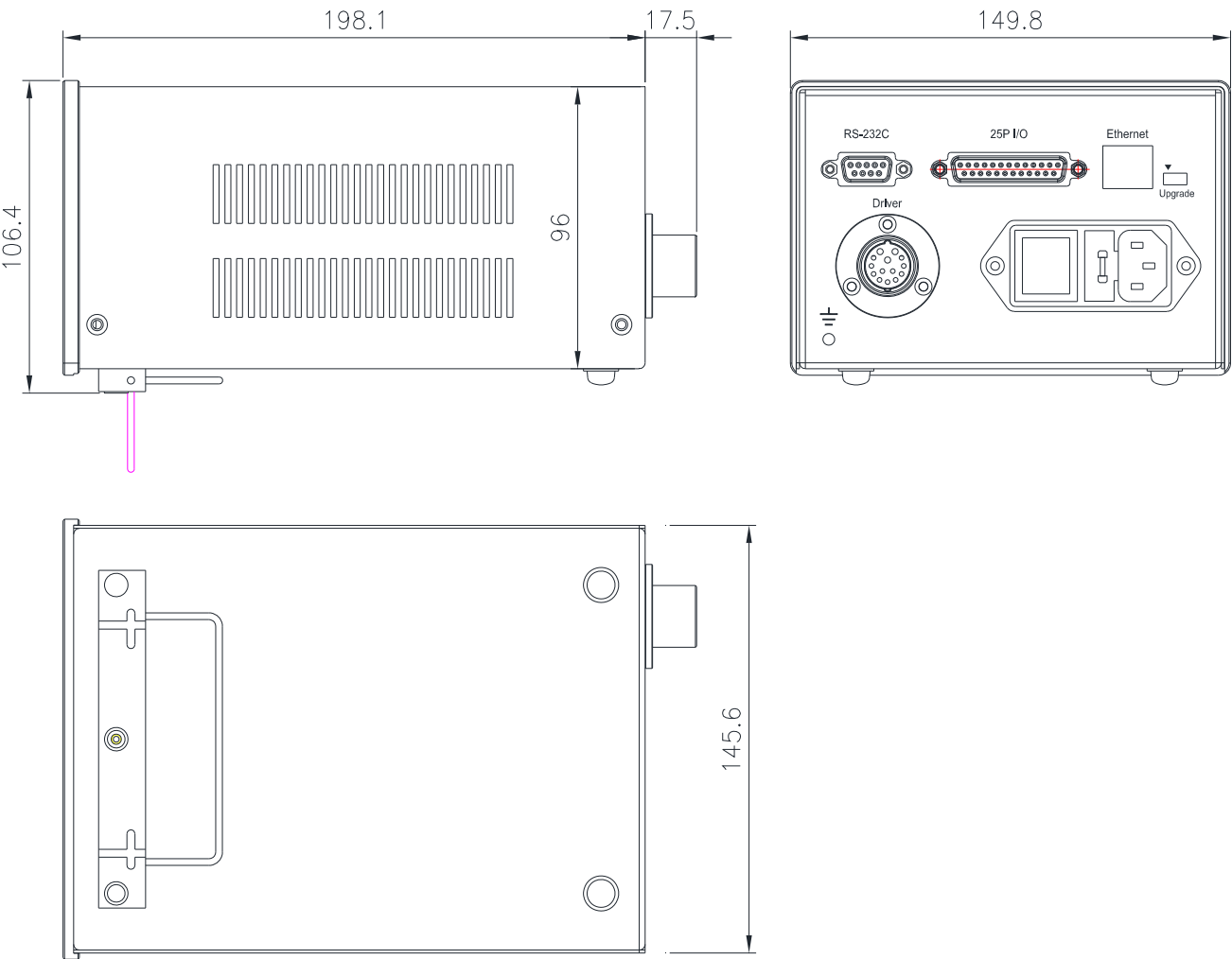
### 6.1 Specification

no	Item	Specification	
		MDC-26 series	MDC-32 series
1	Input	AC120VC / AC230V, 50/60Hz	
2	Output	DC38V 3.5A	
3	Fuse	230V 25A	
4	Operating environment	0 ~ 40℃ / 15 ~ 80% RH ( without dew )	
5	Front panel	4.3" Color LCD with touch screen	
6	Communication	1 x RS232C, 1 x Ethernet	
7	Protocol	Modbus	
8	I/O	8 Input & 8 Output flexible I/O (25P D-Sub)	
9	No. of program(Preset)	15	
10	Torque calibration	- 10% ~ +10%	
11	Screwdriver recognition	Auto detection of connected driver when power ON of controller	
12	Error display	Error code display ( 3 groups )	
13	Fastening verification	Fastening data verification (NG/OK) by the preset pattern of angle.	

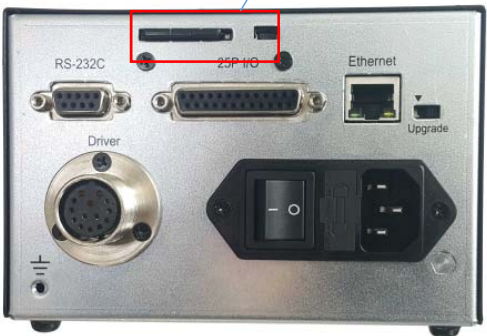
### 6.2 Model specification



6.3 Controller dimension

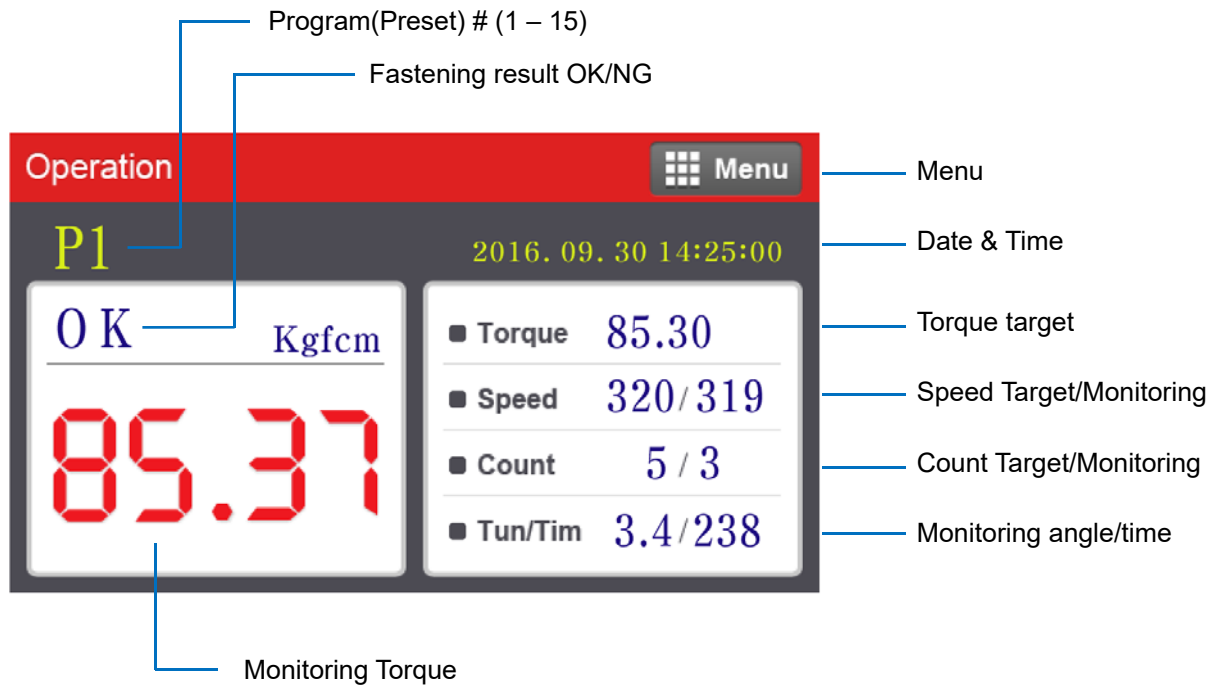


Memory card (option)



## 7. Operation

### 7.1 Operation screen



Operation screen is a default window when the controller power ON.

The real time monitoring data and target settings are displayed together.

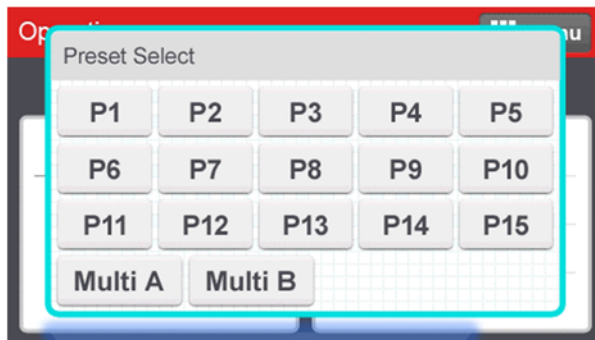
To go other menu, click the  Menu on the top right side.

There are 4 menu for Parameter change, Remote operation, Real time monitoring and Display settings.

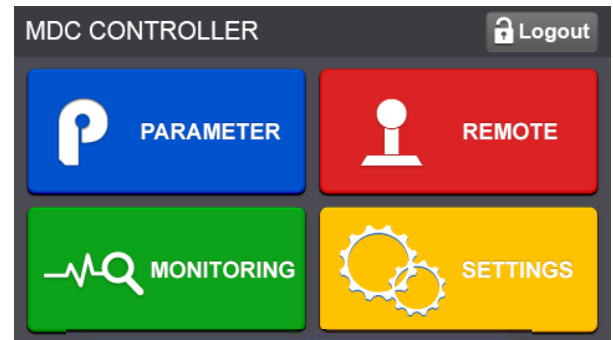




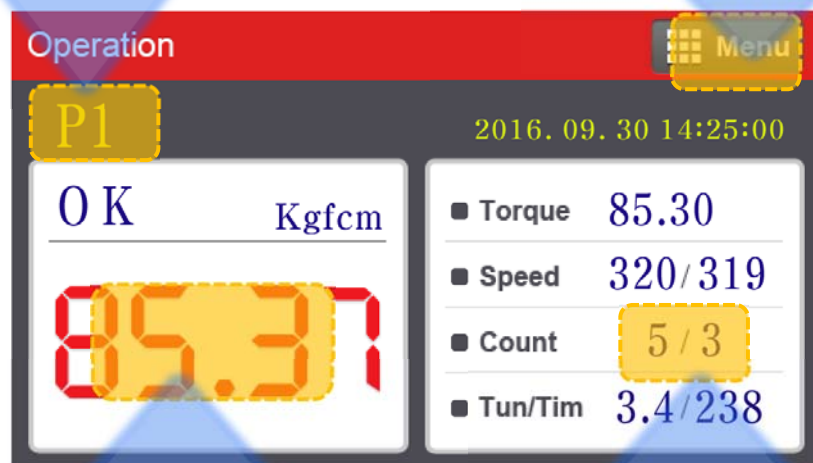
Touch Screen field to move



Preset # select

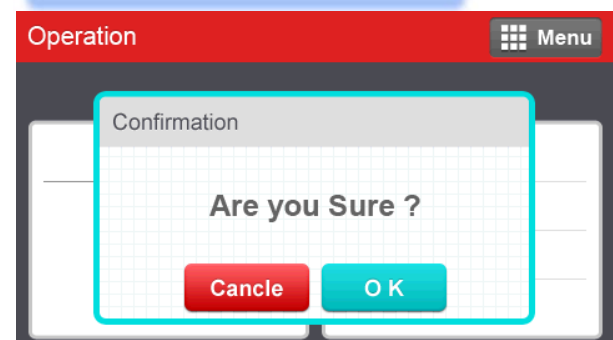
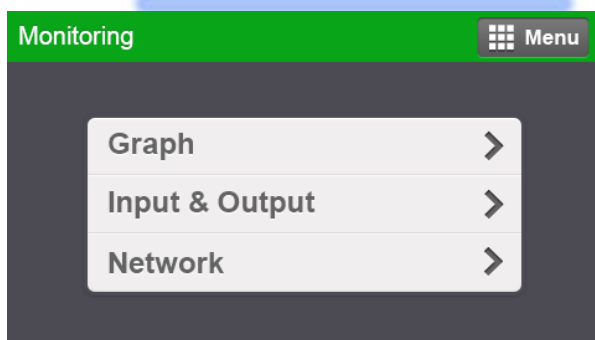


Password Log In



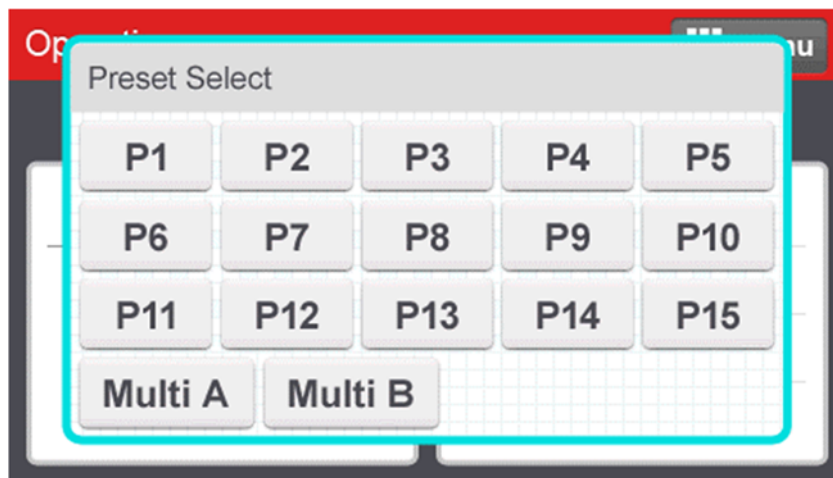
Real time monitoring

Last count cancel



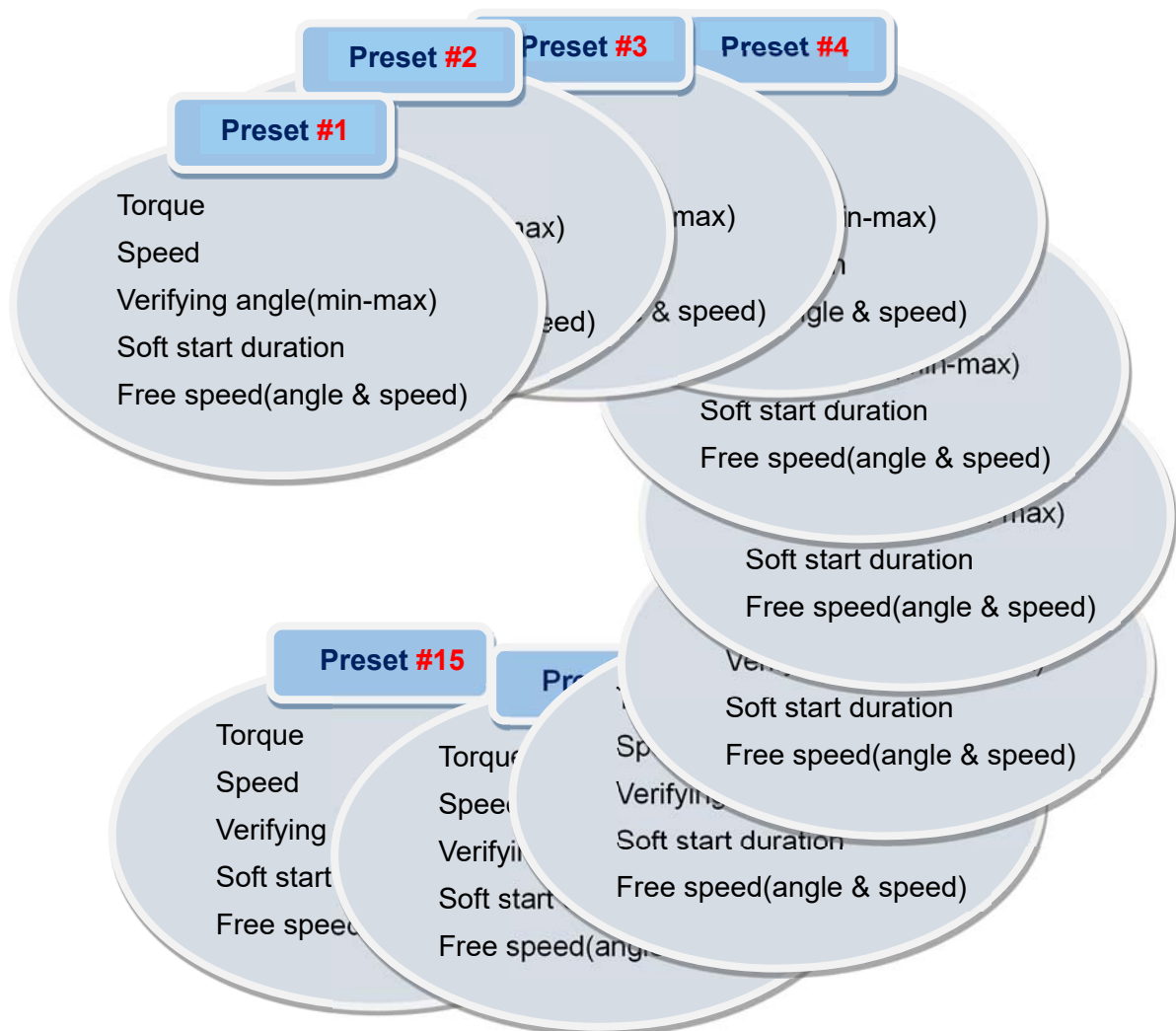


## 7.2 Presets (programs) select




There are 15 presets of program. Each preset contains the following parameters

- Torque
- Speed
- verifying angles
- soft start duration time
- free speed tightening.

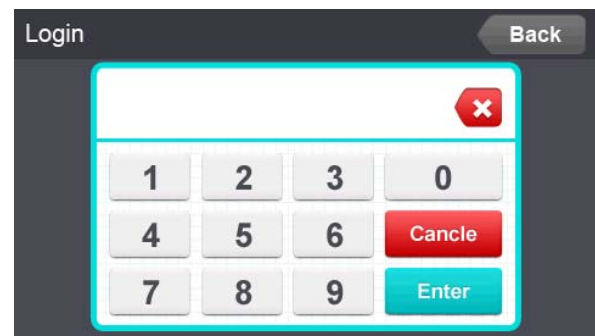


## 7.3 Parameters

To program each Presets, Click  Menu and go to



Parameter menu require password to log in  
The initial factory setting is “ 0 “ for password  
The password can be changed once log in.  
There are approx.. 500 address for each parameters. Parameters are grouped for each settings as below



Parameter group

Group	Parameter	Address
1. Fastening	Preset #1 to #15	A001 – A225
2. I/O	Input	A226 – A233
	Output	A234 – A241
3. Screw count	Number & cycle start	A242 – A247
4. Advanced Function	Free reverse	A250 – 253
	Engaging detection	A254 – 260
	Angle after torque	A261 – 265
5. Controller	Setting 1	A270 – 284
	Setting 2	A290 – 305
6. Network	IP address	A310 – 318
7. Multi sequence	Multi-A, Multi-B	A321 – 348
8. Model	Model #1 to 15	A350 – 499

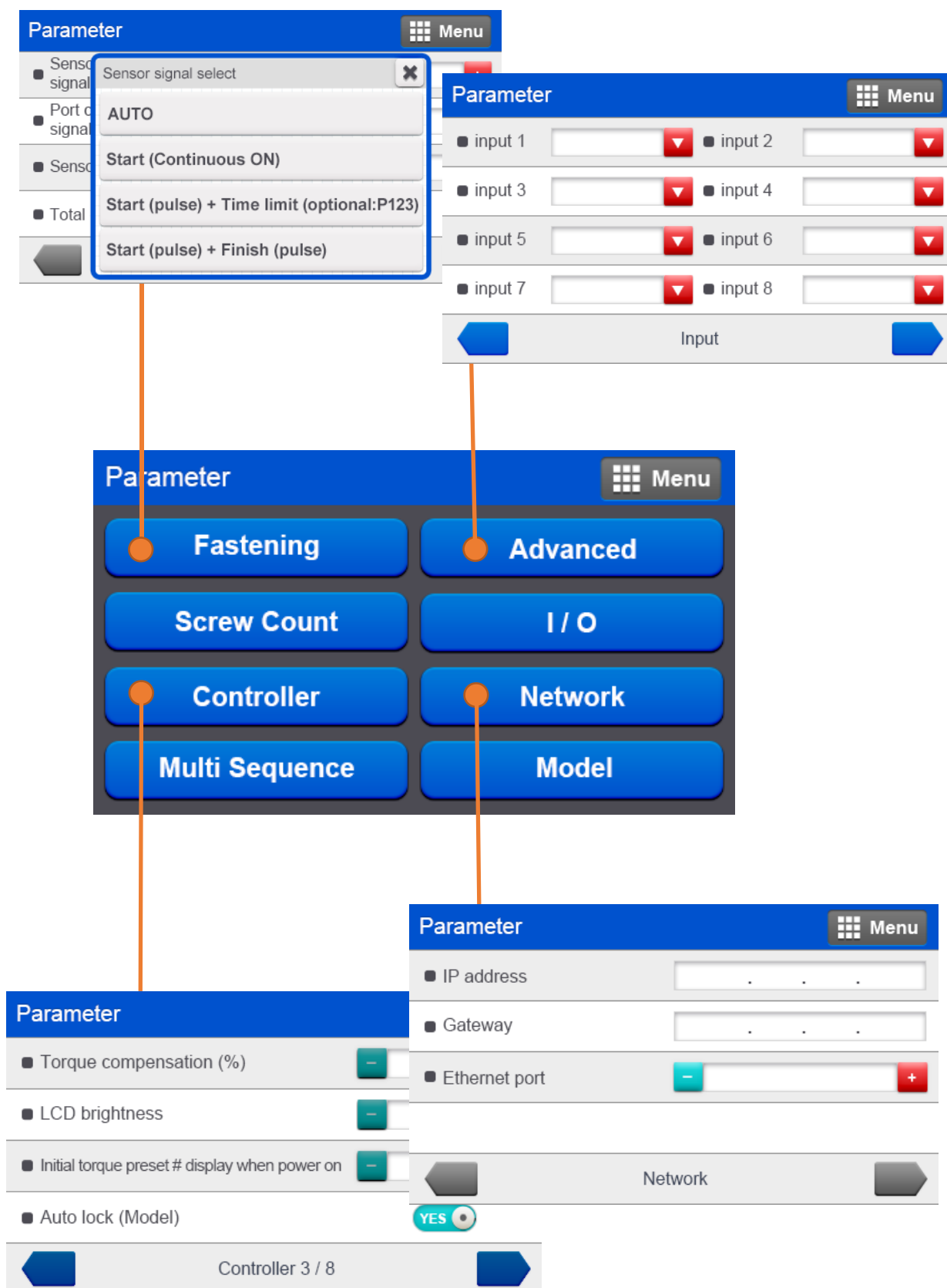
Please refer to the operation manual of ParaMon PC software for details of parameter settings.

The diagram illustrates the navigation path through the ParaMon PC software interface:

- Top Left: Main Parameter Menu**
  - Type: ☒ TC/AM ☐ AC/TM
  - Torque: [Slider]
  - Torque limit (%): [Slider]
  - Speed (rpm): [Slider]
  - Torque compensation (%): [Slider]
  - Navigation: A / 15 Preset
- Top Right: Sub-Parameter Menu**
  - Enable: ☒ YES
  - Speed: [Slider]
  - Torque (%): [Slider]
  - Angle limit (turn): [Slider]
  - Time limit (sec): [Slider]
  - Enable preset number: [Dropdown]
  - Angle start from engaging: ☒ YES
  - Navigation: 2. Engaging Torque Detection
- Middle: Main Menu**
  - Fastening
  - Advanced
  - Screw Count
  - I / O
  - Controller
  - Network
  - Multi Sequence
  - Model
- Bottom Left: Multi Sequence Screen**
  - Step: 6, 7, 8, 9, 10
  - Command: [Dropdown]
  - Navigation: Multi B - 2
- Bottom Right: Input/Output Type Selection**

Input Type	Output Type
1. Active High	1. ON
2. Active Low	2. OFF
3. High	3. ON / OFF (0.5sec)
4. Low	4. ON / OFF (1sec)

Please refer to the operation manual of ParaMon PC software for details of parameter settings.



## Parameter details and factory setting

	Preset #	Parameter	Address	Factory setting
Fastening	1	TC/AM_AC/TM	1	0
		Torque	2	Auto
		Torque min/max (%)	3	0
		Target angle(degree)	4	0
		Min angle(degree)	5	0
		Max angle(degree)	6	0
		Snug torque(%)	7	0
		Speed (rpm)	8	Auto
		Free fastenig angle(degree)	9	0
		Free fastenig speed(rpm)	10	0
		Soft start(1-300ms)	11	0
		Seating point (%) 10-90	12	Auto
		Torque rising rate(ms) 50-200	13	50
		Torque holding time(ms) 1-20	14	2
		Torque compensation (%) 90-110	15	100
	2	TC/AM_AC/TM	16	0
		Torque	17	Auto
		Torque min/max (%)	18	0
		Target angle(degree)	19	0
		Min angle(degree)	20	0
		Max angle(degree)	21	0
		Snug torque(%)	22	0
		Speed (rpm)	23	Auto
		Free fastenig angle(degree)	24	0
		Free fastenig speed(rpm)	25	0
		Soft start(1-300ms)	26	0
		Seating point (%) 10-90	27	Auto
		Torque rising rate(ms) 50-200	28	50
		Torque holding time(ms) 1-20	29	2
		Torque compensation (%) 90-110	30	100
	3	TC/AM_AC/TM	31	0

		Torque	32	Auto
		Torque min/max (%)	33	0
		Target angle(degree)	34	0
		Min angle(degree)	35	0
		Max angle(degree)	36	0
		Snug torque(%)	37	0
		Speed (rpm)	38	Auto
		Free fastenig angle(degree)	39	0
		Free fastenig speed(rpm)	40	0
		Soft start(1-300ms)	41	0
		Seating point (%) 10-90	42	Auto
		Torque rising rate(ms) 50-200	43	50
		Torque holding time(ms) 1-20	44	2
		Torque compensation (%) 90-110	45	100
	4	TC/AM_AC/TM	46	0
		Torque	47	Auto
		Torque min/max (%)	48	0
		Target angle(degree)	49	0
		Min angle(degree)	50	0
		Max angle(degree)	51	0
		Snug torque(%)	52	0
		Speed (rpm)	53	Auto
		Free fastenig angle(degree)	54	0
		Free fastenig speed(rpm)	55	0
		Soft start(1-300ms)	56	0
		Seating point (%) 10-90	57	Auto
		Torque rising rate(ms) 50-200	58	50
		Torque holding time(ms) 1-20	59	2
		Torque compensation (%) 90-110	60	100
	5	TC/AM_AC/TM	61	0
		Torque	62	Auto
		Torque min/max (%)	63	0
		Target angle(degree)	64	0
		Min angle(degree)	65	0
		Max angle(degree)	66	0

		Snug torque(%)	67	0
		Speed (rpm)	68	Auto
		Free fastenig angle(degree)	69	0
		Free fastenig speed(rpm)	70	0
		Soft start(1-300ms)	71	0
		Seating point (%) 10-90	72	Auto
		Torque rising rate(ms) 50-200	73	50
		Torque holding time(ms) 1-20	74	2
		Torque compensation (%) 90-110	75	100
	6	TC/AM_AC/TM	76	0
		Torque	77	Auto
		Torque min/max (%)	78	0
		Target angle(degree)	79	0
		Min angle(degree)	80	0
		Max angle(degree)	81	0
		Snug torque(%)	82	0
		Speed (rpm)	83	Auto
		Free fastenig angle(degree)	84	0
		Free fastenig speed(rpm)	85	0
		Soft start(1-300ms)	86	0
		Seating point (%) 10-90	87	Auto
		Torque rising rate(ms) 50-200	88	50
		Torque holding time(ms) 1-20	89	2
		Torque compensation (%) 90-110	90	100
	7	TC/AM_AC/TM	91	0
		Torque	92	Auto
		Torque min/max (%)	93	0
		Target angle(degree)	94	0
		Min angle(degree)	95	0
		Max angle(degree)	96	0
		Snug torque(%)	97	0
		Speed (rpm)	98	Auto
		Free fastenig angle(degree)	99	0
		Free fastenig speed(rpm)	100	0
		Soft start(1-300ms)	101	0

		Seating point (%) 10-90	102	Auto
		Torque rising rate(ms) 50-200	103	50
		Torque holding time(ms) 1-20	104	2
		Torque compensation (%) 90-110	105	100
	8	TC/AM_AC/TM	106	0
		Torque	107	Auto
		Torque min/max (%)	108	0
		Target angle(degree)	109	0
		Min angle(degree)	110	0
		Max angle(degree)	111	0
		Snug torque(%)	112	0
		Speed (rpm)	113	Auto
		Free fastenig angle(degree)	114	0
		Free fastenig speed(rpm)	115	0
		Soft start(1-300ms)	116	0
		Seating point (%) 10-90	117	Auto
		Torque rising rate(ms) 50-200	118	50
		Torque holding time(ms) 1-20	119	2
		Torque compensation (%) 90-110	120	100
	9	TC/AM_AC/TM	121	0
		Torque	122	Auto
		Torque min/max (%)	123	0
		Target angle(degree)	124	0
		Min angle(degree)	125	0
		Max angle(degree)	126	0
		Snug torque(%)	127	0
		Speed (rpm)	128	Auto
		Free fastenig angle(degree)	129	0
		Free fastenig speed(rpm)	130	0
		Soft start(1-300ms)	131	0
		Seating point (%) 10-90	132	Auto
		Torque rising rate(ms) 50-200	133	50
		Torque holding time(ms) 1-20	134	2
		Torque compensation (%) 90-110	135	100
	10	TC/AM_AC/TM	136	0



		Torque	137	Auto
		Torque min/max (%)	138	0
		Target angle(degree)	139	0
		Min angle(degree)	140	0
		Max angle(degree)	141	0
		Snug torque(%)	142	0
		Speed (rpm)	143	Auto
		Free fastenig angle(degree)	144	0
		Free fastenig speed(rpm)	145	0
		Soft start(1-300ms)	146	0
		Seating point (%) 10-90	147	Auto
		Torque rising rate(ms) 50-200	148	50
		Torque holding time(ms) 1-20	149	2
		Torque compensation (%) 90-110	150	100
	11	TC/AM_AC/TM	151	0
		Torque	152	Auto
		Torque min/max (%)	153	0
		Target angle(degree)	154	0
		Min angle(degree)	155	0
		Max angle(degree)	156	0
		Snug torque(%)	157	0
		Speed (rpm)	158	Auto
		Free fastenig angle(degree)	159	0
		Free fastenig speed(rpm)	160	0
		Soft start(1-300ms)	161	0
		Seating point (%) 10-90	162	Auto
		Torque rising rate(ms) 50-200	163	50
		Torque holding time(ms) 1-20	164	2
		Torque compensation (%) 90-110	165	100
	12	TC/AM_AC/TM	166	0
		Torque	167	Auto
		Torque min/max (%)	168	0
		Target angle(degree)	169	0
		Min angle(degree)	170	0
		Max angle(degree)	171	0

		Snug torque(%)	172	0
		Speed (rpm)	173	Auto
		Free fastenig angle(degree)	174	0
		Free fastenig speed(rpm)	175	0
		Soft start(1-300ms)	176	0
		Seating point (%) 10-90	177	Auto
		Torque rising rate(ms) 50-200	178	50
		Torque holding time(ms) 1-20	179	2
		Torque compensation (%) 90-110	180	100
	13	TC/AM_AC/TM	181	0
		Torque	182	Auto
		Torque min/max (%)	183	0
		Target angle(degree)	184	0
		Min angle(degree)	185	0
		Max angle(degree)	186	0
		Snug torque(%)	187	0
		Speed (rpm)	188	Auto
		Free fastenig angle(degree)	189	0
		Free fastenig speed(rpm)	190	0
		Soft start(1-300ms)	191	0
		Seating point (%) 10-90	192	Auto
		Torque rising rate(ms) 50-200	193	50
		Torque holding time(ms) 1-20	194	2
		Torque compensation (%) 90-110	195	100
	14	TC/AM_AC/TM	196	0
		Torque	197	Auto
		Torque min/max (%)	198	0
		Target angle(degree)	199	0
		Min angle(degree)	200	0
		Max angle(degree)	201	0
		Snug torque(%)	202	0
		Speed (rpm)	203	Auto
		Free fastenig angle(degree)	204	0
		Free fastenig speed(rpm)	205	0
		Soft start(1-300ms)	206	0

		Seating point (%) 10-90		207	Auto			
		Torque rising rate(ms) 50-200		208	50			
		Torque holding time(ms) 1-20		209	2			
		Torque compensation (%) 90-110		210	100			
	15	TC/AM_AC/TM		211	0			
		Torque		212	Auto			
		Torque min/max (%)		213	0			
		Target angle(degree)		214	0			
		Min angle(degree)		215	0			
		Max angle(degree)		216	0			
		Snug torque(%)		217	0			
		Speed (rpm)		218	Auto			
		Free fastenig angle(degree)		219	0			
		Free fastenig speed(rpm)		220	0			
		Soft start(1-300ms)		221	0			
		Seating point (%) 10-90		222	Auto			
		Torque rising rate(ms) 50-200		223	50			
		Torque holding time(ms) 1-20		224	2			
		Torque compensation (%) 90-110		225	100			
		I/O	I/O (IN)	Input #1	0) None 1) Torque select 1 2) Torque select 2 3) Torque select 3 4) Torque select 4 5) Start 6) Fastening / Loosening		226	1
				Input #2			227	2
	Input #3					228	3	
	Input #4					229	4	
	Input #5					230	5	
	Input #6					231	6	
Input #7				232		7		
Input #8	Choose one of the below 0) None 1) Torque Up 2) Fastening OK 3) Ready 4) Alarm 5) Status of F/L				233	8		
I/O (OUT)			Output #1		234	1		
			Output #2		235	2		
			Output #3		236	3		
			Output #4		237	4		
			Output #5		238	5		
			Output #6		239	6		
			Output #7		240	7		
	Output #8			241	8			

Screw count	Screw count	Sensor signal type 0 - 3	242	0
		Time limit (if P122-->2)	243	0
		Count complete OUT manage	244	0
		Middle count no. 0 - 99	245	0
		Sensor signal delay time (x10ms)	246	0
		Total count (screw no.)	247	5
Advanced Function	Free Reverse	Enable(1) / Disable(0)	250	0
		Speed (rpm)	251	0
		Angle (turn) 0 - 20	252	0
		Applicable Preset # 1-15	253	0
	Engaging torque detection	Enable(1) / Disable(0)	254	0
		Speed (rpm)	255	0
		Torque(%)	256	0
		Angle limit (turn) 0 - 20	257	0
		Time limit (sec)	258	0
		Applicable Preset # 1-15	259	0
		Angle start from engaging	260	0
	Extra angle after torque up	Enable(1) / Disable(0)	261	0
		Speed (rpm)	262	0
		Angle (degree) 0-3600	263	0
		Direction	264	0
		Applicable Preset # 1-15	265	0
Controller	Setting 1	Run time limit / Forward (sec)	270	10
		Run time limit / Reverse (sec)	271	10
		Motor stall time limit (sec)	272	0.2
		Loosening speed (rpm)	273	Auto
		Motor acceleration (ms)	274	100
		Fastening complete signal OUT time	275	0
		Driver ID no.	276	1
		Error display reset time	277	1
		Torque compensation master (%) 90-110	278	100
		LCD brightness 10-64	279	45
		Initial preset # when power ON	280	1
		Driver model no. 1-99	281	Auto
		Password 0-9999	282	0

		Parameter initialize to factory setting	283	0
		Driver auto lock (for Model)	284	0
	Setting 2	Auto speed on torque setting	290	1
		Judge fastening min turns	291	0
		Model select	292	0
		Fastening stop error	293	0
		Reverse Lock	294	0
		Trigger start (Handheld only)	295	0
		Reverse start (Handheld only)	296	0
		Auto data output	297	0
		Beep sound	298	1
		Preset change by Touch pannel	299	1
		COM port Baud rate	300	4
		Torque unit	301	0
		Screw type	302	0
		Auto update port	303	0
		Lamp on time	304	0
		Option card	305	0
IP Address		IP Address1	310	192
		IP Address2	311	168
		IP Address3	312	1
		IP Address4	313	100
		Gateway 1	314	192
		Gateway 2	315	168
		Gateway 3	316	1
		Gateway 4	317	1
		Port	318	5000
Multi SQ	PG1	MS PG 1	321	0
		MS PG 2	322	0
		MS PG 3	323	0
		MS PG 4	324	0
		MS PG 5	325	0
		MS PG 6	326	0
		MS PG 7	327	0
		MS PG 8	328	0

	PG2	MS PG 9	329	0
		MS PG 10	330	0
		MS PG 11	331	0
		MS PG 12	332	0
		MS PG 13	333	0
		MS PG 14	334	0
		MS PG 15	335	0
		MS PG 16	336	0
		MS PG 17	337	0
		MS PG 18	338	0
		MS PG 19	339	0
		MS PG 20	340	0
ERROR		ERROR 1	341	0
		ERROR 2	342	0
		ERROR 3	343	0
		ERROR 4	344	0
		ERROR 5	345	0
		ERROR 6	346	0
		ERROR 7	347	0
		ERROR 8	348	0
		Controller model	349	Auto
Model		Model data( 150 )	350 ~ 499	0
Firmware Version			500	Auto

★ Please refer to the operation manual of ParaMon PC software for details of parameter settings.

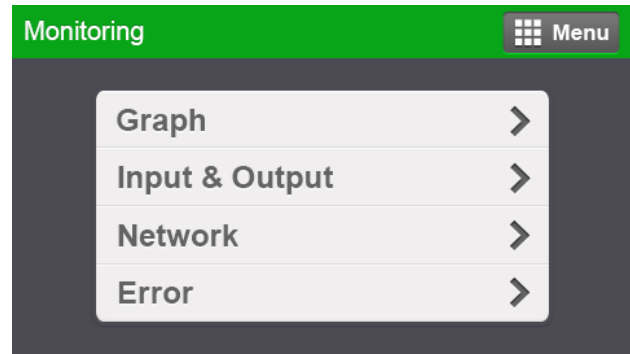
## 7.4 Monitoring

To program each Presets, Click  Menu and go to

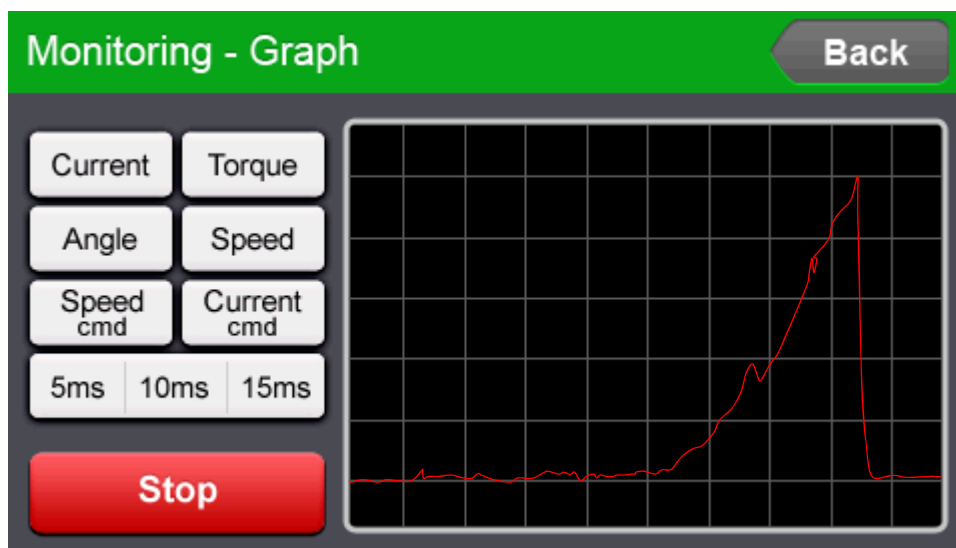


There are three(3) real-time monitoring menu.

- Graph : torque, Angle, Speed and current
- I/O : Input & output status
- Network : RS-232 & Ethernet settings



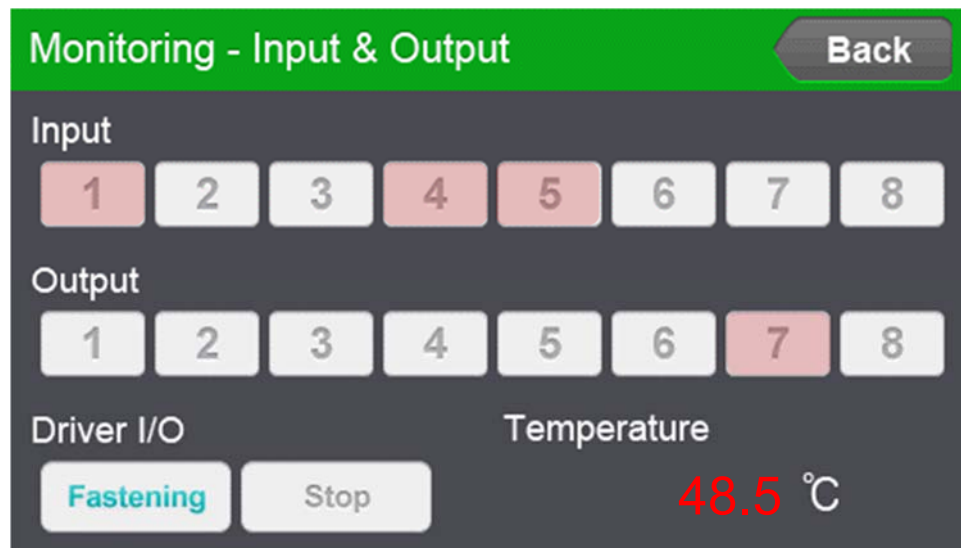
### ◆ Graph (Torque curve) monitoring



Select the required data and press Start. The sampling rate is 5ms for 1second, 10ms for 2 second and 15ms for 3 second display with total 200 data

- Current
- Torque
- Angle
- Speed

◆ I/O Status monitoring



The screenshot shows a control interface titled "Monitoring - Input & Output" with a green header and a "Back" button. It displays the status of 8 input and 8 output channels. Inputs 1, 4, and 5 are active (orange), while others are inactive (grey). Output 7 is active (orange), while others are inactive (grey). Below the channels, there are two buttons: "Fastening" (cyan) and "Stop" (grey). To the right, the "Temperature" is displayed as "48.5 °C" in red.

Input	1	2	3	4	5	6	7	8
Status	Active	Inactive	Inactive	Active	Active	Inactive	Inactive	Inactive

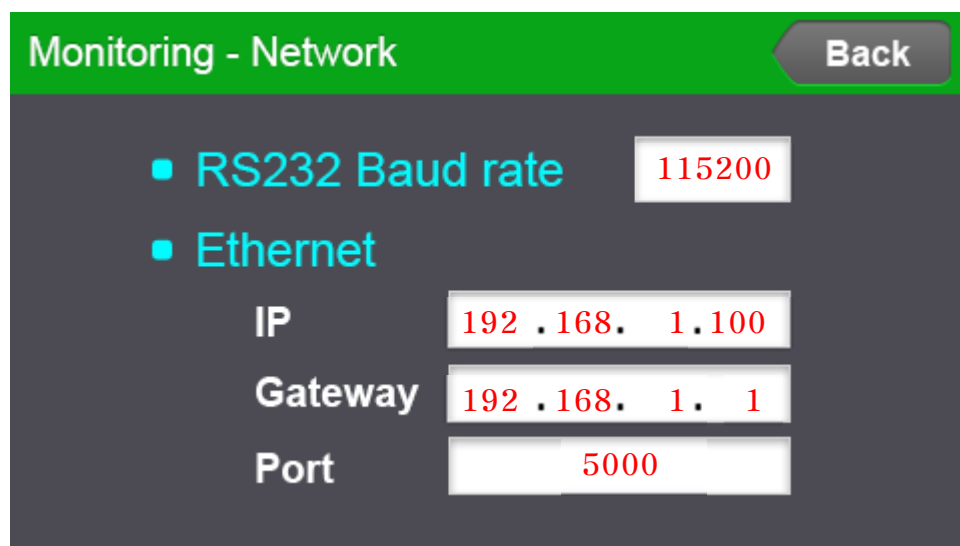
Output	1	2	3	4	5	6	7	8
Status	Inactive	Inactive	Inactive	Inactive	Inactive	Inactive	Active	Inactive

Driver I/O: Fastening (Active), Stop (Inactive)

Temperature: 48.5 °C

The active I/O & tool operation signals are displayed with orange color by real time.  
The temperature of the motor surface is also displayed.  
Refer to the operation manual of ParaMon for details of wiring, schematic and digital I/O mapping.

◆ Network setting

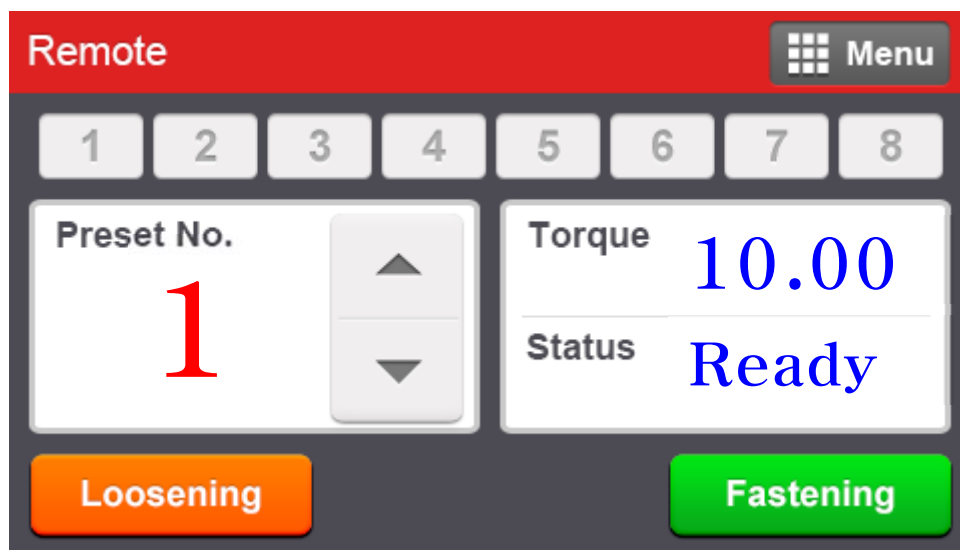


The screenshot shows a control interface titled "Monitoring - Network" with a green header and a "Back" button. It displays network settings for RS232 and Ethernet. The RS232 Baud rate is set to 115200. The Ethernet settings include IP (192.168.1.100), Gateway (192.168.1.1), and Port (5000).

Setting	Value
RS232 Baud rate	115200
Ethernet IP	192.168.1.100
Ethernet Gateway	192.168.1.1
Ethernet Port	5000

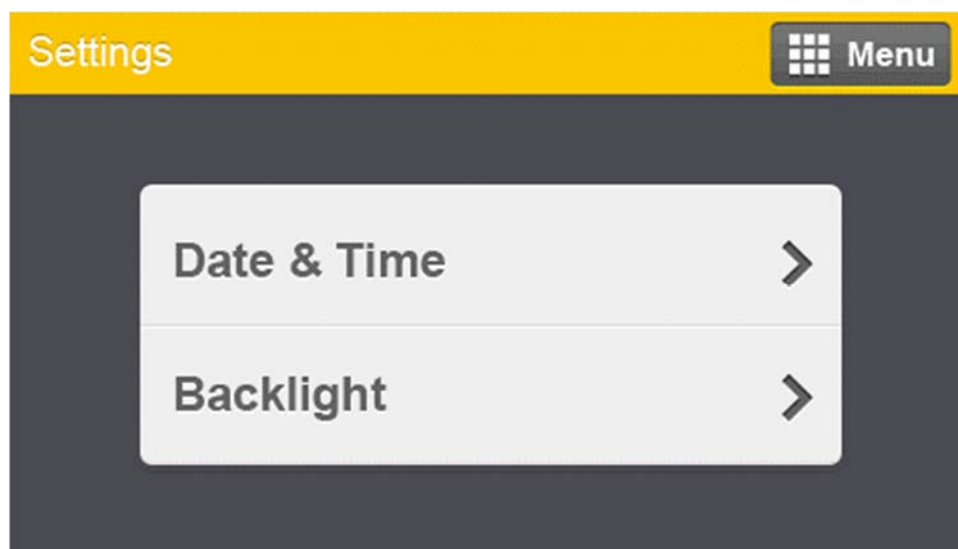


## 7.4 Remote



The tool and output signal can be operated remotely by click the screen.

## 7.5 Setting



System time and date can be modified.

Backlight bright is adjustable.

Revision 0

December 26, 2016

Parameter setting and monitoring PC software for MDC

# ParaMon Operation Manual



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## **1. Software installation**

### **1.1 Required PC specification**

- OS : Windows 7 or later version
- COM port : RS-232C, USB 2.0, Ethrnet

### **1.2 Software**

- Software file : ParaMon v0.00 yyyyymmdd.zip
- Install file : setup.exe

The higher version of software will overwrite the lower version of ParaMon software.

## 2. Operation

### 2.1 Connection

ParaMon pc software have 4 selectable connecting options to the MDC or ADC controller.

MDC controller : Serial RS232C or Ethernet

ADC controller : Serial RS422 or USB

Serial COM port connection requires the information about COM port, Baud rate and the device ID

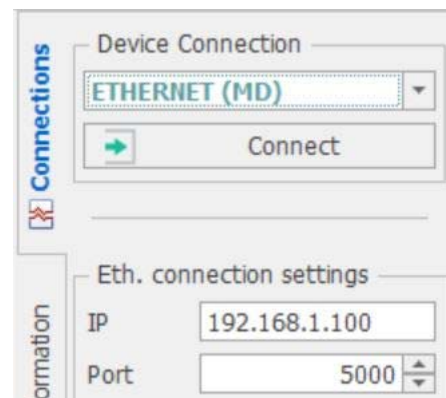
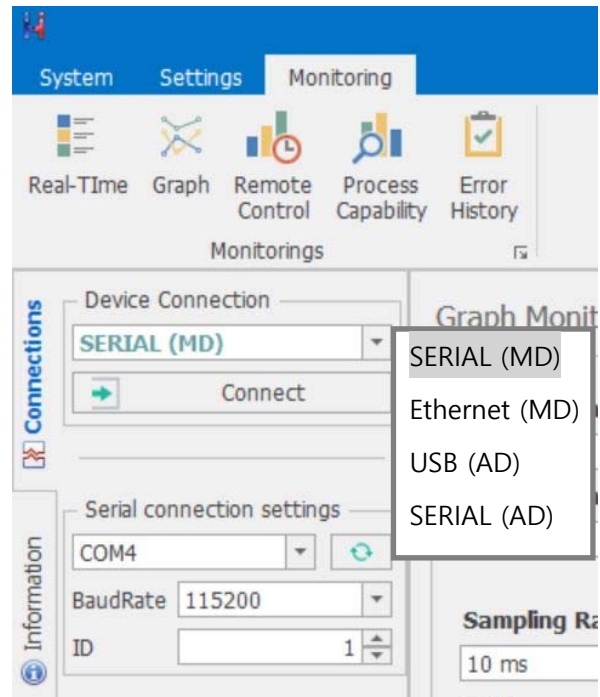
Ethernet connection requires IP and port address.

The followings are the factory setting address for the Ethernet connection

IP : 192.168.1.100

Port : 5000

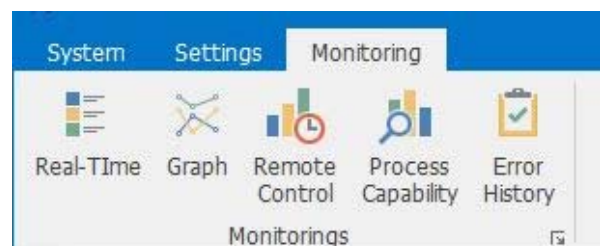
Use the IP address 192.168.1.1 or any other nearby address for your PC, avoiding conflict with other devices.

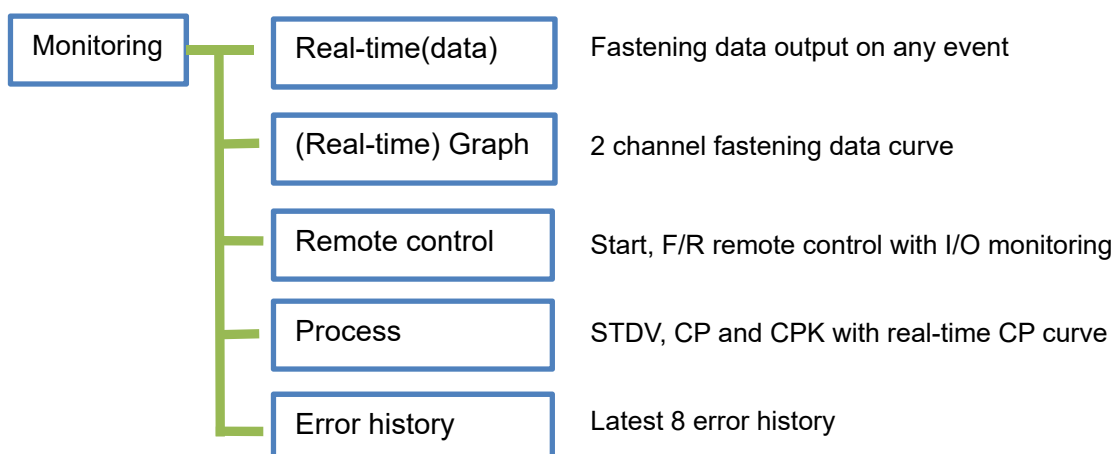
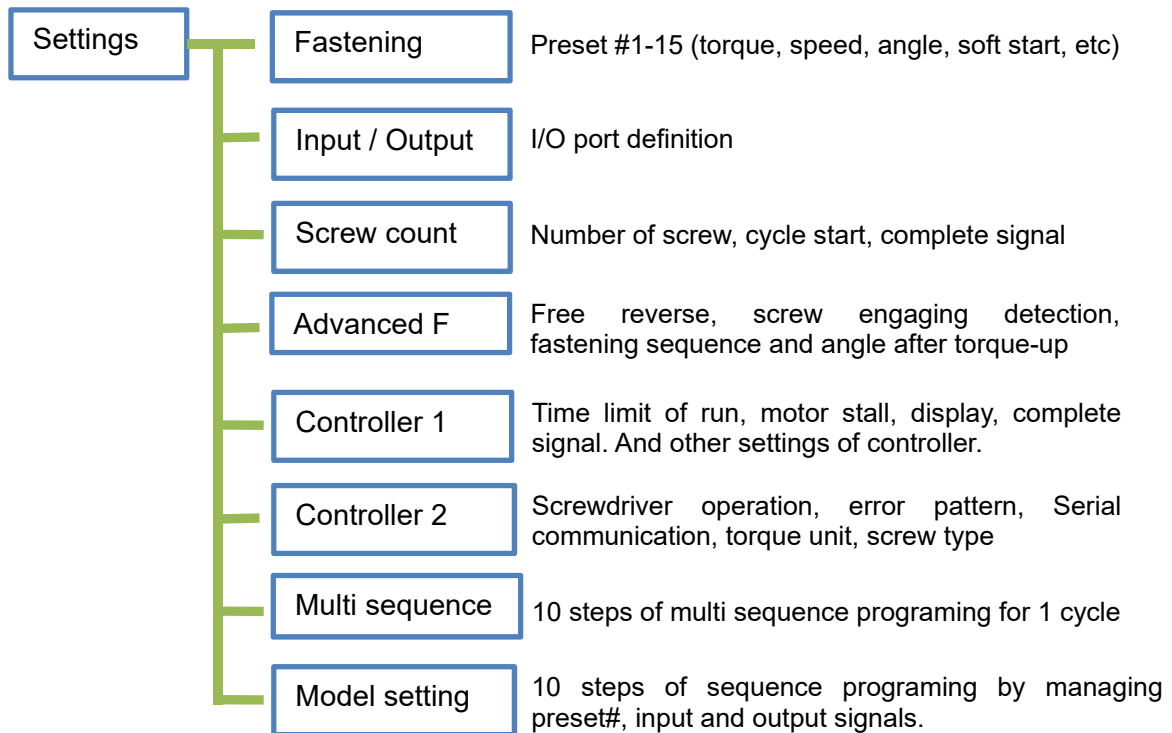
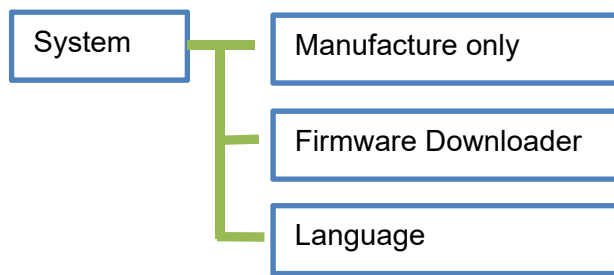


### 2.2 Menu

There are 3 main menu.

- System
- Settings
- Monitoring



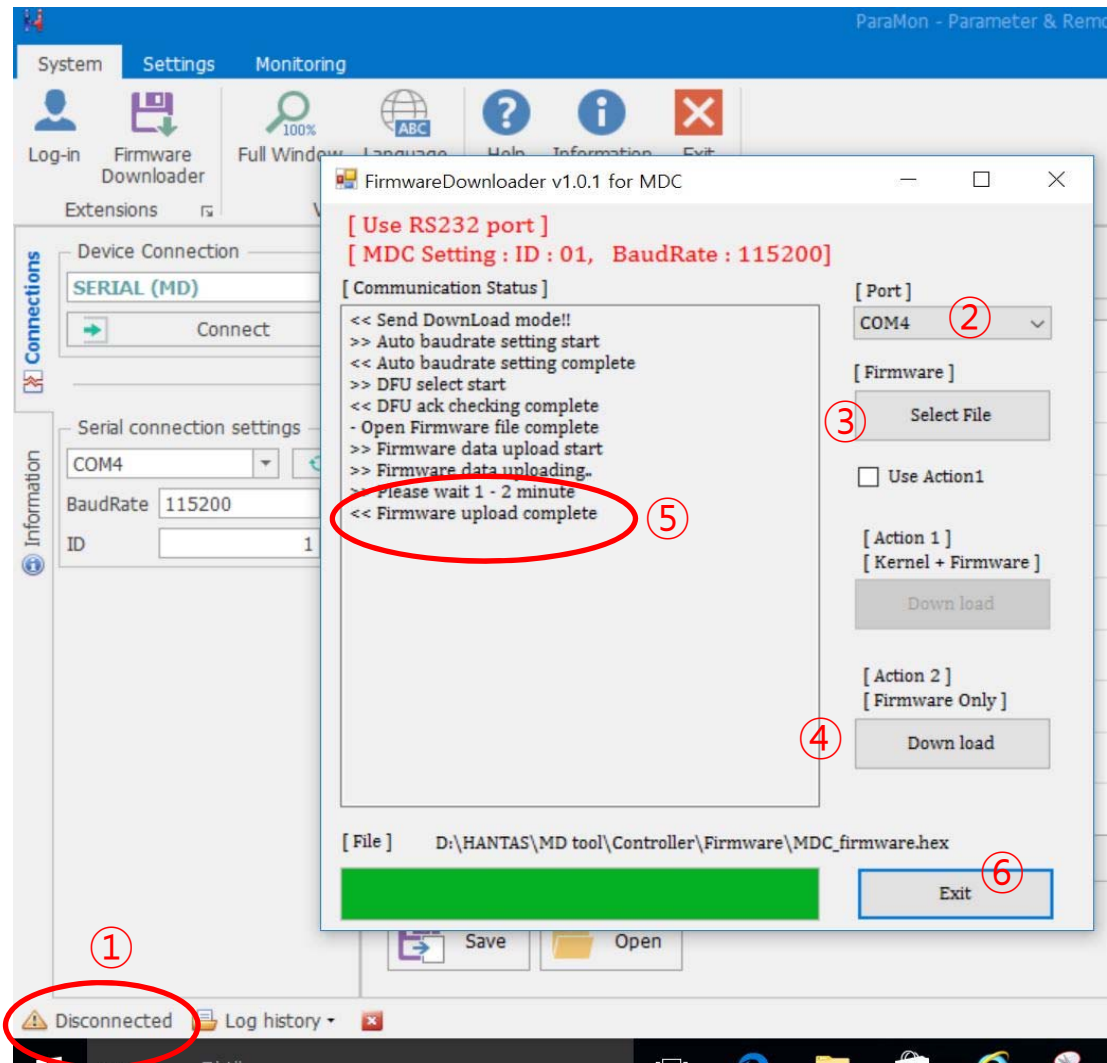


Be sure that the changed parameter on the ParaMon pc software is reflected to the MDC and ADC controller immediately.

## 2.2.1 System

### 1) Firmware downloader

Controller firmware is downloaded as below process. **Use RS232C port .**  
**Ethernet is not allowed for firmware download.**



- ① Disconnect com port connection of PC
- ② Click "Firmware Downloader"
- ③ Select the same COM port, firmware file in the PC
- ④ Click "Down load" for [ Action 2, Firmware only ]. If there is no existing firmware in the controller, refer "Firmware downloader including Kernel data in next page"
- ⑤ See the message "Firmware upload complete" in the message window, and click "Exit" to finish the process.
- ⑥ Turn the power of the controller OFF, and ON again to initialize the settings

## 2) Firmware downloader including Kernel data

It is used when there is no existing or erased firmware in the controller. **Use RS232C port . Ethernet is not allowed for firmware download.**

① Disconnect com port connection of PC and power OFF

② Select "Firmware Upgrade" on the back panel of controller and power ON



③ Click "Firmware Downloader"

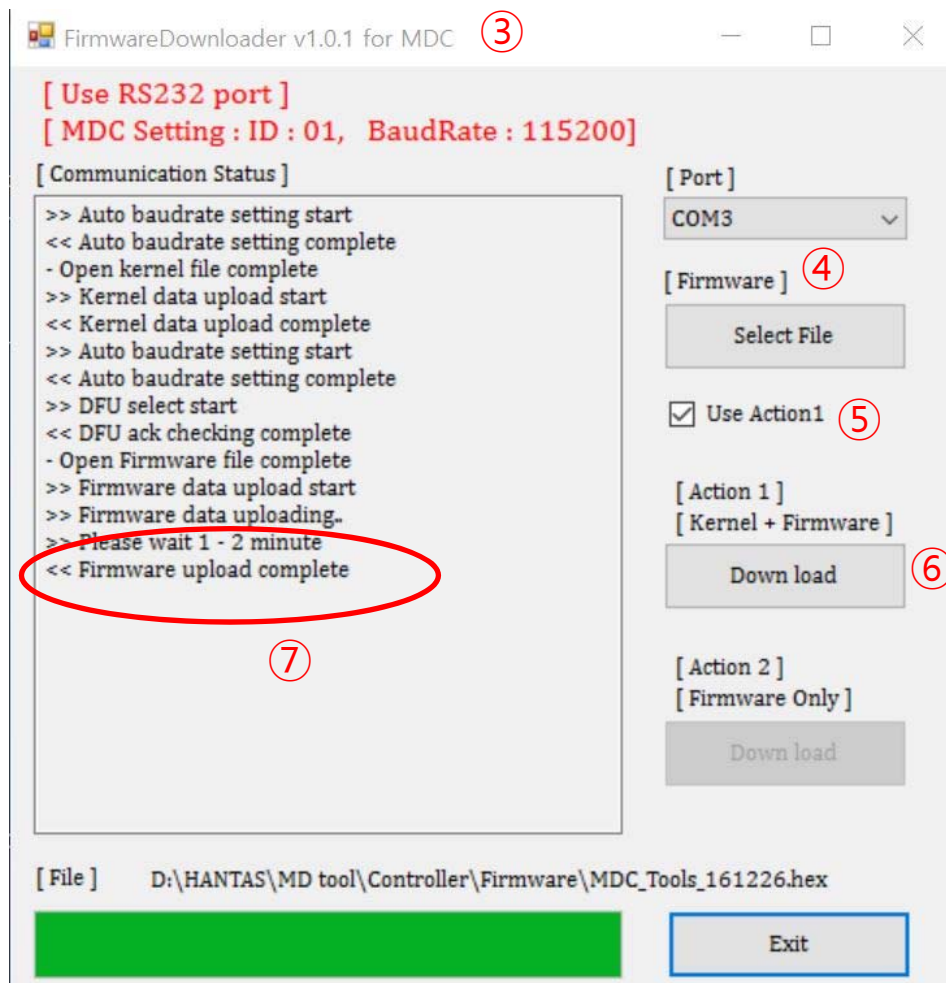
④ Select the same COM port, firmware file in the PC

⑤ Select the "Use Action1" Check button

⑥ Click "Down load" for [ Action 1, Kernel+Firmware ] and click "Down load"

⑦ See the message "Firmware upload complete" in the message window, and click "Exit" to finish the process.

⑧ Turn the power of the controller OFF, return the Upgrade switch back to the original operation position and power ON again to initialize the settings





## 2.2.2 Settings

### 1) Fastening

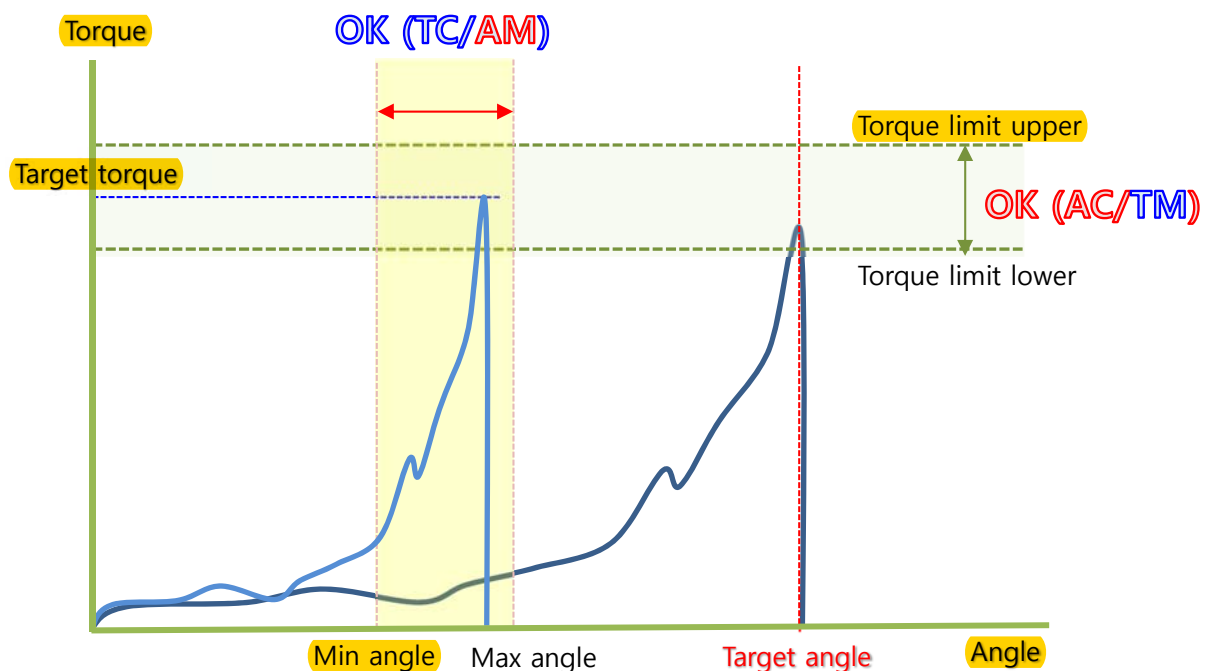
Fastening Setting

Address No.	Parameter	Parameter value	Min value	Max ...
Preset No.: 01				
A001	Type	0	0	1
A002	Torque	0.5	0.5	15
A003	Torque limit (%)	0	0	50
A004	Target angle (degree)	0	0	9999
A005	Min angle (degree)	0	0	9999
A006	Max angle (degree)	0	0	9999
A007	Snug torque (%)	0	0	100
A008	Speed (rpm)	0	150	2000
A009	Free angle (degree)	0	0	9999
A010	Free speed (rpm)	0	0	2000
A011	Soft start (ms)	0	0	300
A012	Seating point torque (%)	40	10	90
A013	Torque rising time (ms)	50	50	200
A014	Torque holding time (ms)	2	1	20
A015	Torque compensation (%)	100	80	120
Preset No.: 02				
Preset No.: 03				
Preset No.: 04				
Preset No.: 05				
Preset No.: 06				
Preset No.: 07				
Preset No.: 08				
Preset No.: 09				
Preset No.: 10				
Preset No.: 11				
Preset No.: 12				

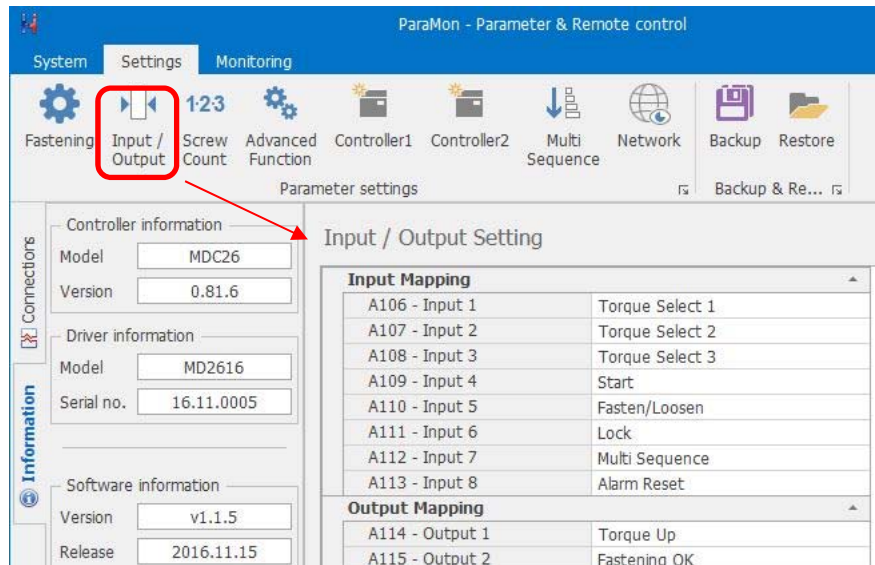
There are 15 preset groups for fastening setting. Each preset # consists of torque, speed, Min & Max angle for fastening OK range, soft start, Free speed before tightening.

- Control type : TC/AM or AC/TM  
( torque control angle monitoring or angle control torque monitoring )
- Torque : Target torque
- Torque limit (%) : OK torque range in AC/TM mode

- Target angle : Target angle in AC/TM mode
- Min angle (degree) : Minimum angle to be OK in TC/AM mode
- Max angle (degree) : Maximum angle to be OK in TC/AM mode
- Snug torque(%) : Point (% from target torque) to start monitoring angle in TC/AM mode
- Speed : Target speed. Speed is changed by torque setting automatically. To change manually, Auto Speed must be Disabled in Control 2
- Free speed : Manual setting speed. Shift back to the auto speed after the free angle running
- Free angle : Angle for Free speed.
- Soft start(mS) : Speed reach to the target in the setting time
- Seating point(%) : Auto speed slow down to ramp-up speed for torque control
- Torque rising time(mS) : Time setting from seating point to the target
- Torque holding time(mS) : Target torque holding time
- Torque compensation(%) : Preset # has each torque compensation value.



## 2) Input / Output management



The digital I/O provide the free assignment feature for 8 Inputs and 8 Outputs.

Factory setting of I/O assignments are as following. **To validate changing I/O, turn the power OFF and ON again.**

Description	Digital Input	Description	Digital Output
Preset select 1	Input 1	Torque up	Output 1
Preset select 2	Input 2	Fastening OK	Output 2
Preset select 3	Input 3	Ready	Output 3
Start	Input 4	Motor Run	Output 4
Fasten / Loosen	Input 5	Alarm	Output 5
Lock	Input 6	Status For/Rev	Output 6
Multi sequence	Input 7	Count Complete	Output 7
Reset	Input 8	Alarm 1	Output 8
Count Start	-	Alarm 2	
Count Reset	-	Alarm 3	
Count Out	-	Model Complete	
Preset select 4	-		
Model Cancel	-		
Model select 1	-		
Model select 2	-		
Model select 3	-		
Model select 4	-		

◆ MDC (25P D-Sub connector) I/O details

Pin No	Description	Factory setting
1	IN 1	Preset select 1
2	IN 2	Preset select 2
3	IN 3	Preset select 3
4	IN 4	Start
5	IN 5	Forward / Reverse
6	IN 6	Driver Lock
7	IN 7	Multi sequence
8	IN 8	Reset
9	X	
10	OUT 1	Torque UP
11	OUT 2	Fastening OK
12	OUT 3	Ready
13	OUT 4	Motor RUN
14	OUT 5	Alarm
15	OUT 6	Status F/L
16	OUT 7	Count complete
17	OUT 8	
18	X	
19	X	
20	X	
21	Out COM	
22	In COM	
23	X	
24	X	
25	X	

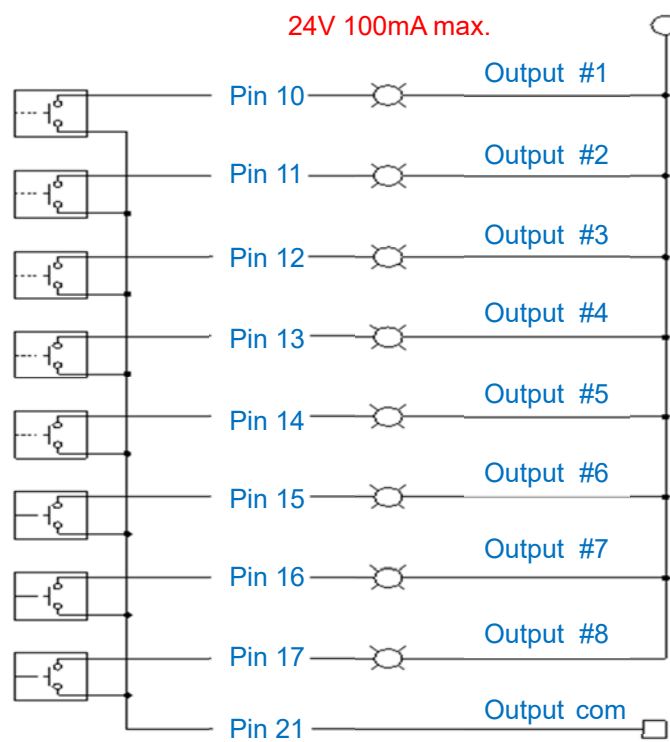
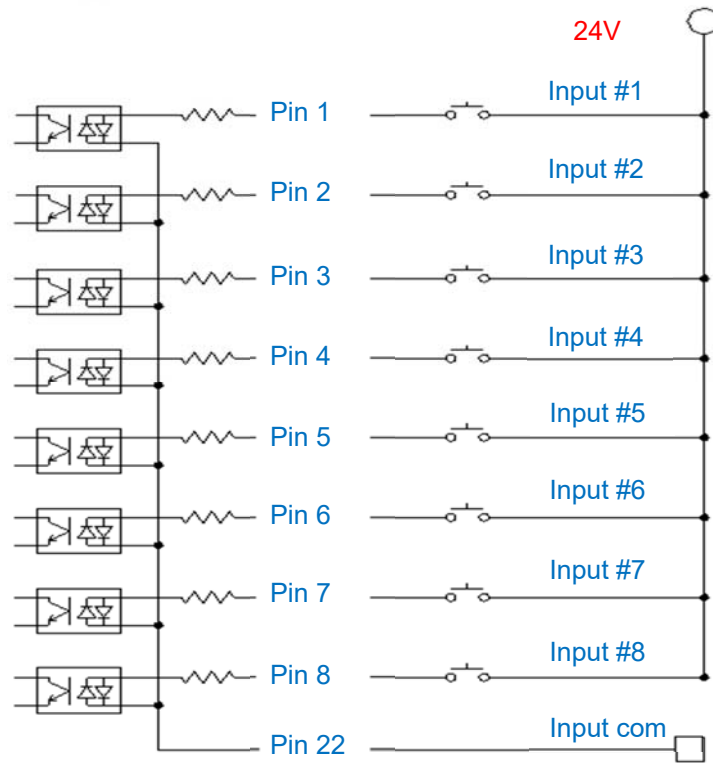
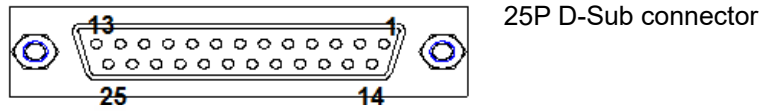
◆ Binary coding with 5 inputs to select preset #

Preset #	Input				Multi sequence
	Torque select 4	Torque select 3	Torque select 2	Torque select 1	
1	0	0	0	1	
2	0	0	1	0	
3	0	0	1	1	
4	0	1	0	0	
5	0	1	0	1	
6	0	1	1	0	
7	0	1	1	1	
8	1	0	0	0	
9	1	0	0	1	
10	1	0	1	0	
11	1	0	1	1	
12	1	1	0	0	
13	1	1	0	1	
14	1	1	1	0	
15	1	1	1	1	
Multi A	0	0	0	1	1
Multi B	0	0	1	0	1

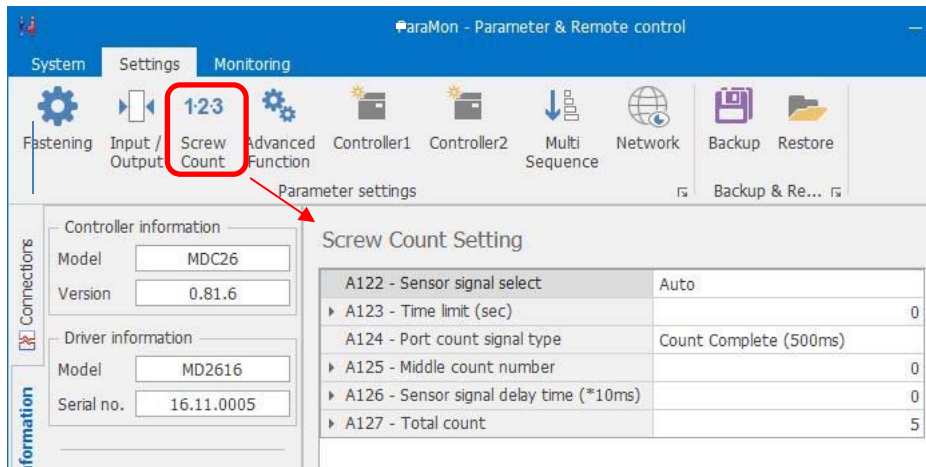
◆ Binary coding with 3 outputs for error codes in 7 groups

Error code	Alarm 3	Alarm 2	Alarm 1
110,111,112,113,114,115,116,118,200,201,220	0	0	1
300,301,302,303,304,309	0	1	0
310,311	0	1	1
330,331	1	0	0
332	1	0	1
333,334,335,336	1	1	0
400,401,500	1	1	1

◆ MDC 25P I/O schematic

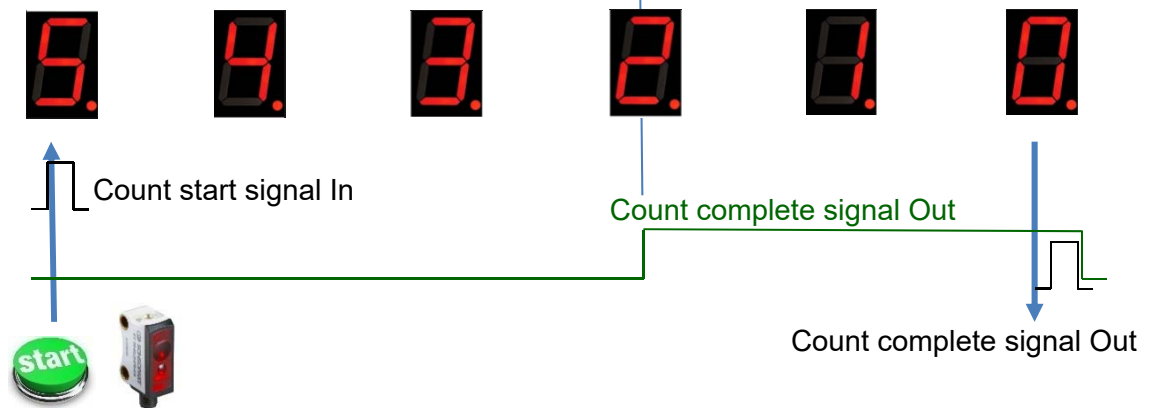


### 3) Screw count



Total count number

Middle count number



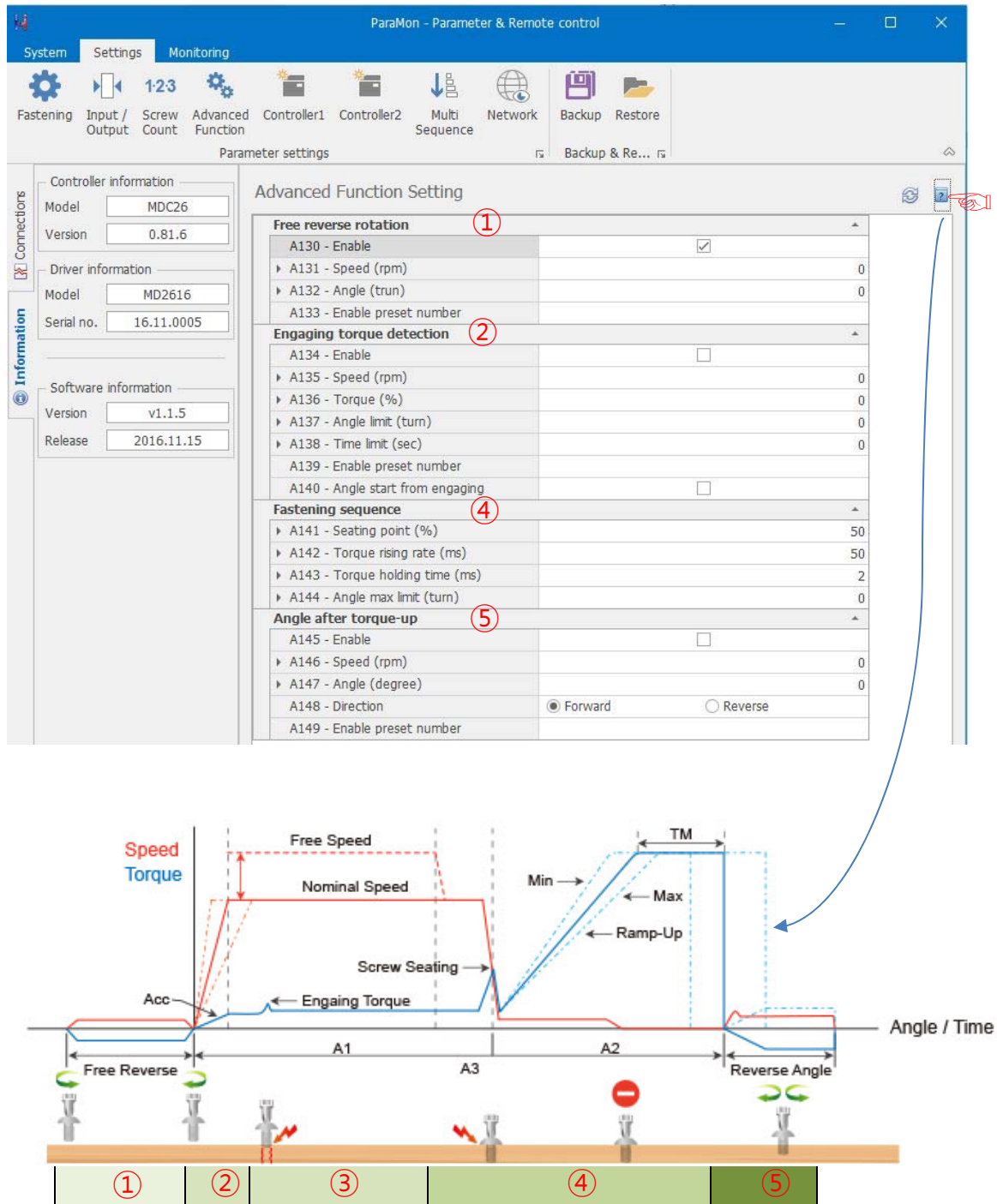
#### ◆ Count start signal (IN)

- 1) No signal, auto start (Auto) - auto reset to total number after "0"
- 2) Continuous ON until completed, otherwise count NG
- 3a) Sensor or switch with one trigger pulse - Count starts with only trigger pulse. Counting is valid until complete or reset. Reset calls count NG
- 3b) One trigger pulse with timer for counting - Counting should be completed within the time of timer from the trigger pulse, otherwise count NG
- 4) One trigger pulse to start counting, another trigger pulse to stop counting and evaluate OK or NG. Any remaining number calls count NG

#### ◆ Count complete signal (OUT)

If mid count number is used, count complete signal out is provided on mid count number and reset on the cycle completed.

#### 4) Advanced functions



There are 4 steps of Advanced Function to customize the screw fastening process.

Step 1 (Option) : Free Reverse rotation to guide the screw into the screw hole smoothly with low speed



Step 2 (Option) : Engaging torque detection – The monitoring angle count is reset and start again from the engaging torque detection point which the screw start joining the thread. It is possible only when the screw engaging provide significantly higher torque than previous free run. Engaging torque setting is by percentage of target torque.

Step 3 (Preset) : Free Speed – The system auto speed by torque setting can be manually replaced to have higher or lower speed than it's original auto speed during the limited angle setting. Be sure that the free speed run should stop before the screw seating point which screw start to tightening joint. To use this option, go the Fastening setting menu.

Step 4 (Preset) : Fastening sequence – have the important parameter factors to the tightening quality.

1) Seating point (%) : It is trash hold point at that the target speed is shifting to torque up process. The factory setting is guided from hard joint. If the it is soft joint, the setting can be higher percentage of the target torque.

2) Torque rising time(mS) : It is the speed and time during ramp-up to the target torque. Quick or slow speed to the target torque according to the condition.

3) Torque holding time(mS) : Tool holds the target torque for the time setting. It stabilizes the tightening condition.

Step 5 (Option) : Angle after torque-up(A261) : It manage extra angle control in both forward or reverse direction after tightening by torque.

## 5) Controller 1 & 2

Controller Setting 1		
▶ A270 - Forward RUN time limit (sec)		10
▶ A271 - Reverse RUN time limit (sec)		10
▶ A272 - Motor Stall time limit (sec)		0.2
▶ A273 - Loosening speed (rpm)		900
▶ A274 - Acceleration (ms)		100
▶ A275 - Fastening complete signal out time (ms)		0
▶ A276 - Driver ID		1
▶ A277 - Error display reset time (sec)		1
▶ A278 - Torque Compensation (%)		100
▶ A279 - LCD brightness		45
▶ A280 - Initial torque preset # display when power on		1
▶ A281 - Driver model no.		4
▶ A282 - Password		0
▶ A283 - Controller parameter initialize		0
A284 - Automatic driver lock (Model mode only)	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable

Controller Setting 2		
A290 - Auto speed	<input type="radio"/> Disable	<input checked="" type="radio"/> Enable
▶ A291 - Judged fasten minimum turns		0
A292 - Model select	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A293 - Fastening stop error	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A294 - Reverse lock(handheld only)	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A295 - Trigger start (handheld only)	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A296 - Reverse start (handheld only)	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A297 - Auto data output	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable
A298 - Select Sound	<input type="radio"/> Disable	<input checked="" type="radio"/> Enable
A299 - Select Preset by Touch pannel	<input type="radio"/> Disable	<input checked="" type="radio"/> Enable
A300 - Com Port baudrate setting	115200	
A301 - Torque Unit	Kgf.cm	
A302 - Screw type	<input checked="" type="radio"/> CW	<input type="radio"/> CCW
A303 - Auto data output type	<input checked="" type="radio"/> Serial	<input type="radio"/> Ethernet
▶ A304 - Lamp on time (sec)		0
A305 - Option card	<input checked="" type="radio"/> Disable	<input type="radio"/> Enable

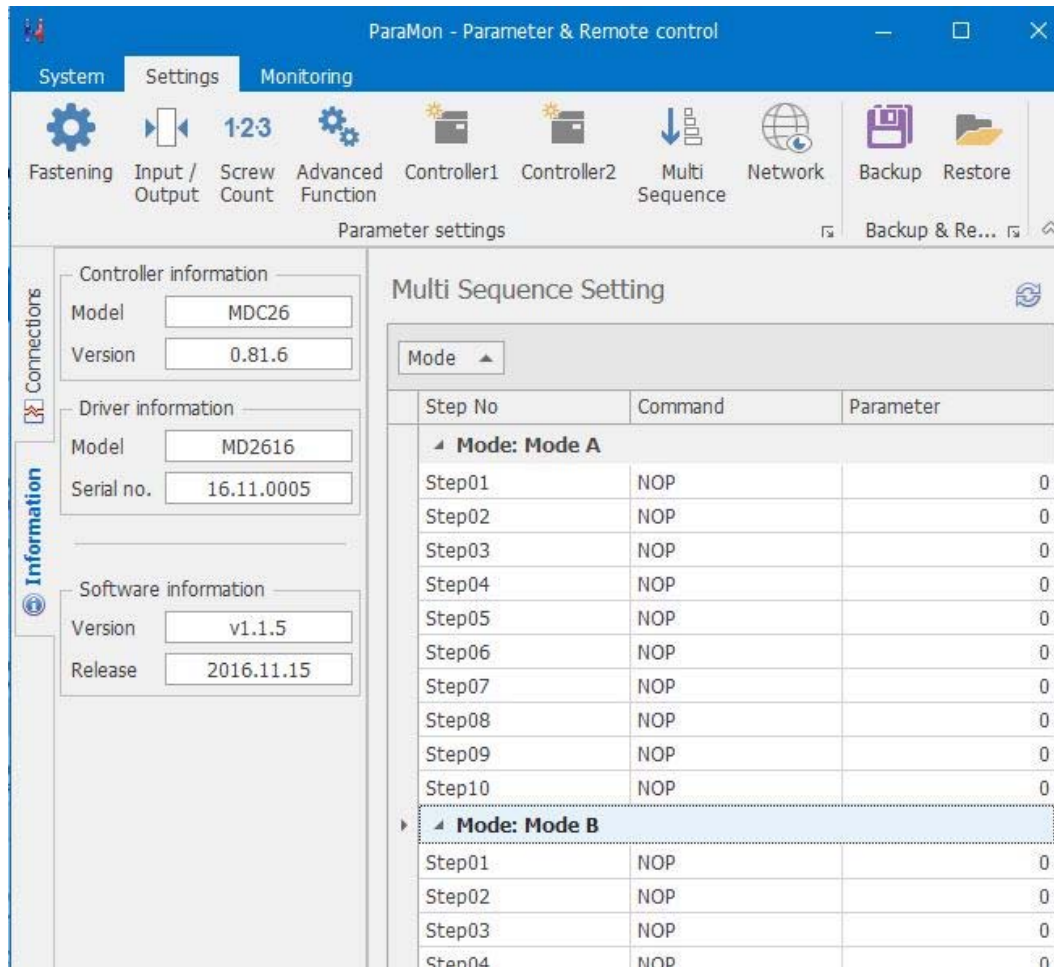
Forward / Reverse motor RUN time, and motor stall time is limited for motor safety. The following parameters is ideally recommended to be kept with factory setting in all application.

- Forward RUN time limit (A270) : Run limit to forward rotation
- Reverse RUN time limit (A271) : Run limit to reverse rotation
- Motor Stall time limit (A272) : Immediate stop when motor is stalled.
- Acceleration (A274) : Slow start of motor to the target speed
- Fastening OK signal time (A275) : Signal output time setting longer than 150mS which is factory setting. Shorter time than factory setting doesn't work.
- Torque compensation (A278) : It is master calibration of torque.
- Auto speed (A290) : ENABLE provide the safe speed on the torque setting
- Driver model no.(A281) : not changeable. Auto recognized

Other parameters are selectable and changeable for application requirements.

- Password (A282) : Factory setting is " 0 ". Be careful not to lose the PW.
- Controller parameter initialize (A283) : Key in " 77 " to flash the parameters back to the factory settings.
- Automatic driver lock (A284) : Driver can be locked in out of the process when the Model mode is selected
- Judged fasten minimum turns (A291) : Turns out of judgement.
- Fastening stop error (A293) : DISABLE does not creat any NG when the tool stops without fully tightening by torque up.
- Auto data output (A297) : Fastening data output automatically on every events as like run, For/Rev change, torque up, preset change, etc.
- Torque unit (A301) : Kgf.cm / Kgf.m / cNm / Nm / ozf.in / lbf.in / lbf.ft  
Whenever the unit is changed, the controller should be reboot again.
- Lamp on time (A304) : LED lamp off timer from operation stop for sleep.
- Option card (A305) : Fastening data saving option with SD memory card is available by optional order with extra cost.

## 6) Multi sequence



### ◆ Command details

Command	Description
NOP	No operation
Fastening	tool start fastening process in forward rotation
Loosening	tool start loosening process in reverse rotation
Select preset#	Select preset #
Delay	time delay for setting time
Jump	Move to the setting step
Count value = A	Total number "A" to count
Sub if (A)	Subtract 1 from "A" and save the value replacing "A" . If the value "A" is not "0", then move to the next lower step. If the value "A" is "0", then move to 2 <sup>nd</sup> lower step
End	Finish multi-sequence process

Multi sequence provide a cycle of fastening by a start signal.

Total 10 steps of programing is allowed in MA(Multi A) and MB(Multi B) presets

To program, select the command and required parameter on each step.

To finish the multi sequence programing, last step command should be "END"

[ Example of Multi sequence step program ]

Setp no	Command	Parameter
Step 1	Count Value = A	10
Step 2	Select Preset#	1
Step 3	Fastening	
Step 4	Loosening	5
Step 5	Select Preset#	3
Step 6	Fastening	
Step 7	Sub if (A)	
Step 8	Jump	2
Step 9	End	

Step 1 : Total counting number is 10

Step 2 : Preset #1 selected and move to the next step

Step 3 : Start fastening and stop by torque or angle setting, and move to the next step

Step 4 : Loosen 5 turns and move to the next step

Step 5 : Preset #3 selected and move to the next step

Step 6 : Start fastening and stop by torque or angle setting, and move to the next step

Step 7 : Subtract 1 from "10" and save "9" by replacing "10". If the value " A" is not "0", then move to the next lower step. If the value " A" is "0", then move to 2<sup>nd</sup> lower step

Step 8 : Jump to step no. 2

Step no.2 to Step no. 6 works for a cycle. Total 10 cycles are operated automatically by a start signal.

Any failure or NG on each step, Multi-sequence process stops and provide the alarm signal.

## 7) Models

It provides sequential screw tightening with screw counting feature together with I/O and time delay managing by programming in 10 steps.

There are 4 different type of command – Input, Output, Fastening and Time delay

Each step can have one of the above four commands with related setting value

The fastening with counting number follows all settings and features in Screw Count menu except the number of screw.

There are total 15 programmable Models.

Once Model is selected, the digital inputs for preset # select becomes model # select automatically.

To use Model feature,  
select Enable on the menu of Controller 2 - Model select (A292).

The spindle can be locked automatically in all steps except Fastening step, by selecting Enable on the menu of Controller 1 – Automatic driver lock (A284)

ParaMon - Parameter & Remote control

System Settings Monitoring

Fastening Input / Output Screw Count Advanced Function Controller1 Controller2 Multi Sequence Models Backup Restore

Parameter settings Backup & Re...

Controller information  
Model: ADC400  
Version: 0.70.1

Driver information  
Model: AD1501  
Serial no.: 16.09.0003

Software information  
Version: v1.1.8  
Release: 2016.12.19

Model Setting

Step No.	Command.	Data 1	Data 2
Model No.: 1			
1	Input	5	1
2	Fastening	2	3
3	Delay	0	0.5
4	Output	2	3
5	Fastening	3	5
6	Output	3	4
7	None	0	0
8	None	0	0
9	None	0	0
10	None	0	0
Model No.: 2			
Model No.: 3			
Model No.: 4			

◆ Command details

Command	Description	Data 1	Data 2
Input	Mapping digital Input	Input # select from 1 - 16	0 : No output → NG 1 : Active High 2 : Active Low 3 : High status 4 : Low status
Output	Mapping digital Output	Output # select from 1 - 8	0 : No Output → NG 1 : On 2 : Off 3 : On for 0.5s and Off 4 : On for 1.0s and Off
Fastening	Start fastening	Preset # from 1 - 15	Count number from 1 - 250
Delay	Delay time	-	0.1 - 25 sec. (unit: 0.1s)

[ Example of Model programming ]

Step	Command	Data 1	Data 2	Description
Step 1	Input	5	1	If there is input signal turning on in Input no.5, then move to the next step
Step 2	Fastening	2	3	Fastening total 3 screws with preset# 2. If fastening of all screws are completed, then moves to the next step. If there is the cycle start condition except "Auto" on the menu of Screw Count, counting will start only with the cycle start signal input. And if the workpiece is removed without complete of count number, Model process can be stopped by Model cancel (input). Refer 3) Screw Count on the manual
Step 3	Delay	-	0.5	Delay for 0.5 seconds. Then move to the next step
Step 4	Output	2	3	Provide 0.5s pulse ON signal output in Output # 2. Then move to the next step.
Step 5	Fastening	3	5	Fastening total 5 screws with preset# 3. Then moves to the next step. Screw counting condition is same as Step 2
Step 6	Output	3	4	Provide 1.0s pulse ON signal output in Output # 2. Then move to the next step.



Step 1 : Read the sensor signal when it detect the workpiece loading

- Connect sensor to Digital Input 5 (pin no.16)
- I/O setting → Input 5 : None



Step 2 : Screw tightening with Preset #2

Number of screw = 3

Step 3 : Delay process 0.5sec



Step 4 : Provide output signal for 0.5 seconds

- Connect buzzer to Digital Output 2 (pin no. 37 & 38)
- I/O setting → Output 2 : None



Step 5 : Screw tightening with Preset #3

Number of screw = 5



Step 6 : Provide output signal for 0.5 seconds

- Connect buzzer to Digital Output 3 (pin no. 39 & 40)
- I/O setting → Output 3 : None



## 2.2.3 Monitoring

Setting of Auto Data Out (A297) should be " Disable " for Monitoring

### 1) Real-time monitoring

ParaMon - Parameter & Remote control

System Settings Monitoring

Real-Time Graph Remote Control Process Capability Error History

Monitors

Controller information

Model MDC3626

Version 0.81.0

Driver information

Model MD2616

Serial no. 16.11.0005

Software information

Version v1.1.4

Release 2016.11.09

Real Time Monitoring

Drag a column header here to group by that column

Number	Time	Fasten...	Preset	T/Tor...	C/Tor...	Speed	Angle 1	Angle 2	Angle	Error	Count	F/L	Status
3	13:51...	752	1	5	4.92	118	1.24	0.04	1.28	0	4	1	1
4	13:51...	799	1	5	5.01	118	1.33	0.03	1.36	0	3	1	1
5	13:51...	1201	1	5	5.04	118	1.25	0.48	1.73	0	2	1	1
6	13:51...	841	1	5	5.01	118	1.41	0.03	1.44	0	1	1	1
7	13:51...	804	1	5	4.99	118	1.34	0.02	1.37	0	5	1	1
8	13:51...	788	1	5	5.03	118	1.31	0.02	1.34	0	4	1	1
9	13:51...	767	1	5	4.98	118	1.27	0.02	1.3	0	3	1	1
10	13:51...	819	1	5	5.03	118	1.37	0.03	1.4	0	2	1	1
11	13:51...	811	1	5	4.97	118	1.35	0.03	1.38	0	1	1	1
12	13:51...	781	1	5	5.01	118	1.29	0.02	1.32	0	5	1	1
13	13:51...	758	1	5	5.03	118	1.25	0.02	1.28	0	4	1	1
14	13:51...	767	1	5	5.04	118	1.27	0.02	1.3	0	3	1	1
15	13:51...	758	1	5	4.97	118	1.25	0.02	1.28	0	2	1	1
16	13:51...	841	1	5	5.11	118	1.42	0.03	1.46	0	1	1	1
17	13:51...	731	1	5	5.01	118	1.2	0.02	1.22	0	5	1	1
18	13:51...	739	1	5	5.04	118	1.21	0.03	1.25	0	4	1	1
19	13:51...	746	1	5	5.01	118	1.22	0.02	1.25	0	3	1	1

Save

ReaTime Monitor  
fastening monitoring ...

Clear Stop

Connected Log history

The following data are monitored automatically on every event as like motor run, torque up, Forward / Reverse change, preset # change, etc.

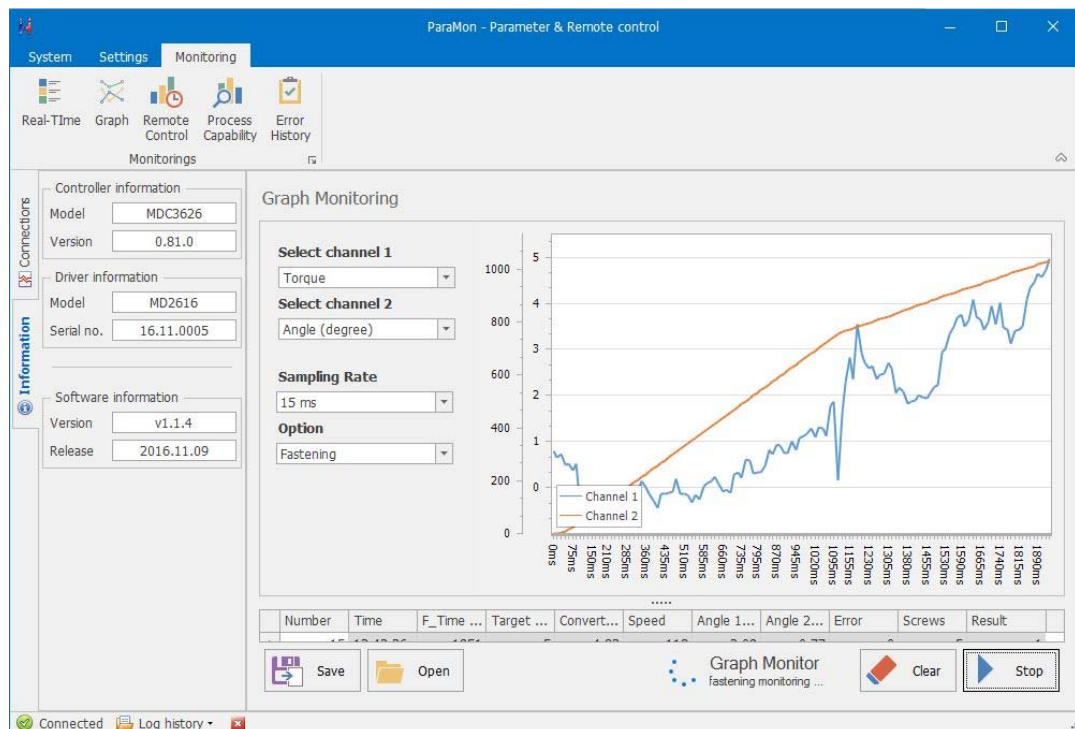
- Date & time
- Fastening time
- Preset #
- Target torque
- Converted torque
- Speed
- Angle 1 ( angle from motor start to screw seating point )
- Angle 2 ( angle from screw seating point to the end )
- Angle 3 ( Angle 1 + Angle 2 )
- Snug Angle(degree) : angle from snug torque to the end
- Error code
- Screw count no.
- Forward / Reverse status
- Status ( OK, NG )

The monitoring data can be saved in CSV file. And it can open the file.

## 2) Graph monitoring

Total 200 real-time data are displayed with curve together in two channel.

- Torque, Speed, Angle(degree) and current
- Data sampling rate : 5ms, 10ms, 15ms
- Data display option : Fastening, Loosening, All



The monitoring data can be saved in CSV file. And it can open the file.

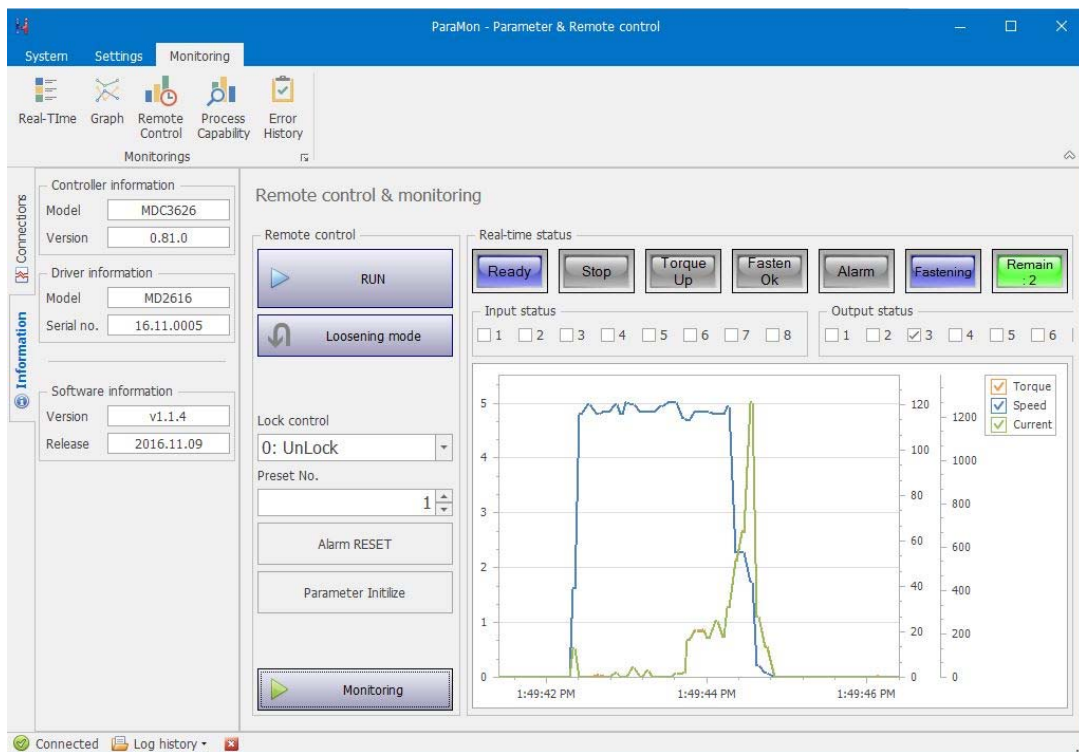
### 3) Remote control & I/O status monitoring

The tool is operated remotely for the followings.

- Fastening / loosening rotation,
- Tool Start
- Tool lock & unlock

The following main signal status and I/O are monitored and displayed together with torque, speed and current curves.

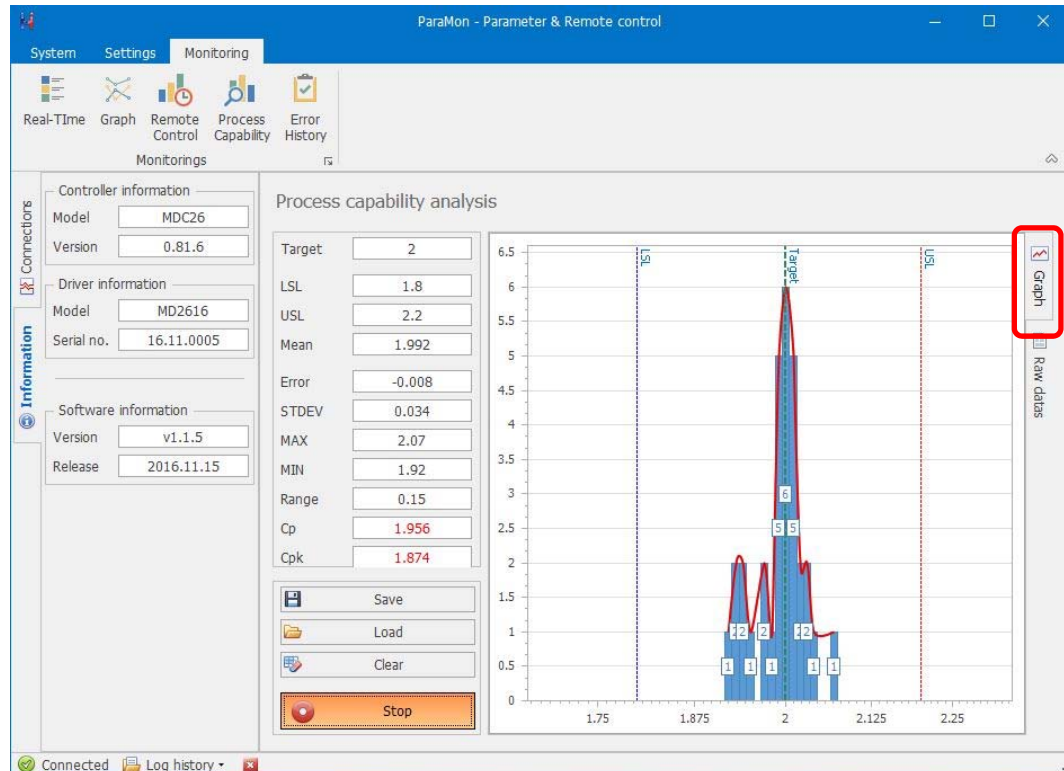
- Ready, Tool start/stop, Torque up, Fastening OK, Alarm, F/R, I/O



#### 4) Process capability display

From real-time monitoring fastening torque data, the following statistical data are calculated and displayed. The data is updated automatically for every fastening until monitoring cancelled.

- Average, Standard deviation, CP, CPK



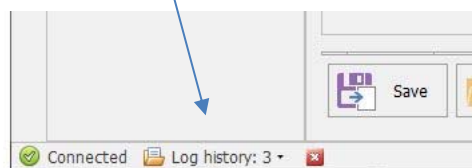
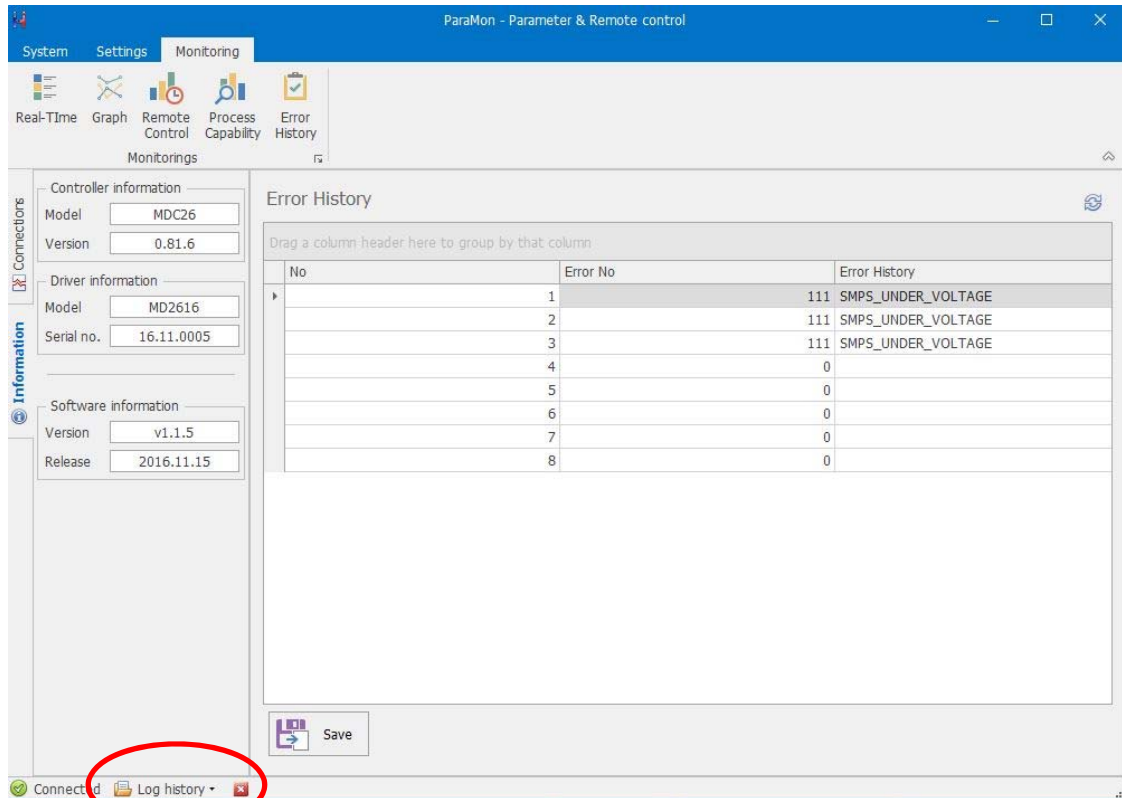
Process capability analysis

Target	2
LSL	1.8
USL	2.2
Mean	1.992
Error	-0.008
STDEV	0.034
MAX	2.07
MIN	1.92
Range	0.15
Cp	1.956
Cpk	1.874
Save	
Load	
Clear	
Stop	

No.	FastenTime	P...	T/Torque	C/Torque	Speed	Angle	Error	Status
1	553	1	2	1.99	620	0.31	0	1
2	467	1	2	1.97	620	3.61	0	1
3	501	1	2	1.97	620	3.54	0	1
4	479	1	2	2.02	620	3.66	0	1
5	462	1	2	1.92	620	3.43	0	1
6	473	1	2	1.98	620	3.52	0	1
7	508	1	2	2.04	620	3.66	0	1
8	456	1	2	2	620	3.32	0	1
9	491	1	2	2.03	620	3.54	0	1
10	475	1	2	1.99	620	3.64	0	1
11	450	1	2	1.93	620	3.32	0	1
12	487	1	2	2	620	3.73	0	1
13	392	1	2	2	620	2.78	0	1
14	387	1	2	1.99	620	2.73	0	1
15	419	1	2	2.07	620	3.01	0	1
16	412	1	2	2.03	620	2.98	0	1
17	397	1	2	2	620	2.88	0	1
18	407	1	2	2.02	620	3	0	1
19	387	1	2	1.95	620	2.76	0	1
20	403	1	2	1.99	620	2.82	0	1
21	425	1	2	2.01	620	2.07	0	1

## 5) Error history display

The latest 8 tool error histories which are saved in the controller



ATTENTION : communication is disconnected

ATTENTION : communication is disconnected

ATTENTION : communication is disconnected

Log history is information about the communication of PC to the tool.

### 3. Error code

#### 3.1 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
116	Com error related with I/O data	System failed to read the data from I/O port by communication issue	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

### 3.2 Fastening error by the pattern setting

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	Model setting error	Failure in Model programing.	
303	Model cancel	The Model process is canceled	
304	Motor stall by loosening failure	Motor stall by loosening failure within time limit on P62	Auto reset after set time
309	Bit socket tray	Bit socket tray application error	
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 set time(A277) and display the latest number. It can be clear to "0" by pressing RESET button.	Auto reset after set time or RESET button
330	Min Angle error	Target torque reached before the Min angle	Auto reset after set time
331	Target angle setting errir	Target angle setting is out of the range [ AC/TM mode]	Auto reset after set time
332	Angle over	Target torque reached over the Max angle	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

334	Engaging torque detection fail	The engaging torque is not detected in time or angle limit	
335	Converted torque error	Converted torque is out of OK range	
336	Over torque error	torque reached to the high limit of torque	
400	Ethernet port fail	Ethernet device IC initializing fail	
401	Ethernet socket error	Ethernet communication error related with socket	
500	Over temperature	Overtemperature over 80°C	Auto reset under 80°C