

**Torque Controller for
Highly Reliable Fastening
Tools**

**U E C - 5 5 0 0
Instruction Manual**

1.0 EDITION

March 2006

Table of Contents

1. Safety Precautions	2
2. Diagrammatic Sketch.....	5
2.1. Block Diagram.....	5
2.2. Features	6
2.3. Installation.....	7
2.4. Environmental Conditions.....	7
3. Specifications	8
4. Exterior Features & Functions	9
4.1. Front Panel.....	9
4.2. Back Panel	11
5. Terminal Block Particulars.....	12
5.1. Input/Output Terminal Details.....	12
5.2. Output Terminal - Particulars	13
6. Setting.....	14
6.1. Setting Data Rewriting via Setting Case	14
6.2. Setting Data Reviewing	15
6.3. DPM Window - Spindle Number Switching.....	16
6.3.1 Spindle Number Switching on every fastening operation.....	16
6.3.2 Spindle Number Switching using Key.....	16
7. Key-in Test.....	17
8. I/O Wiring Check	18
9. Torque Polarity Switching	20
10. Setting	21
10.1. Basic Setting.....	21
10.2. MODE Setting.....	23
10.3. TIMER Setting.....	32
10.4. Measurements Display.....	34
11. Function.....	35
11.1. Fastening Control Specifications.....	35
11.2. Measurement Value Upper/Lower Judgment	36
12. 11. Torque Sensor Wiring Diagnosis.....	38
12.1. 11.1 Error Detection.....	38
12.2. 11.2 ZERO/CAL Check Timing.....	38
13. Auto ZERO	39
14. Torque Waveform Monitoring.....	40
15. ANALOG OUTPUT Terminals	41
16. 15 Errors	42
16.1. Errors traceable to Hardware.....	42
16.2. Setting Error & Fastening Error.....	44

1. Safety Precautions


Before installing, operating, servicing and inspecting this System, you should first thoroughly read this Instruction Manual, and always use this System properly and safely. Also, be sure to operate this System after you have become familiar with this System and safety precautions. Take note that two different signs: “DANGER” and “CAUTION”, are used in this Instruction Manual according to the degree of seriousness and urgency.




: A fatality and/or heavy personal injury is highly possible by misoperation. Urgent warning is essential in the event of an accident.



: A dangerous situation accompanying mid-slight personal injury and/or property damage is possible by misoperation.

Besides,  signs also warn the risk of serious consequences depending on the situation. So, always follow the instructions given in this Manual.

Installation & Surroundings

 CAUTION
<p>Always attach to a metal or other incombustible component to prevent a fire.</p> <p>Keep away from combustibles to prevent a fire.</p> <p>Avoid foreign matter intrusion to prevent a fire.</p> <p>Set up Controller on a site that can bear its weight to avoid personal injury from accidental falling.</p> <p>Keep your workplace well lighted and clean to avoid personal injury.</p> <p>Never wear loose-fitting clothes or dangling jewelry when using this System, and always wear the right clothes for your job. In addition, be careful not to get your hair caught in tools, and if you wear your hair long, always tie with a rubber ribbon or the like and wear a protective helmet to prevent personal injury.</p> <p>Securely install and fix this System to avoid personal injury in case of an emergency like an earthquake.</p>

Wiring



DANGER

Be sure to turn OFF the mains prior to wiring to avoid an electric shock or a fire.
Make sure that cords and outlets are properly grounded to avoid an electric shock or a fire.
Carry out wiring after you installed Controller to avoid an electric shock or a fire.
Wiring must be carried out by an expert electrician to avoid an electric shock or a fire.
Always use Y-shape or round crimp terminals when wiring Terminal Block to avoid an electric shock or a fire.



CAUTION

Be sure that Controller rated voltage agrees with AC power source to avoid personal injury and a possible fire.
Wires must be routed and fixed properly and securely to avoid personal injury and a fire.

Handling/Operation



DANGER

Assurance of work-site safety by operators themselves prior to power switching operation is essential to prevent personal injury.
Never touch switching devices with moistened hands to avoid an electric shock.
Avoid touching the terminals of current-carrying Controller even during Tool is under non-operating conditions to avoid an electric shock.
Avoid damage, mechanical stress, load to cords and never tuck them in forcibly to avoid an electric shock.
Be sure to turn OFF the mains after each use.



CAUTION

Make settings within the confines of the prescribed operating range to avoid personal injury and burns.

Perform operations in safe surroundings while keeping proper footing. Avoid poor postures to prevent danger.

Perform operations with extra care. Operations in a careless and inappropriate manner and long-duration operation is prohibited to avoid personal injury or work-related diseases.

Maintenance/Serviceing



DANGER

Turn off and unplug the mains prior to inspection/replacement to avoid an electric shock.

Maintenance/servicing works only by an expert is allowed. Be sure to take off metal articles (wrist-watch or ring) prior to operation. Inspect cords periodically for damage, and have an expert make repairs or exchange if signs of wear are noticed. Always use insulating tools at the time of servicing to avoid an electric shock and personal injury.

Always order our designated agent when overhauling becomes necessary to avoid an electric shock, personal injury and fire.

Disposal



CAUTION

Dispose of your System as an industrial waste.

Others



DANGER

Never add modifications to your System to avoid an electric shock, injury or fire.

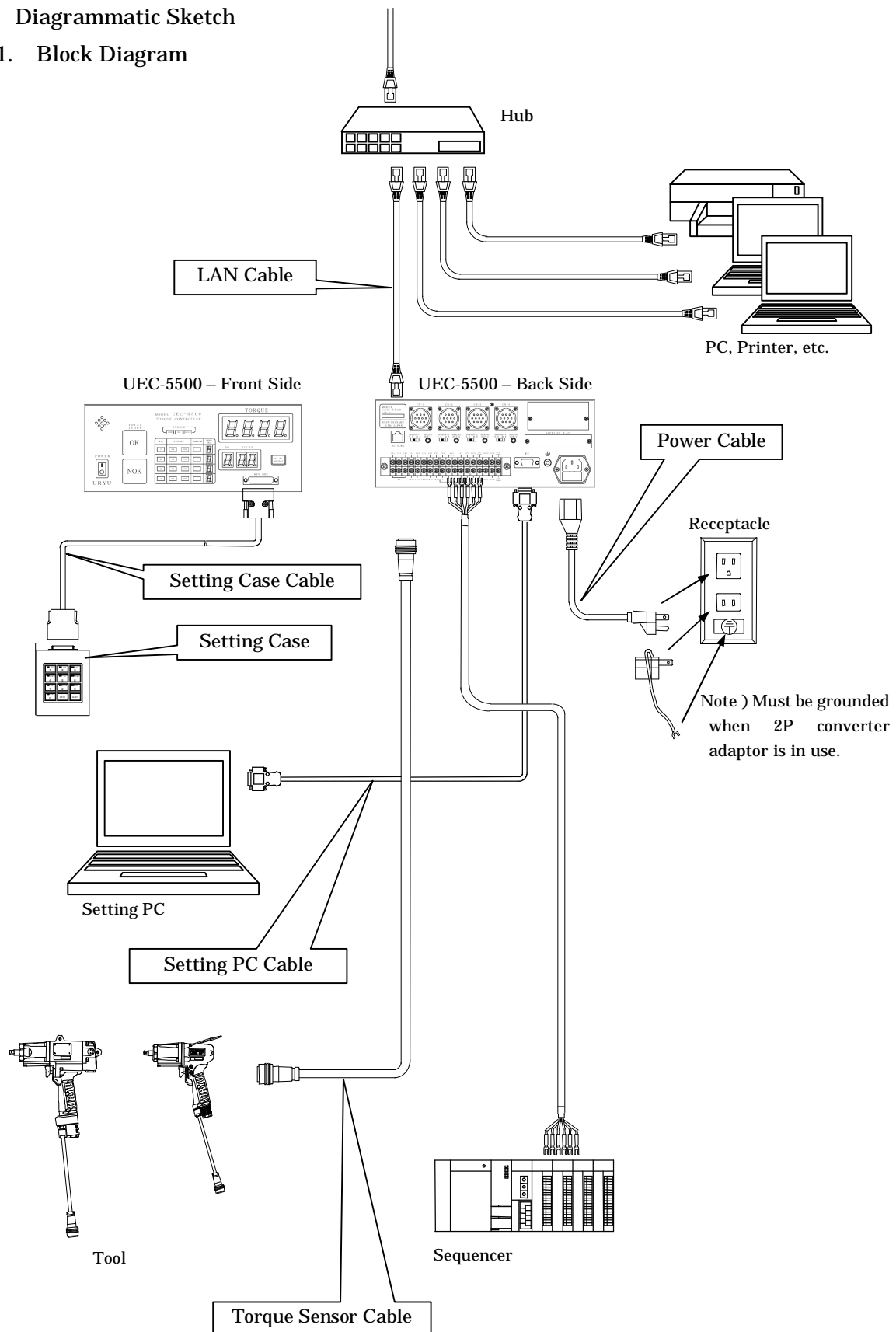
Stop your System right away and cut off the power whenever something unusual occurs.

General Precautions

Keep persons irrelevant to System operation away from work-sites.

2. Diagrammatic Sketch

2.1. Block Diagram



2.2. Features

4-Tool-Adaptable & 4-Spindle-Concurrent-Processing Capable

Self-diagnosis Function

Self-diagnosis function will run at power-on for some 3 seconds and perform ROM → RAM → AD → D/A → ZERO/CAL checks.

Various types of fastening error-detecting functions and fastening number controlling functions are available.

UEC-5500 is compatible with various types of Torque Sensor and Tool such as EC/MC Wrench, Angle Nutrunner and Open Wrench.

Eight different fastening torque values (Work 1-8) and fastening numbers can be set or switched as necessary.

Tool control using Cumulative Fastening Number and Cumulative Pulse Number as a guideline is possible.

You may check Input/Output status and error signals thoroughly on your PC Monitor or on Front Touch Panel Indicator and/or by beep sounds.

Various Control and Setting values can be renewed or monitored either on the purpose-specific Setting Case or on your PC.

UEC-5500 is compatible with two types of Torque Sensor.

- SG (Striction Gauge Type Sensor)
700Ω
- MS (Magneto-striction Type Sensor of URYU)

Up to 20,000 pieces of fastening data per spindle can be saved.

Special-purpose PC Software includes the following features (See Setting Software Instruction Manual for further details.) :

- Setting data transmission/reception
- Fastening data reception and auto-storage
- Waveform fastening data reception and auto-storage
- Statistical data reception
- I/O check

Ethernet-compatible

- Setting data transmission/reception
- Fastening data transmission

Installation Precautions

Install and fix Controller securely and firmly by following the precautions below:

2.3. Installation

- 1) Controller is designed for indoor use and be sure to place it in dry and out of direct sunlight locations. Remember that Controller is not waterproof.
- 2) Controller must be installed in a place where corrosive/flammable gases, grinding fluid, oil mist, iron-powder and chip will not occur.
- 3) Controller must be installed in a well-ventilated place, and avoid moisture, dust and dirt.
- 4) Install Controller in a vibration-free environment.
- 5) Controller must be installed in a place where immediate unplugging of the power cable is practical in preparation for an unexpected Controller malfunction.
- 6) In the case that you will use Controller under Contamination III environment, be sure to house it in a housing box.

2.4. Environmental Conditions


Items	Requirements
Use Environment	Indoor use
Ambient Temperature	0 ~ 50 (no freezing)
Ambient Humidity	Less than 90%RH (no dew condensation)
Storage Temperature	0 ~ 50 (no freezing)
Storage Humidity	Less than 90%RH (no dew condensation)
Vibration	Lower than 5.6m/s ² (10 ~ 60Hz)
Altitude	Lower than 1,000m
Over-voltage Category	Over-voltage Category III ¹
Degree of Contamination	Degree of Contamination: 2

¹...The applicable Over-voltage Category (I, II, III) and Degree of Contamination (1, 2, 3) as per IEC664 are described above.

As indicated above, this System is classified into Over-voltage Category III and Degree of Contamination 2.

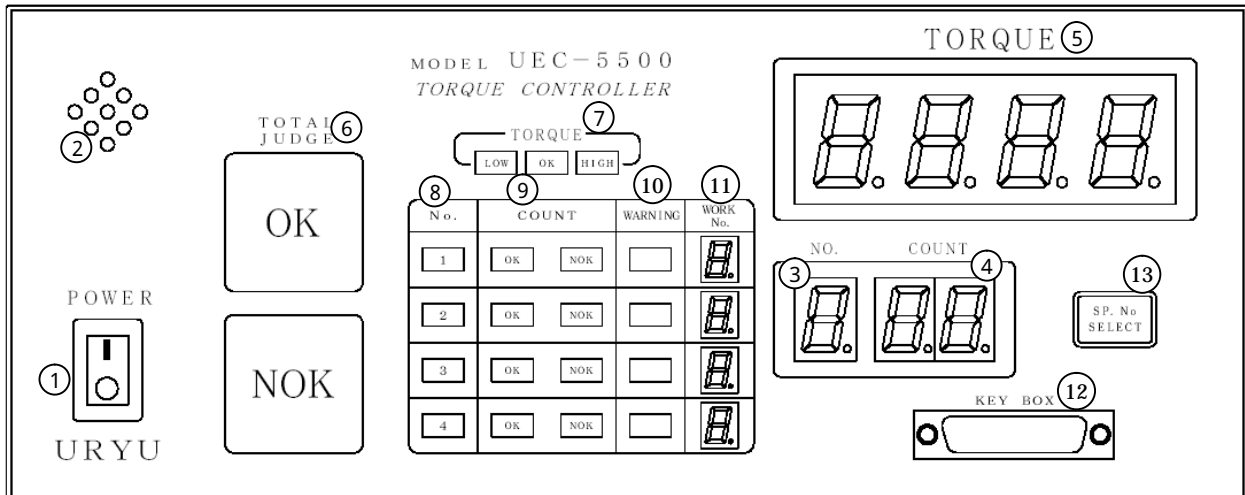
(Note) The word “IEC” represents International Electro-technical Commission.

3. Specifications

Items	Particulars
Power Supply	AC100-240V±10%
Power Frequency	50/60Hz
Noise Immunity	1200V 1μs (measured on a noise simulator)
Insuration Resistance	Higher than DC500V 10MΩ
Power Consumption	About 50VA
Weight	About 3.5 kg
Outer Dimension	240(D) × 270(W) × 115(H)
Major Functions	Torque Monitoring/Control Fastening Number Control
Setting Device	Setting Case
	PC (Setting Software is necessary)
Display	Torque Resolution±2048 (12-bit A/D in use)
	Major Indications
	4-digit digital window : Torque Value
	1-digit digital window (small) × 4 : WORK No.
	1-digit digital window (large) : Spindle No.
Lamp	2-digit digital window : Count Balance
	TOTAL Lamp (for count judgment) : OK (green) / NOK (red)
Terminal Block Input Signal	TORQUE Lamp (for torque judgment) : LOW (yellow) / OK (green) / HIGH (red)
	Photo-coupler insulating, current-operated input method
Terminal Block Output Signal	Voltage : DC24V Input Resistance : 4.7kΩ
	14 places (free-format)
Oscilloscope Output	Contact Capacity : AC125V, 0.3A DC30V, 1A
	8 places (free-format) , VALVE + 24V (for VALVE Terminal)
Key	(Plug Size : JIS C6560 small, single-head plugφ3.5×15)
	Filtered waveform torque will be output via the jack terminal.
Options	Coupling Cable : UK-PULG (Part Code; 909-483-0)
	 : This key enables spindle number setting and stops the buzzer in case of an error.
Compliance	Setting Case : Outboard numeric keypad (optional)
	Designation : Setting PC Cable Part Code : 910-219-0
Options	Specs : RS-232C Straight Cable D-sub9 female pin - D-sub9 female pin 3m
	Designation : PC Cable Changer Part Code : 910-225-0
Options	Specs : D-sub9 male pin - D-sub9 male pin
	Designation : Setting Case Part Code : 910-208-0
Options	Designation : Setting Case Cable Part Code : 910-206-0
	Torque Sensor Cable
Options	Designation : Sensor Cable CP 3F5 Part Code : 909-921-0
	Designation : Sensor Cable CP 3F10 Part Code : 900-922-0
Compliance	EN61010-1, UL508

4. Exterior Features & Functions

4.1. Front Panel



Power ON/OFF Switch

This is Power ON/OFF Switch. Be sure to turn OFF this switch after each use.

Buzzer

This Buzzer produces a beep sound at every fastening/key operation and Error/NOK occasion.

1-digit Digital Panel Meter Window - Spindle Number will be indicated here.

2-digit Digital Panel Meter Window

Count Balance, MODE now in selection and TIMER Number will be indicated here.

4-digit Digital Panel Meter Window - Measured Torque and Setting Value will be indicated here.

TOTAL Lamp

OK :
NOK : Not in action now (It flashes when Write-in Mode is effected.)

TORQUE Lamp

LOW : This lamp lights up when Torque Measurement Value at the time of judgment fell short of the preset Lower Limit.

OK : This lamp lights up when Torque Measurement Value at the time of judgment stayed within the preset Upper/Lower Limit ranges.

HIGH : This lamp lights up when Torque Measurement Value at the time of judgment exceeded the preset Upper Limit.

No. Lamp

Spindle Number now in use will light up. (It turns ON when MODE 31 is set to "1" or "2" and stays OFF when the mode is set to "0".)

COUNT Lamp

OK : It lights up when the corresponding Spindle's preset fastening number has been attained.

NOK : It lights up when the corresponding Spindle's preset fastening number has not been attained at the time of judgment.

WARNING Lamp

It flashes when Cumulative Fastening Number/Pulse Number reached Repair Point and lights up when it reached Exchange Point.

WORK No. Display

It displays the currently selected WORK No.

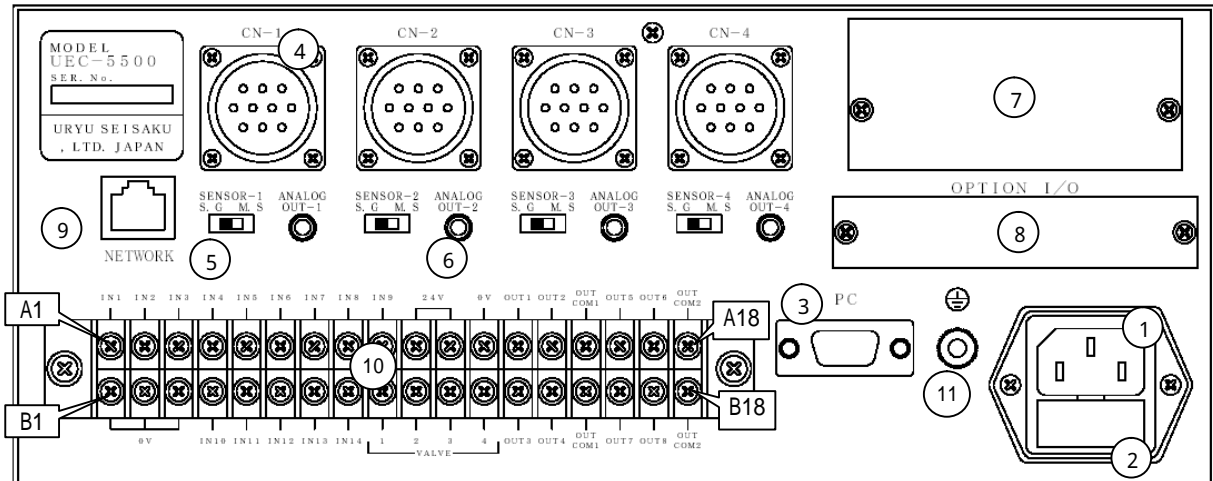
Setting Case Coupling Connector

Hook up "Setting Case Cable" here to connect the special-purpose "Setting Case" specifically designed for inputting Setting Value.

SP. No. SELECT Key

Select Spindle Number to write in Setting Value using this key. Also, touch this key to stop Buzzer in case of an error.

4.2. Back Panel



Power Cable Terminal

Hook up the supplied power cable here.

Fuse Holder

UEC Protection Fuse (3.15A) (A spare fuse is contained in this holder.)

PC Connector (D-sub9 female pin)

Connect Setting PC using this connector. Always use “straight” communication cable.

Sensor Cable Connector

Hook up the sensor cables of Torque Sensor and Tool here.

SENSOR Selection Switch

Select between “MS (URYU Magneto-striction Sensor)” and “SG (Striction Gauge Sensor)” using this switch.

ANALOG OUTPUT Terminal

Waveform torque output terminal

(Refer to [Waveform Torque Monitoring](#) and [ANALOG OUTPUT Terminal](#) sections for details.)

Optional Board Space

Space for optional boards (not in use now)

NETWORK Connector

Ethernet connector

Input/Output Terminal Block

A1	IN 1	Input Terminal	B1	0 V For Input Terminal (common to any input terminal)		
A2	IN 2		B2			
A3	IN 3		B3			
A4	IN 4		B4	IN 1 0	Input Terminal	
A5	IN 5		B5	IN 1 1		
A6	IN 6		B6	IN 1 2		
A7	IN 7		B7	IN 1 3		
A8	IN 8		B8	IN 1 4		
A9	IN 9		B9	VALVE 1 ~ VALVE 4 Each spindle VALVE output		
A10	2 4 V		B10			
A11	For VALVE Output		B11			
A12	0 V for Input Terminal (common to any input terminal)		B12			
A13	OUT 1	Output Terminal	B13	OUT 3	Output Terminal	
A14	OUT 2		B14	OUT 4		
A15	OUT COM 1 Output Terminal Common (for OUT 1 ~ 4)		B15	OUT COM 1 Output Terminal Common (for OUT 1 ~ 4)		
A16	OUT 5	Output Terminal	B16	OUT 7	Output Terminal	
A17	OUT 6		B17	OUT 8		
A18	OUT COM 2 Output Terminal Common (for OUT 5 ~ 8)		B18	OUT COM 2 Output Terminal Common (for OUT 5 ~ 8)		

Free-format type terminal block is used and the details of Input/Output can be changed freely.

- Always use Y-shape or round crimp terminals when wiring Terminal Block.

Grounding Terminal

Use this grounding terminal in cases where the power plug grounding is not practical.

5. Terminal Block Particulars

5.1. Input/Output Terminal Details

Setting	Name	Details																																							
1	No. 1 Spindle L S 1	No. 1 Spindle Limit Switch																																							
2	No. 1 Spindle L S 2																																								
3	No. 2 Spindle L S 1	No. 2 Spindle Limit Switch																																							
4	No. 2 Spindle L S 2																																								
5	No. 3 Spindle L S 1	No. 3 Spindle Limit Switch																																							
6	No. 3 Spindle L S 2																																								
7	No. 4 Spindle L S 1	No. 4 Spindle Limit Switch																																							
8	No. 4 Spindle L S 2																																								
9	All Spindle R E S E T	All Spindle RESET																																							
1 0	No. 1 Spindle R E S E T	Each Spindle RESET																																							
1 1	No. 2 Spindle R E S E T																																								
1 2	No. 3 Spindle R E S E T																																								
1 3	No. 4 Spindle R E S E T																																								
1 4	All Spindle P A S S	All Spindle Forced OK																																							
1 5	No. 1 Spindle P A S S	Each Spindle Forced OK																																							
1 6	No. 2 Spindle P A S S																																								
1 7	No. 3 Spindle P A S S																																								
1 8	No. 4 Spindle P A S S																																								
1 9	S P . S E L E C T	As is the case with Full -scale Panel SP No. SELECT																																							
2 0	No. 1 Spindle Q L	Each Spindle QL Signal																																							
2 1	No. 2 Spindle Q L																																								
2 2	No. 3 Spindle Q L																																								
2 3	No. 4 Spindle Q L																																								
2 4	No. 1 Spindle P S	Each Spindle TM Tool Fastening Signal																																							
2 5	No. 2 Spindle P S																																								
2 6	No. 3 Spindle P S																																								
2 7	No. 4 Spindle P S																																								
2 8	No. 1 SpindleWORK S E L E C T A	Each Spindle Work Selection Signal, A・B・C Eight different works can be selected by varying combinations of A, B, C. <table><tr><th rowspan="2">WORK</th><th colspan="3">WORK SELECT INPUT STATUS</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>1</td><td>OFF</td><td>OFF</td><td>OFF</td></tr><tr><td>2</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>3</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td>4</td><td>ON</td><td>ON</td><td>OFF</td></tr><tr><td>5</td><td>OFF</td><td>OFF</td><td>ON</td></tr><tr><td>6</td><td>ON</td><td>OFF</td><td>ON</td></tr><tr><td>7</td><td>OFF</td><td>ON</td><td>ON</td></tr><tr><td>8</td><td>ON</td><td>ON</td><td>ON</td></tr></table>	WORK	WORK SELECT INPUT STATUS			A	B	C	1	OFF	OFF	OFF	2	ON	OFF	OFF	3	OFF	ON	OFF	4	ON	ON	OFF	5	OFF	OFF	ON	6	ON	OFF	ON	7	OFF	ON	ON	8	ON	ON	ON
WORK	WORK SELECT INPUT STATUS																																								
	A		B	C																																					
1	OFF		OFF	OFF																																					
2	ON		OFF	OFF																																					
3	OFF		ON	OFF																																					
4	ON		ON	OFF																																					
5	OFF		OFF	ON																																					
6	ON		OFF	ON																																					
7	OFF		ON	ON																																					
8	ON	ON	ON																																						
2 9	No. 1 SpindleWORK S E L E C T B																																								
3 0	No. 1 SpindleWORK S E L E C T C																																								
3 1	No. 2 SpindleWORK S E L E C T A																																								
3 2	No. 2 SpindleWORK S E L E C T B																																								
3 3	No. 2 SpindleWORK S E L E C T C																																								
3 4	No. 3 SpindleWORK S E L E C T A																																								
3 5	No. 3 SpindleWORK S E L E C T B																																								
3 6	No. 3 SpindleWORK S E L E C T C																																								
3 7	No. 4 SpindleWORK S E L E C T A																																								
3 8	No. 4 SpindleWORK S E L E C T B																																								
3 9	No. 4 SpindleWORK S E L E C T C																																								
4 0	No. 1 SpindleWORK S E L E C T 1	Each Spindle Work Selection Signal 1~4 Four different works can be selected by varying combinations of 1, 2, 3, 4. <table><tr><th rowspan="2">WORK</th><th colspan="4">WORK SELECT INPUT STATUS</th></tr><tr><th>W.SEL.1</th><th>W.SEL.2</th><th>W.SEL.3</th><th>W.SEL.4</th></tr><tr><td>1</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td></tr><tr><td>2</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>3</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr><tr><td>4</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr></table>	WORK	WORK SELECT INPUT STATUS				W.SEL.1	W.SEL.2	W.SEL.3	W.SEL.4	1	ON	OFF	OFF	OFF	2	OFF	ON	OFF	OFF	3	OFF	OFF	ON	OFF	4	OFF	OFF	OFF	ON										
WORK	WORK SELECT INPUT STATUS																																								
	W.SEL.1		W.SEL.2	W.SEL.3	W.SEL.4																																				
1	ON		OFF	OFF	OFF																																				
2	OFF		ON	OFF	OFF																																				
3	OFF		OFF	ON	OFF																																				
4	OFF		OFF	OFF	ON																																				
4 1	No. 1 SpindleWORK S E L E C T 2																																								
4 2	No. 1 SpindleWORK S E L E C T 3																																								
4 3	No. 1 SpindleWORK S E L E C T 4																																								
4 4	No. 2 SpindleWORK S E L E C T 1																																								
4 5	No. 2 SpindleWORK S E L E C T 2																																								
4 6	No. 2 SpindleWORK S E L E C T 3																																								
4 7	No. 2 SpindleWORK S E L E C T 4																																								
4 8	No. 3 SpindleWORK S E L E C T 1																																								
4 9	No. 3 SpindleWORK S E L E C T 2																																								
5 0	No. 3 SpindleWORK S E L E C T 3																																								
5 1	No. 3 SpindleWORK S E L E C T 4																																								
5 2	No. 4 SpindleWORK S E L E C T 1																																								
5 3	No. 4 SpindleWORK S E L E C T 2																																								
5 4	No. 4 SpindleWORK S E L E C T 3																																								
5 5	No. 4 SpindleWORK S E L E C T 4																																								

5.2. Output Terminal - Particulars

Setting	Name	Details
1	C P U R U N	Output will be produced when Tool is under controllable status. (OFF status during setting value rewriting is under way.)
2	No. 1 Spindle OPERATION RANGE	Each spindle - Fastening is under way.
3	No. 2 Spindle OPERATION RANGE	
4	No. 3 Spindle OPERATION RANGE	
5	No. 4 Spindle OPERATION RANGE	
6	No. 1 Spindle COUNT OK	Each spindle - Count OK
7	No. 2 Spindle COUNT OK	
8	No. 3 Spindle COUNT OK	
9	No. 4 Spindle COUNT OK	
1 0	No. 1 Spindle COUNT NOK	Each spindle - Count NOK
1 1	No. 2 Spindle COUNT NOK	
1 2	No. 3 Spindle COUNT NOK	
1 3	No. 4 Spindle COUNT NOK	
1 4	No. 1 Spindle TORQUE OK	Each spindle - Fastening OK
1 5	No. 2 Spindle TORQUE OK	
1 6	No. 3 Spindle TORQUE OK	
1 7	No. 4 Spindle TORQUE OK	
1 8	No. 1 Spindle TORQUE NOK	Each spindle - Fastening NOK
1 9	No. 2 Spindle TORQUE NOK	
2 0	No. 3 Spindle TORQUE NOK	
2 1	No. 4 Spindle TORQUE NOK	
2 2	No. 1 Spindle CHECK	Output will be produced when any of the spindles attained either Cumulative Fastening Number Check Point or Cumulative Fastening Pulse Number Check Point.
2 3	No. 2 Spindle CHECK	
2 4	No. 3 Spindle CHECK	
2 5	No. 4 Spindle CHECK	
2 6	No. 1 Spindle EXCHANGE	Output will be produced when any of the spindles attained either Cumulative Fastening Number Exchange Point or Cumulative Fastening Pulse Number Exchange Point has been attained.
2 7	No. 2 Spindle EXCHANGE	
2 8	No. 3 Spindle EXCHANGE	
2 9	No. 4 Spindle EXCHANGE	
3 0	No. 1 Spindle S V	Each spindle - Slow/Full switching output Output will be produced when Torque Measurement reached START Setting Value. Turn it OFF at the same time when VALVE is output.
3 1	No. 2 Spindle S V	
3 2	No. 3 Spindle S V	
3 3	No. 4 Spindle S V	
3 4	No. 1 Spindle WORK 1 Answer	The currently selected WORK No. will be output.
3 5	No. 1 Spindle WORK 2 Answer	
3 6	No. 1 Spindle WORK 3 Answer	
3 7	No. 1 Spindle WORK 4 Answer	
3 8	No. 2 Spindle WORK 1 Answer	
3 9	No. 2 Spindle WORK 2 Answer	
4 0	No. 2 Spindle WORK 3 Answer	
4 1	No. 2 Spindle WORK 4 Answer	
4 2	No. 3 Spindle WORK 1 Answer	
4 3	No. 3 Spindle WORK 2 Answer	
4 4	No. 3 Spindle WORK 3 Answer	
4 5	No. 3 Spindle WORK 4 Answer	
4 6	No. 4 Spindle WORK 1 Answer	
4 7	No. 4 Spindle WORK 2 Answer	
4 8	No. 4 Spindle WORK 3 Answer	
4 9	No. 4 Spindle WORK 4 Answer	
5 0	Buzzer Output	Use this terminal when an external buzzer will be used.

6. Setting

6.1. Setting Data Rewriting via Setting Case

Select Write-in Mode to rewrite already entered setting data. When Write-in Mode has been selected, VALVE Output will be turned ON to render Tool inoperative.

Hook up Setting Case Cable to KEY BOX Connector on the front panel to start Setting Case.



Turn on UEC.

Start Write-in Mode.

Key Operation :  ·  ·  ·  · 

The above operation will render UEC inoperative. TOTAL NOK Lamp, the currently selected Spindle No. Lamp and WORK No. indicators will flash during Write-in Mode.


Select an intended WORK No.

Key Operation :  · (WORK NO. 1 ~ 8) · 




Select an intended Spindle No.

Key Operation :  ·  or use the preceding  key to jump to the next spindle.


Select an intended Setting.

Key Operation : (LOW、HIGH、CUT, etc.) · 

In the case of MODE or TIMER resetting:

Key Operation :  or  · (MODE/TIMER No.) · 

Type in setting values (numeric values).

Key Operation : (0 ~ 9999) · 

Perform Step and again to rewrite the same setting items of different Spindle.

Repeat the above procedures from Step to rewrite other setting items.

Exit from Write-in Mode. (Data rewriting/adding operation will finish now.)

Key Operation : 

6.2. Setting Data Reviewing

MODE (TIMER) Setting Review

Key Operation

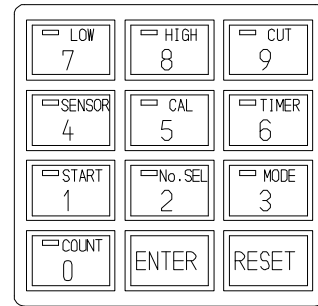
  : MODE(TIMER) Key LED Lamp lights up.

: Select an intended MODE(TIMER) No. to review Setting.

 : Setting of the selected MODE(TIMER) will appear.

 : Fastening Balance will appear again.


MODE Key LED Lamp will go off now.



COUNT Number Review

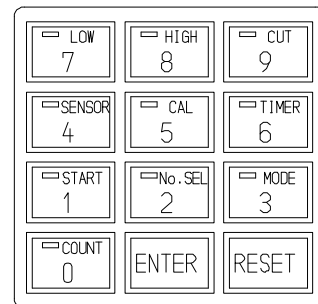
Key Operation

 : COUNT Key LED Lamp lights up.

 : Fastening Number Setting will appear.

 : Fastening Balance will appear again.

COUNT Key LED Lamp will go off now.



6.3. DPM Window - Spindle Number Switching

6.3.1 Spindle Number Switching on every fastening operation

No. 1 Spindle will appear on the 4-digit DPM Window at power-on. Once a fastening operation has been added, the subject Spindle will appear on DPM Window and the same will follow one after another. (To be more specific, the spindle subjected to fastening operation at the latest will be shown on DPM Window.)

6.3.2 Spindle Number Switching using Key



A touch of Key will call up No. 1 Spindle instead of the currently displayed Commit No. and No. 2 Spindle, No. 3 Spindle, No. 4 Spindle will appear one after another in sequence by this operation. Comit No. comes after No. 4 Spindle. To be more specific, Comit No. No. 1 Spindle No. 2 Spindle No. 3 Spindle No. 4 Spindle Comit No. will appear in sequence.

(1) Spindle Number Switching using

Spindle Display can be switched every time  Key on the front panel is touched.












When Spindle No. has been changed in the course of MODE, TIMER, COUNT Setting was on display, the selected spindle's setting will appear accordingly.

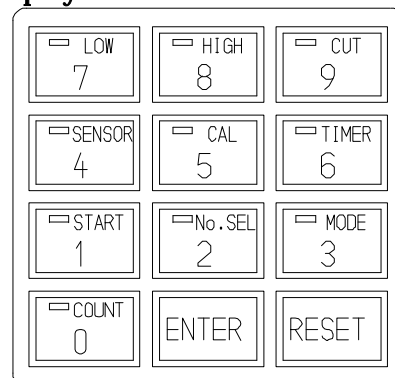
(2) Spindle Number Switching using Setting Case

To change Spindle Display using Setting Case, touch  ·  keys. Then, the next Spindle Display will appear.

When Spindle No. has been changed in the course of MODE, TIMER, COUNT Setting was on display, the selected spindle's setting will appear accordingly.

(3) Key Operation Example at the time of Commit No. Display

 : DPM indicates Commit No.
 : DPM indicates No. 1 SP Fastening Balance.
 : DPM indicates No. 1 SP Fastening Balance.
 : DPM indicates No. 2 SP Fastening Balance.
 : DPM indicates No. 3 SP Fastening Balance.
 ·  ·  ·  :
DPM indicates No. 3 SP TIMER13 Setting.
 : DPM indicates No. 3 SP TIMER13 Setting.
 : DPM indicates No. 4 SP TIMER13 Setting.



7. Key-in Test

MODE 90: Perform this test to see if the special-purpose Setting Case is functioning normally.

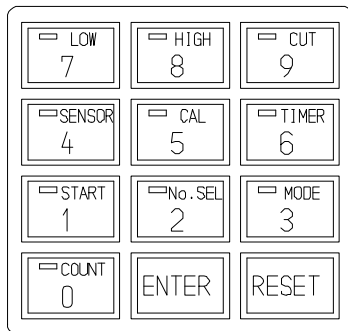
[Procedure]

Connect the special-purpose Setting Case and then turn UEC on.

Start MODE 90 Key-in Test

Operate  ·  ·  ·  keys.

TOTAL NOK lamp flashes during Key-in Test is under way, and
DOM turns into:

























Key Switch Check Procedure

Key Operation

DPM Window

Key LED

Key Operation	DPM Window	Key LED
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	 Key L E D ON
 Key ON	[-] [] []	

Turn  Key ON to exit from Key-in Test.

8. I/O Wiring Check

MODE91: This mode enables a check of the external wires connected to Terminal Block.

MODE92/93/94: These modes allow Terminal Block forced output.

[Procedure]



Perform the above I/O Wiring Check using Setting Case or your PC.

[In the case of Setting Case]

Connect Setting Case and Turn UEC on.

MODE91 Input Wiring Check will start. (UEC is rendered inoperative and TOTAL NOK Lamp will flash.)

Key Operation :  ·  ·  · 

DPM will give [-  ] indication when no external input has been received.

When an input was accepted by Terminal Block, a number corresponding to the target terminal will appear on the 4-digit DPM. In the case of two or more inputs, the preceding input will be displayed first.

Correlation between Input Status & DPM Display

When I/O Wiring Check has been completed, touch  key to exit from the mode.

INPUT Terminal	DPM Display	INPUT Terminal	DPM Display
I N 1	▪	I N 8	▪
I N 2	▪	I N 9	▪
I N 3	▪	I N 1 0	▪ ▪
I N 4	▪	I N 1 1	▪ ▪
I N 5	▪	I N 1 2	▪ ▪
I N 6	▪	I N 1 3	▪ ▪
I N 7	▪	I N 1 4	▪ ▪

Start MODE92/93/94 to perform Output Wiring Check. (UEC is rendered inoperative and TOTAL NOK Lamp will flash.)

Key Operation :  ·  ·  ( , ) 

DPM will give [-] [] [] indication.

When a key operation has been added, output will be procued to the target Output Terminal or Tool.

Correlation between Key Input & Output

MODE 9 2			
Key	Output	Key	Output
1	OUT 1	5	OUT 5
2	OUT 2	6	OUT 6
3	OUT 3	7	OUT 7
4	OUT 4	8	OUT 8

MODE 9 3			
Key	Output	Key	Output
1	No. 1 SP Terminal Block & Tool VALVE	5	No. 2 SP Terminal Block & Tool VALVE
2	No. 1 SP Tool Green Lamp	6	No. 2 SP Tool Green Lamp
3	No. 1 SP Tool Red Lamp	7	No. 2 SP Tool Red Lamp
4	No. 1 SP Tool Yellow Lamp	8	No. 2 SP Tool Yellow Lamp

MODE 9 4			
Key ㏊	Output	Key	Output
1	No. 3 SP Terminal Block & Tool VALVE	5	No. 4 SP Terminal Block & Tool VALVE
2	No. 3 SP Tool Green Lamp	6	No. 4 SP Tool Green Lamp
3	No. 3 SP Tool Red Lamp	7	No. 4 SP Tool Red Lamp
4	No. 3 SP Tool Yellow Lamp	8	No. 4 SP Tool Yellow Lamp

When Output Wiring Check has been completed, touch  to exit from the mode.

[Output Wiring Check using PC]

Turn on your PC and start Setting Software.

I/O Check will start then. (UEC will be rendered inoperative.)

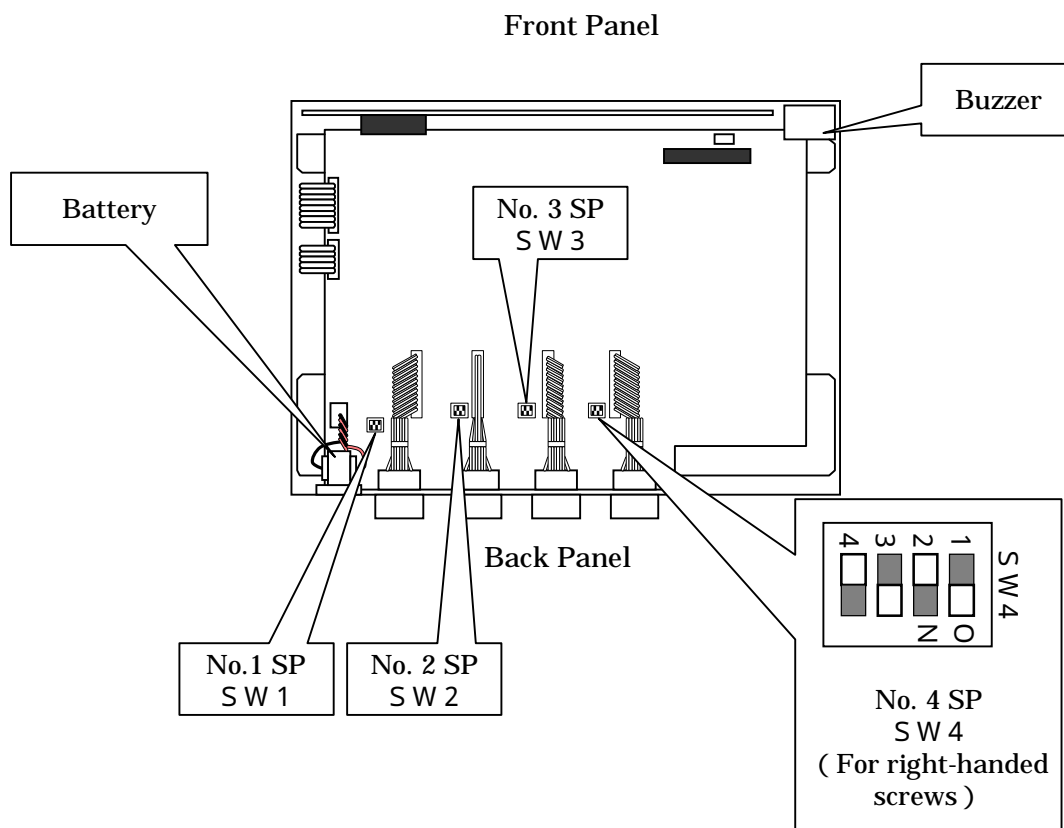
Wiring check will be performed through input status monitoring and forced output operation.

Exit from I/O check operation after completing the steps above.

(Refer to Setting Software Instruction Manual for details.)

9. Torque Polarity Switching

When you fasten left-handed bolts, Torque Signal coming from Tool will be input in a minus direction that hinders torque measurement. In order to avoid this, you must reverse the torque measurement polarity setting preset at Controller side. You may change this setting by shifting on-board DIP switches inside UEC-5500.



- The polarity of inputs coming from Torque Sensor can be reversed by switching on-board DIP Switch Setting.
- All in all four (4) DIP switches are available and they are for No. 1 SP (SW1), No. 2 SP (SW2), No. 3SP (SW3) and No. 4 SP (SW4) respectively.
- For SW*(1 ~ 4), shift 1 & 3 to the ON position and shift 2 & 4 to the OFF position when fastening right-handed screws.
- For DSW1, shift 1 & 3 to the OFF position and shift 2 & 4 to the ON position when fastening left-handed screws.
- When you will use “standard” EC/MC wrench, Tool will not become “shutoff” status under counterclockwise rotation. In such a case, use an external valve or use Tool specifically designed for counterclockwise rotation.

10. Setting

10.1. Basic Setting

LOW (Torque Lower Limit)

Initial Setting : 78.5 [Nm]

Setting Range : 0.0 ~ 980.4 (LOW[MAX978.7] < CUT[MAX979.8])

- This is the lower limit setting for torque measurement.
- Make LOW setting when you do not use Work Station communication networking.

HIGH Torque Upper Limit)

Initial Setting : 58.8 [Nm]

Setting Range : 0.4 ~ 980.6 (CUT[MIN0.3] < HIGH[MIN0.4] CUT[MAX979.8] < HIGH[MAX979.9])

- This is the upper limit setting for torque measurement.
- Make HIGH setting when you do not use Work Station communication networking.

CUT (Torque CUT Value)

Initial Setting : 19.6 [Nm]

Setting Range : 0.2 ~ 980.5 (CUT [MAX979.8] < HIGH[MAX979.9])

- This is the Fastening CUT Torque setting under Torque Control.
- Make CUT setting in the absence of network communications with Work Station.

CAL (Torque Sensor Rated Value)

Initial Setting : 1000

Setting Range : 100 ~ 9999

- UEC uses this setting to determine Torque Signal Voltage coming from Torque Sensor and uses SENSOR setting to determine the ratio against Sensor rating and will display resultant Torque accordingly.

SENSOR (Torque Sensor Resistance Value • Rated Strain Amount)

Torque Sensor Resistance Value (Unit:Ω) [SENSOR 1 Setting Value]

- Torque Sensor Circuit Resistance has to be entered.

Initial Setting : 700

Enter 480, 700 or 350 according to the specifications of the torque sensor you will use.

- Enter 700 in the case that you will use EC wrench.
- No setting is necessary when you will use MC wrench (「 - - - 」 will be shown in this case.)

Torque Sensor Rated Strain Amount [SENSOR 2 Setting Value]

Initial Setting : 750

Setting Range : 100 ~ 4400

- This should equal to the expansion amount that 4 strain gages housed in Torque Sensor show at the time when the rated load is applied to it.
- Note that, in this UEC system, unit output voltage of Torque Sensor is determined based upon the preset strain amount.

(When a strain amount of 1000 is entered, Unit Output Voltage will be 0.5[mV / V].

Example) Unit Output Voltage will be 1 [mV / V] when a strain amount of 2000 has been entered.)

- **Set 750 in the case that you will use EC wrench.**
- **No setting is necessary when you will use MC wrench (「 - - - 」 will be shown in this case.)**

START (Start Level)

Initial Setting : 9.8

Setting Value : 0.1 ~ 980.3 (START[MIN0.1] < MODE24[MIN0.2])

- This setting value is applied to:
TIMER 1/2/3/6 Start Point
TSC Data Measurement Start Point

- **START** has to be set at a value exceeding 1/5 of Rated Torque. Lower **START** settings will sometimes cause **OK** • **NOK** judgment error that may further invite next fastening operation failure.

COUNT (Fastening Number)

Initial Setting : 99

Setting Range : 1 ~ 99

- Make **COUNT** setting when performing Fastening Number Control without using network communications with Work Station.
- This number corresponds to the fastening number per 1 Work under Fastening Number Control mode.
- **COUNT OK/NOK** judgment will be given according to this setting.

10.2. MODE Setting

MODE 1 (Initial Error Detection Option)

Initial Setting : 0

Setting : 0 – Initial Error will not be detected.

Setting : 1 - Initial Error will be detected.

Function

- Use this setting when Work galling detection is necessary.
- If the time required for Fastening Torque Measurement to rise from START Setting to CUT Setting is less than the time preset on TIMER 2, Initial Error judgment will be given.

Reactions at the time of Initial Error Detection

- DPM Window : [LO.E.] and [Torque Measurement] will appear by turns.
- TRQUE/ANGLE Lamp on the front panel will not turn on at this point.
- Buzzer : ON

Alarm Resetting

- MODE3: In the case that 1 is set, Start Reset will be effected at the start of next fastening operation.
- Touch RESET Key or input RESET Terminal.

MODE 2 (Cycle Error Detection Option)

Initial Setting : 0

Setting : 0 - Cycle Error will not be detected.

Setting : 1 - Cycle Error will be detected.

Function

- Use this function when Fastening Time Control is necessary.
- If Fastening Torque Measurement has not attained CUT Setting from START Setting even after a lapse of the time preset on TIMER 3, Cycle Error judgment will be given.

Reactions at the time of Cycle Error Detection

- DPM Window : [CYL.E.] and [Torque Measurement] will appear by turns.
- TRQUE/ANGLE Lamp on the front panel will not turn on at this point.
- Buzzer : ON
- When Output Board is in use : TORQUE NOK will be output.

Alarm Resetting

- MODE3: In the case that 1 is set, Start Reset will be effected at the start of next fastening operation.
- Touch RESET Key or input RESET Terminal.

MODE 3 (UEC Reaction Selection at the time of fastening error detections (LO.E./CYL.E./F.E))

Initial Setting : 1

Setting : 0 - The next fastening operation will not start and UEC will be rendered inoperative (Valve ON Status), unless alarm resetting operation has been added (by touching RESET Key or by inputting RESET Terminal).

Setting: 1 - No alarm resetting operation is necessary and the next fastening operation will automatically effect alarm resetting and render UEC operative.

MODE11: Torque Measurement will start after Start Reset in response to next torque inputting (higher than Torque START Setting) in the case that 0 is set, and in response to next External START inputting in the case that 1/2/3 is set.

MODE 4 (UEC Reaction Selection at the time of Upper/Lower (Torque/Pulse) effort detections)

Initial Setting : 1

Setting: 0 – The next fastening operation will not start, unless alarm resetting operation has been added (by touching RESET Key or by inputting RESET Terminal). (Valve ON Status)

Setting: 1 – No alarm resetting operation is necessary and the next fastening operation will automatically effect alarm resetting.

MODE 5 (Fastening Interruption Error Detection Option)

Initial Setting : 0

Setting : 0 – Fastening Interruption Error will not be detected.

Setting : 1 – Fastening Interruption Error will be detected.

Function

- When torque input has been interrupted before Fastening Torque reaches CUT Setting from START Setting · LOW Setting, a fastening interruption error will be detected. (Ex. Tool's start lever is released.)

Note) Even though the final torque value exceeded LOW Setting and remained in the OK range, Fastening Interruption Error judgment will be given when torque inputting has been interrupted before attaining CUT Torque.

Reactions at the time of Fastening Interruption Error Detection

- DPM Window : [F.E.] and [Torque Measurement] will appear by turns.
- Buzzer : ON

Alarm Resetting

- MODE 3: In the case that 1 is set, Start Reset will be effected at the start of the next fastening operation.
- Touch RESET Key or input RESET Terminal.

Note that this function is effective only when MODE9 is set to 3.

MODE 6 (Forced Judgment Option at the time of TIMER3 Timeout)

Initial Setting : 0

Setting : 0 - Forced judgment will not be made at the time of TIMER3 timeout.

Setting : 1 - Forced judgment will be made at the time of TIMER3 timeout.

Function

- Use this function when you need Fastening Time Control without detecting Cycle Error.
- When Fastening Torque Measurement failed to reach CUT Setting from START Setting within the time preset on TIMER 3, VALVE Output will be produced and Tool will be forcibly stopped and a judgment will be given.
- TIMER 1 will start after TIMER 3 timeout and at the time when Torque dropped to a value less than START Setting.
- Note that this function is effective only when MODE2 is set to 0.

MODE 8 (Buzzer Volume)

Buzzer Volume Setting

Initial Setting : 5

Setting Range : 0 ~ 5

Function

- Buzzer volume setting
- Increase the setting number to increase Buzzer sound.
- Buzzer will not produce sound when 0 is entered.

MODE 9 (Fastening Mode Selection)

Initial Setting : 3

Setting : 1 - Torque Monitoring

Torque measurement value judgment will be given without controlling.

Setting : 3 - MC Wrench/EC Wrench Torque Control

This is mainly used for MC & EC Wrench, and torque measurement value judgment will be given with controlling.

MODE 14 (Fastening Number Count Operation Option)

Initial Setting : 0

Setting: 0 - All-the-time fastening countdown ready condition will be rendered. If the preset fastening number is not attained at the time of LS1 Terminal input, COUNT NOK judgment will be given.

Setting : 1 - Fastening Countdown Operation Range will be defined. Countdown operation will start upon LS1 Terminal input, and COUNT NOK judgment will be given when the preset fastening number is not attained at the time of LS2 Terminal input.

Setting : 2 - TIMER 50 will start at the time of LS1 Terminal input. If the timer became timeout before completing the preset fastening number, COUNT NOK will result.

Setting : 3 - TIMER 50 will start in response to the first fastening judgment or QL Wrench input. If the timer became timeout before completing the preset fastening number, COUNT NOK will result.

Setting : 4 - Fastening Countdown Operation Range will be defined. Countdown operation will start when WORK Switch on the optional input board has been turned ON. If the preset fastening number is not attained at the time when WORK Switch has been turned OFF, COUNT NOK judgment will result.

Setting : 5 – Even when the preset fastening number is not attained at the time of LS1 Terminal input, COUNT NOK judgment will not be given and the remaining fastening number will be cleared.
If the preset fastening number is attained before LS1 Terminal input, COUNT OK judgment will result.

- Note that MODE 14 is common to WORK No. 1 ~ 4 and is spindle-by-spindle setting.

MODE 15 (Fastening Operation Check Buzzer Output Option)

Initial Setting : 0

Setting : 0 – Buzzer output will not be produced at the time of fastening operation.

Setting : 1 – Buzzer output will be produced at the time of fastening operation.

Function

The buzzer will turn ON for 1-pulse duration at the time of fastening OK and will turn ON for 2-pulse duration at the time of fastening number count-up.

MODE 21 (Pulse Number Lower Limit)

Initial Setting : 2

Setting Range : 0 ~ 9998 (MODE21 [MAX9998] < MODE22[MAX9999])

Function

This is the lower limit for pulse number measurement. When Pulse Measurement Value until Torque Measurement Value attained CUT once exceeding START fell short of the number preset on MODE 21, Pulse LOW NOK will result.

Reactions at the time of Pulse LOW NOK detection

- DPM Window : [PLS. L.] and [Torque Measurement] will appear by turns.
- Buzzer : ON

Abnormal Resetting

- MODE 4 : Start Reset will be effected at the start of the next fastening operation in the case that 1 is set.
- Touch RESET Key or input RESET Terminal.

MODE 22 (Pulse Number Upper Limit)

Initial Setting : 100

Setting Range : 1 ~ 9999 (MODE34 [MAX9998] < MODE35[MAX9999])

Function

This is the upper limit for pulse number measurement. When Pulse Measurement Value until Torque Measurement Value attained CUT once exceeding START stepped across the number preset on MODE 22, Pulse HIGH NOK will result. VALVE Output will be turned ON to stop Tool at this point, and the corresponding error message will be displayed.

Reactions at the time of Pulse HIGH NOK detection

- DPM Window : [PLS. H.] and [Torque Measurement] will appear by turns.
- Buzzer : ON

Alarm Resetting

- MODE4 : Start Reset will be effected at the start of the next fastening operation in the case that 1 is set.
- Touch RESET Key or input RESET Terminal.

MODE 24 (Torque CUT Correction Option)

Initial Setting : 0

Setting : 0- In the case that Torque CUT Correction Value is in use, Torque Measurement will be kept on still after Fastening Torque attained Torque CUT Setting and even in the course of counting the pulse number for Torque CUT Correction Value, and the peak value obtained will be displayed as a fastening torque and a judgment will be given based upon such value.

Setting : 1- In the case that Torque CUT Correction Value is in use, pulses up until Torque CUT Setting has attained for the first time will be taken for torque measurement, and pulses occurring after CUT Value will be neglected.

MODE 25 (Torque CUT Correction Value)

Initial Setting : 1

Setting Range : 1 ~ 5

Function

- When Fastening Torque attained CUT Setting, torque values for the preset pulses after CUT Setting will be measured, and then VALVE Output follows and Tool will be suspended accordingly.
- This function will become effective only when Control Mode has been set to “3”.
- Enter “1” when you use tools like an Angle Nutrunner or UOW that exhibit so-called “stalling” waveform.

Enter “1” in the case that you do not use this function.

MODE 31 (Fastening Condition Option)

Initial Setting : 1

Setting : 0 – Without Tool (not connected)

Setting : 1 – With torque-sensor-equipped Tool (connected)

Setting : 2 – With TM Type Tool or with QL Wrench

MODE 42 (Alarm Number)

Initial Setting : 0

Setting Range : 0 ~ 9999 (in 100s)

- Use this mode to notify operators of Tool maintenance timing.
- Enter a guideline Cumulative Fastening Number intended for the next coming Tool maintenance timing.
- When Cumulative Fastening Number reached Alarm Number, WARNING Lamp on the front panel will flash.

MODE 43 (Repair Number)

Initial Setting : 0

Setting Range : 0 ~ 9999 (in 100s)

- Use this mode to notify operators of Tool replacing timing.
- Enter a guideline Cumulative Fastening Number intended for the next Tool replace timing.
- When Cumulative Fastening Number reached Repair Number, WARNING Lamp on the front panel will light up.

MODE 44 (Alarm Pulse Number)

Initial Setting : 0

Setting Range : 0 ~ 9999 (in 1000 pulses)

- Use this mode to notify operators of Tool maintenance timing.
- Enter a guideline Cumulative Fastening Pulse Number intended for the next coming Tool maintenance timing.
- When Cumulative Fastening Pulse Number reached Alarm Pulse Number, WARNING Lamp on the front panel will flash.

MODE 45 (Repair Pulse Number)

Initial Setting : 0

Setting Range : 0 ~ 9999 (in 1000 pulses)

- Use this mode to notify operators of Tool replace timing.
- Enter a guideline Cumulative Fastening Pulse Number.
- When Cumulative Fastening Pulse Number reached Repair Pulse Number, WARNING Lamp on the front panel will light up.

MODE 46 (Tool Data Clear)

Initial Setting : 0

Setting Range : 0, 1

- When 1 has been written in, Cumulative Fastening Number and Cumulative Fastening Pulse will be cleared.
- Clear Cumulative Fastening Number/Pulse when appropriate measures like Tool replace have been taken.

MODE 50 (UEC No.)

Initial Setting : 1

Setting Range : 1 ~ 25

- Allocate any number to each UEC-5500 when you use two or more UECs.

MODE 82 (Memory Data Mean Value Display)

Function

- Memory data mean values will be displayed.
- This mode will become effective during Write-in Mode (MODE 99) .
- Computing will be suspended when RESET Key is turned ON in the course of data processing.

MODE 83 (Memory Data σ Value Display)

Function

- Memory data σ values will be displayed.
- This mode will become effective during Write-in Mode (MODE 99)
- Computing will be suspended when RESET Key is turned ON in the course of data processing.

MODE 84 (Memory Data $3\sigma\pm\%$ Value Display)

Function

- Memory data $3\sigma\pm\%$ values will be displayed.
- This mode will become effective during Write-in Mode (MODE 99)
- Computing will be suspended when RESET Key is turned ON in the course of data processing.

MODE 85 (Memory Data CP Value Display)

Function

- Memory data CP values will be displayed.
- CP values will be determined based upon the values (LOW · HIGH) set for WORK No. now in selection.
- This mode will become effective during Write-in Mode (MODE 99)
- Computing will be suspended when RESET Key is turned ON in the course of data processing.

MODE 86 (Memory Data CPK Value Display)

Function

- Memory data CPK values will be displayed.
- CPK values will be determined based upon the values (LOW · HIGH) set for WORK No. now in selection.
- This mode will become effective during Write-in Mode (MODE 99) .
- Computing will be suspended when RESET Key is turned ON in the course of data processing.

MODE 87 (Memory Data Block Setting)

Initial Setting : 0

Setting : 0 - Up to 20,000 pieces of memory per spindle can be saved (memorized) regardless of WORKNo., and in the case that the number of memory exceeded 20,000 pieces, the excessive memory will be updated in the order of date.

Setting : 1 - Up to 2,500 pieces of memory per Spindle WORK No can be saved. In the case that the number of memory exceeded 2,500 pieces per block, the excessive memory will be updated in the order of date.

Function

- You may select between Spindle-by-Spindle Measurement Data Memorizing Method and Block-by-Block Memorizing Method based upon each Spindle WORK No. as necessary.
- Mean and CPK values are calculated on a block-by-block basis.

MODE 88 (Memory Data Selection)

Initial Setting : 0

Setting : 0 - Fastening data will not be saved.

Setting : 1 - Every fastening data will be saved regardless of operation.

When the number of memory reached 19990 or 2490 pieces (10 pieces before MAX), Buzzer will turn ON and D · P · M will show "COUP". You may turn off D · P · M display by inputting RESET Terminal or by touching RESET Key. However, fastening operation is kept on subsequently, Buzzer will turn ON and D · P · M will give the same message again.

Setting : 2 - The same will occur as in the case of Setting 1 and MAX alarm will not be produced with this setting.

Setting : 3 - Only OK data among fastening data will be saved.
(MAX Alarm will be produced.)

Setting : 4 - The same will occur as in the case of Setting 3 and MAX alarm will not be produced.

Function

- Data to be saved and MAX Alarm ON/OFF can be set.
- When you have changed the previous setting, all the data in memory will be cleared.

MODE 89 (Memory Data Clear)

Function

- All the data saved in WORK No. now selected will be cleared.
- This mode will become effective during Write-in Mode (MODE 99) .
- When "MODE", "8", "9" and "ENTER" have been keyed in, DPM shows "-CLE" sign and keying in "ENTER" again will effect data clearing.
- Alternatively, you may clear data by touching F.9 Memory Clear Key on Statistics Screen using your PC and SettingSoftware.

MODE 98 (Baud Rate Selection)

Initial Setting : 2

Setting : 0 - 9600 bps baud rate will be selected.

Setting : 1 - 19200 bps baud rate will be selected.

Setting : 2 - 38400 bps baud rate will be selected.

Setting : 3 - 57600 bps baud rate will be selected.

Setting : 4 - 115200 bps baud rate will be selected.

Function

Baud rate of data to be exchanged between UED main unit and Setting PC will be set.

Note that they are not the baud rate of Communication Board.

MODE 130 ~ 133 (IP Address 1 ~ 4)

Initial Setting : 0000

Setting Range : 0000 ~ 0255

- Enter IP Address at Controller side.

MODE 134 (Subnet Mask)

Initial Setting : 8 255.255.255. 0

Setting Range : 1 ~ 31

MODE 135 ~ 138 (Default Gateway)

Initial Setting : 0000

- Not in use

MODE 139 (TCP Port)

Initial Setting : 2101

Setting Range : 0 ~ 9999

Controller TCP Port setting

MODE 140 (Connection Mode)

Initial Setting : 1

Setting : 0 – Controller Side will be set to Host Side.

Setting : 1 – Controller Side will be set to Client Side.

- Make the setting value “1” (Host Side).

MODE 141 ~ 144 (Remote Host IP Address 1 ~ 4)

Initial Setting : 000

Setting Range : 000 ~ 255

- Enter IP Address of your setting PC.

MODE 145 (Remote TCP Port)

Initial Setting : 0

- Enter TCP Port of your setting PC.
- Always enter the same value as with Controller TCP Port (MODE 139)

MMODE 149 (Ethernet Connection Monitoring Function)

Indication : Ethernet connection status

0 : TCP/IP, not connected

1 : TCP/IP, connected

2 : Workstation, connected (special spec.)

10 : Setting Software Mode, connected (standard spec.)

20 : Data Transmission Mode, connected (standard spec.)

***They are not setting values, which please note.**

MODE 101 ~ 114 (Input Terminal Allocation Setting)

Allocate functions to Input Terminals (IN 1 ~ 14).

Setting	Name	Setting	Name
1	No. 1 Spindle L S 1	2 8	No. 1 Spindle WORK SELECT A
2	No. 1 Spindle L S 2	2 9	No. 1 Spindle SELECT B
3	No. 2 Spindle L S 1	3 0	No. 1 Spindle WORK SELECT C
4	No. 2 Spindle L S 2	3 1	No. 2 Spindle WORK SELECT A
5	No. 3 Spindle L S 1	3 2	No. 2 Spindle WORK SELECT B
6	No. 3 Spindle L S 2	3 3	No. 2 Spindle WORK SELECT C
7	No. 4 Spindle L S 1	3 4	No. 3 Spindle WORK SELECT A
8	No. 4 Spindle L S 2	3 5	No. 3 Spindle WORK SELECT B
9	All Spindle RESET	3 6	No. 3 Spindle WORK SELECT C
1 0	No. 1 Spindle RESET	3 7	No. 4 Spindle WORK SELECT A
1 1	No. 2 Spindle RESET	3 8	No. 4 Spindle WORK SELECT B
1 2	No. 3 Spindle RESET	3 9	No. 4 Spindle WORK SELECT C
1 3	No. 4 Spindle RESET	4 0	No. 1 Spindle WORK SELECT 1
1 4	All Spindle PASS	4 1	No. 1 Spindle WORK SELECT 2
1 5	No. 1 Spindle PASS	4 2	No. 1 Spindle WORK SELECT 3
1 6	No. 2 Spindle PASS	4 3	No. 1 Spindle WORK SELECT 4
1 7	No. 3 Spindle PASS	4 4	No. 2 Spindle WORK SELECT 1
1 8	No. 4 Spindle PASS	4 5	No. 2 Spindle WORK SELECT 2
1 9	S P . SELECT	4 6	No. 2 Spindle WORK SELECT 3
2 0	No. 1 Spindle Q L	4 7	No. 2 Spindle WORK SELECT 4
2 1	No. 2 Spindle Q L	4 8	No. 3 Spindle WORK SELECT 1
2 2	No. 3 Spindle Q L	4 9	No. 3 Spindle WORK SELECT 2
2 3	No. 4 Spindle Q L	5 0	No. 3 Spindle WORK SELECT 3
2 4	No. 1 Spindle P S	5 1	No. 3 Spindle WORK SELECT 4
2 5	No. 2 Spindle P S	5 2	No. 4 Spindle WORK SELECT 1
2 6	No. 3 Spindle P S	5 3	No. 4 Spindle WORK SELECT 2
2 7	No. 4 Spindle P S	5 4	No. 4 Spindle WORK SELECT 3
		5 5	No. 4 Spindle WORK SELECT 4

MODE 121 ~ 128 (Output Terminal Allocation Setting)

Allocate functions to Output Terminals.

Setting	Name	Setting	Name
1	C P U R U N	2 6	No. 1 Spindle EXCHANGE
2	No. 1 Spindle OPERATION RANGE	2 7	No. 2 Spindle EXCHANGE
3	No. 2 Spindle OPERATION RANGE	2 8	No. 3 Spindle EXCHANGE
4	No. 3 Spindle OPERATION RANGE	2 9	No. 4 Spindle EXCHANGE
5	No. 4 Spindle OPERATION RANGE	3 0	No. 1 Spindle S V
6	No. 1 Spindle COUNT O K	3 1	No. 2 Spindle S V
7	No. 2 Spindle COUNT O K	3 2	No. 3 Spindle S V
8	No. 3 Spindle COUNT O K	3 3	No. 4 Spindle S V
9	No. 4 Spindle COUNT O K	3 4	No. 1 Spindle WORK 1 Answer
1 0	No. 1 Spindle COUNT NOK	3 5	No. 1 Spindle WORK 2 Answer
1 1	No. 2 Spindle COUNT NOK	3 6	No. 1 Spindle WORK 3 Answer
1 2	No. 3 Spindle COUNT NOK	3 7	No. 1 Spindle WORK 4 Answer
1 3	No. 4 Spindle COUNT NOK	3 8	No. 2 Spindle WORK 1 Answer
1 4	No. 1 Spindle TORQUE O K	3 9	No. 2 Spindle WORK 2 Answer
1 5	No. 2 Spindle TORQUE O K	4 0	No. 2 Spindle WORK 3 Answer
1 6	No. 3 Spindle TORQUE O K	4 1	No. 2 Spindle WORK 4 Answer
1 7	No. 4 Spindle TORQUE O K	4 2	No. 3 Spindle WORK 1 Answer
1 8	No. 1 Spindle TORQUE NOK	4 3	No. 3 Spindle WORK 2 Answer
1 9	No. 2 Spindle TORQUE NOK	4 4	No. 3 Spindle WORK 3 Answer
2 0	No. 3 Spindle TORQUE NOK	4 5	No. 3 Spindle WORK 4 Answer
2 1	No. 4 Spindle TORQUE NOK	4 6	No. 4 Spindle WORK 1 Answer
2 2	No. 1 Spindle CHECK	4 7	No. 4 Spindle WORK 2 Answer
2 3	No. 2 Spindle CHECK	4 8	No. 4 Spindle WORK 3 Answer
2 4	No. 3 Spindle CHECK	4 9	No. 4 Spindle WORK 4 Answer
2 5	No. 4 Spindle CHECK	5 0	Buzzer Output

10.3. TIMER Setting

TIMER 1 (Fastening Judgment Delay Timer)

Initial Setting : 300 [msec]

Setting Range : 50 ~ 9999 [msec]

- The time interval before producing a judgment output from the time when judgment output ready status is rendered (fastening completion) can be set on this delay timer.
- This setting defines the torque measurement end point under Control operation.
- Make this setting upon giving due consideration of the torque leap amount occurring at the time of stopping motion.

Setting Guideline

- Higher than 500 [msec] in the case that you will use Stall Fastening Tool.
- 300 [msec] in the case that you will use Pulse Tool.

TIMER 2 (Initial Error (LO.E.) Detect Timer)

Initial Setting : 500 [msec]

Setting Range : 1 ~ 9999 [msec]

- MODE 1 : This setting is necessary in the case that “1” has been entered in MODE 1.
- This setting defines Waveform Upper Limit between the instant when Fastening Torque Measurement attained START Torque and the instant when it attained the preset CUT value.
- Timer will start when Torque reached START Setting.

TIMER 3 (Cycle Error (CYL.E.) Detect Timer)

Initial Setting : 5000

Setting Range : 1 ~ 9999 [msec]

- MODE 2 : This setting is necessary in the case that “1” has been entered in MODE 2.
- This setting defines Waveform Lower Limit between the instant when Fastening Torque Measurement attained START Torque and the instant when it attained the preset CUT value.
- Timer will start when Torque reached START Setting.

TIMER 4 (Fastening OK Output Timer)

Initial Setting : 9999

Setting Range : 0 ~ 9999 [msec]

- The duration time of TORQUE OK to be produced from Output Board can be set on this Timer. Setting is not necessary in ordinary cases.
- Set this timer if it is apparent that output duration time exerts an influence over UEC External Sequence.
- Setting : 0 – Output will be maintained to the next fastening operation start timing.

TIMER 5 (COUNT OK Terminal Output Timer)

Initial Setting : 9999

Setting Range : 0 ~ 9999 [msec]

- The duration time of COUNT OK Terminal Output ON can be set on this Timer.
- Output will be turned OFF if Fastening Number Control gets started during Timer is in action.
- In the case of “0” setting, output will be maintained to the next fastening number control start timing.
- ”0” setting will not be accepted during MODE 14 is in use.

TIMER 6 (Torque Measurement Timing Delay Timer)

Initial Setting : 20

Setting Range : 0 ~ 9999 [msec]

- Timer will start at the time when Torque Measurement attained START Setting, and Torque Measurement will start at the time when Timer became timeout. (Torque measurement will not be performed before Timer became timeout.)
- Use this timer to ignore torque leaping occurring at the time of bolt/nut seating.
- Setting : 0- Torque measurement will start at the time when START level is attained.

TIMER 10 (QL Wrench Anti-chattering Timer)

Initial Setting : 100

Setting Range : 0 ~ 9999 [msec]

- This setting is useful to count fastening number exactly and to prevent two or more fastening counts often occurring from QL wrench chattering behavior.
- Once QL Terminal Input is turned OFF, even when an input is turned ON again within the preset time, the second fastening will not be taken into count.

TIMER 13 (TM Tool Valve ON Timer)

Initial Setting : 700

Setting Range : 1 ~ 9999 [msec]

- When you use TM Tool, set Fastening duration time on this timer.
- TIMER 13 will start upon PS Terminal Input is turned ON.
- TIMER 13 will be reset when PS Terminal Input is turned OFF during the timer is in action.

TIMER 14 (TM Tool Valve OFF Timer)

Initial Setting : 800

Setting Range : 1 ~ 9999 [msec]

- When you use TM Tool, set Valve OFF (Tool OFF) duration time on this timer.
- TIMER 14 will start in responset to TIMER 13 timeout, and VALVE Terminal Output will turn ON (Valve OFF) during TIMER 14 is in action to suspend Tool.

TIMER 20 (Valve Return Timer)

Initial Setting : 300

Setting Range : 1 ~ 9999 [msec]

- This timer starts in response to TIMER 1 timeout after Fastening Torque attained CUT Setting and Tool is suspended by Valve Output and will effect Valve returning in sync of timeout timing.

TIMER 40 (Pin Aligning Timer)

Initial Setting : 0

Setting Range : 0 ~ 9999 [msec]

- Use this timer when bolt pin aligning operation is necessary.
- This timer will start at the time of torque judgment. As torque measurement will start only after TIMER 40 timeout, carry out pin alignment operation by performing additional fastening operation during the idle time.
Select "0" in the case that you do not use this function.

TIMER 50 (Line Control Timer)

Initial Setting : 100

Setting Range : 1 ~ 9999 [sec]

- Make setting when "2" or "3" is entered in MODE 14. This timer enables time-base Line Control.

Note that only this timer uses [sec] unit.

Work-by-Work setting

10.4. Measurements Display

MODE 18 (ZERO Point Value Display)

- DPM Window will display ZERO Point value when MODE 70 is selected during Write-in Mode.
- When a ZERO Point deviation has been noticed, key in “ ENTER ” during “ ZERO ” is displayed to effect deviation correction. (Deviation correction will be added when a deviation stays within 20% against the rated value.)
- Key in “ RESET ” to return to Torque Measurement Display.
This operation will be accepted only during Write-in Model (MODE 99).

MODE 19 (Fastening Time Display)

- When MODE 19 is selected, DPM will display fastening time required for the immediately preceding fastening operation (the time required from START Setting to CUT Setting). Measurement Display will appear again automatically after a lapse of 2 seconds.

MODE 20 (Pulse Number Display)

- When MODE 33 is selected, DPM will display Pulse Number.
- Key in “ ENTER ” again to return to Torque Measurement Display.

11. Function

11.1. Fastening Control Specifications

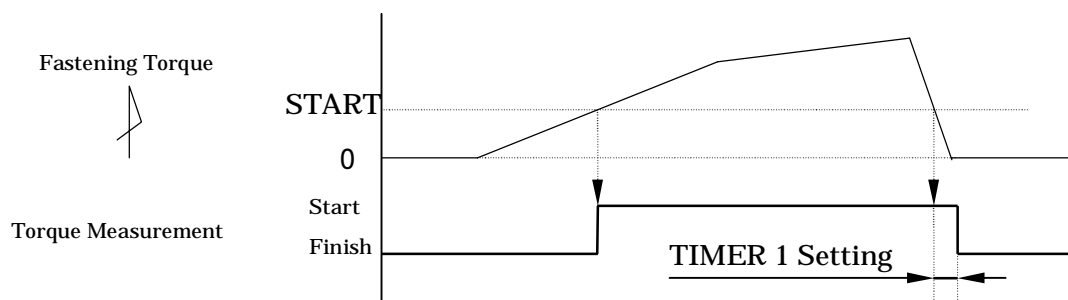
Either of the following two types of Fastening Control modes can be selected as necessary:

MODE 9: 1 Torque Monitoring

3 MC/EC Wrench Torque Control

1) Torque Monitoring MODE 9: 1

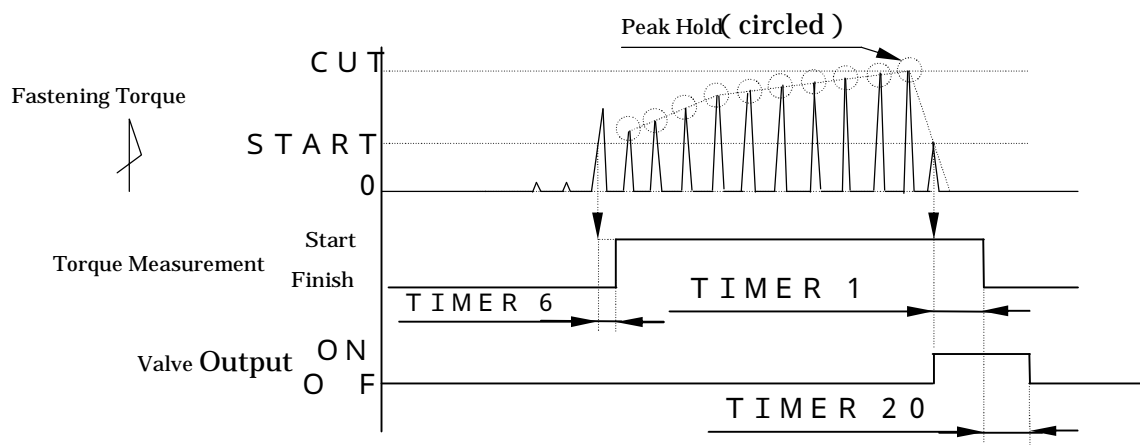
This is mainly for monitoring torque measurements of Angle Nutrunner UAN-series (mechanical clutch based rotation stopping tools). Torque measurement will start; at the time of External Start Input in the case of MODE11 with "1" Setting; and at the time when a torque exceeding START Torque Setting has been input in the case of MODE 11 with "0" Setting, and when a value less than START Torque is detected, judgment will be output after TIMER 1 has expired.



3) MC/EC Wrench Torque Control MODE 9: 3

This is used for MC/EC Wrench torque controlling. Torque Measurement will start when a torque exceeding START Torque has been input and Tool will be suspended in response to VALVE output after CUT Setting is attained. When a value less than START Torque is detected, judgment will be output after TIMER 1 has expired.

When you have set TIMER 6, TIMER 6 starts after a torque exceeding STRAT Setting is input and Torque Measurement will be initiated after TIMER 6 has expired to ignore torque leaping amount at the time of bolt seating.



11.2. Measurement Value Upper/Lower Judgment

UEC is capable of giving pass/fail judgment as to whether Torque/Angle/Pulse measurements are within the predefined upper/lower limits.

Upper/Lower Limit Judgment will be made based upon Torque/Pulse measurements taken up to the end of fastening operation.

Upper/Lower limits for Torque Measurement can be defined by setting Upper Limit: HIGH and Lower Limit: LOW.

Upper/Lower limits for Pulse Measurement can be defined by setting HIGH: MODE 23 and LOW: MODE 22.

[Judgment]

(1) In the case that measurements are within Upper/Lower limits (OK)

- Front Panel's OK LED (green) Lamp lights up.
- Tool LED Lamp lights up green.
- TORQUE OK will be output.
- Buzzer will turn ON for 1-pulse duration if "1" has been entered in MODE 15. (ON for 2-pulse duration in the case of COUNT OK)

(2) In the case that Torque measurements are beyond Upper Limit (HIGH NOK)

- Front Panel's HIGH LED (red) Lamp lights up.
- Tool LED Lamp lights up red.
- Buzzer Output will turn ON.
- TORQUE NOK will be output.

(4) In the case that Pulse measurements are beyond Upper Limit

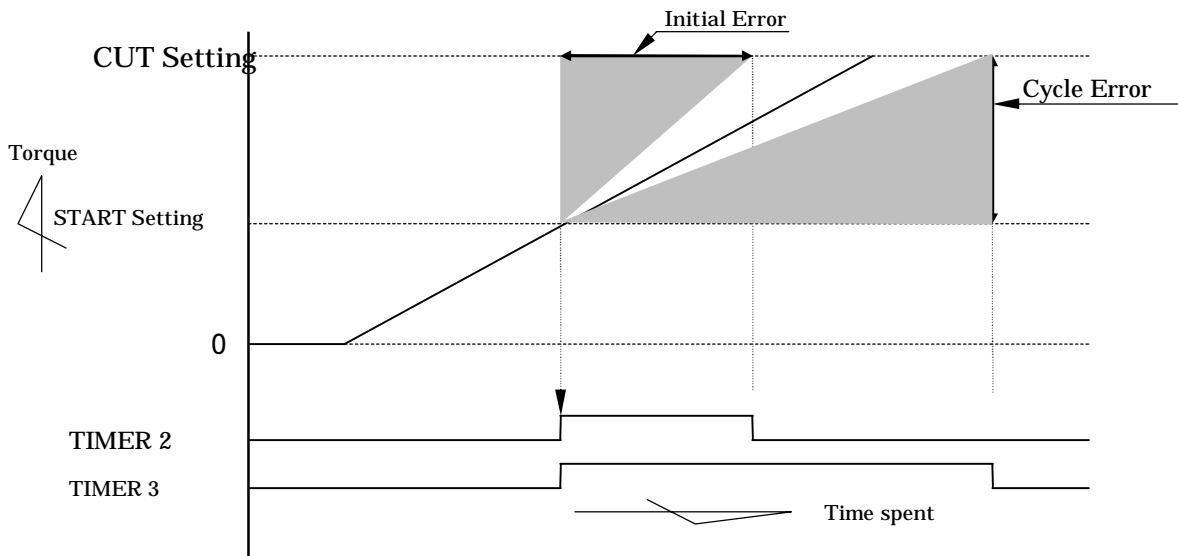
- DPM Window will display "PLS.H." and " Torque Measurement" by turns.
- Tool LED Lamp lights up red.
- Buzzer Output will turn ON.
- TORQUE NOK will be output.

(5) In the case that Torque measurements are below Lower Limit (LOW NOK)

- Front Panel's LOW LED (yellow) Lamp lights up.
- Tool LED Lamp lights up yellow.
- Buzzer Output will turn ON.
- TORQUE NOK will be output.

(7) In the case that Pulse measurements are below Lower Limit

- DPM Window will display " PLS.L. " and " Torque Measurement " by turns.
- Tool LED Lamp lights up yellow.
- Buzzer Output will turn ON.
- TORQUE NOK will be output.



Remark) Linear torque change case is illustrated.

2) Initial Error [LO. E.]

Time required for torque to rise to CUT Setting from Start Level Setting will be measured. When the time measured has been judged shorter than the preset time (the time preset on TIMER2), an error judgment will be given.

[Setting]

- MODE 1: 1
- TIMER 2: 1 ~ 9999 [msec]

[Setting Method]

- Determine the setting value in consideration of the time required for torque to rise to CUT Level from Start Level during ordinary fastening operation.
- Obtain required time using MODE 19 (Key Operation: "MODE" "1" "9" "ENTER) or based upon TSC printout data to be produced from Centro-nics Printer.

3) Cycle Error [CYL. E.]

Time required for torque to rise to CUT Setting from Start Level Setting will be measured. When the time measured has been judged longer than the preset time (the time preset on TIMER3), an error judgment will be given.

[Setting]

- MODE 2: 1
- TIMER 3: 1 ~ 9999 [msec]

[Setting Method]

- Determine the setting value in consideration of the time required for torque to rise to CUT Level from Start Level during ordinary fastening operation.
- Obtain required time using MODE 19 (Key Operation: "MODE" "1" "9" "ENTER) or based upon TSC printout data to be produced from Centro-nics Printer.

12. 11. Torque Sensor Wiring Diagnosis

This function enables Torque Sensor failure and Torque Sensor Cable breaking/short-circuit detection. ZERO/CAL Check function will be used for error detection.

12.1. 11.1 Error Detection

1) ZERO Check

A deviation off from Torque Sensor Output Voltage 0[V] under free of load torque application to Torque Sensor can be checked using this function. Error judgment will be given when a deviation at ZERO point (DPM Window's ZERO Point Value) is more than $\pm 6\%$ range against CAL Setting.

2) CAL Check

The wiring of Torque Sensor to UEC can be tested for correct wiring and the match between the Torque Sensor specifications and Sensor settings can be checked through CAL Check. To perform CAL Check, UEC bring Torque Sensor into under rated load conditions technically and examine the Torque Sensor Output Signal to see if it stays within $100 \pm 6\%$ range against CAL Setting.

Which Sensor to be rendered under rated load conditions technically will be determined by checking SENSOR settings against each SENSOR specifications.

When it is revealed that the wiring between Torque Sensor and UEC is not appropriate through the process mentioned earlier, an error detecting operation will be performed to see if there is a mismatch between the Sensor specifications and Sensor settings.

12.2. 11.2 ZERO/CAL Check Timing

- The interval during Self-diagnosis Function is running after UEC power-on
- At the time when RESET Terminal is input
- At the time when RESET Key is input
- When "F · 6 ZERO CAL" was input on "ZERO Point Adjust Screen" using Setting Software

Reactions at the time of error detection

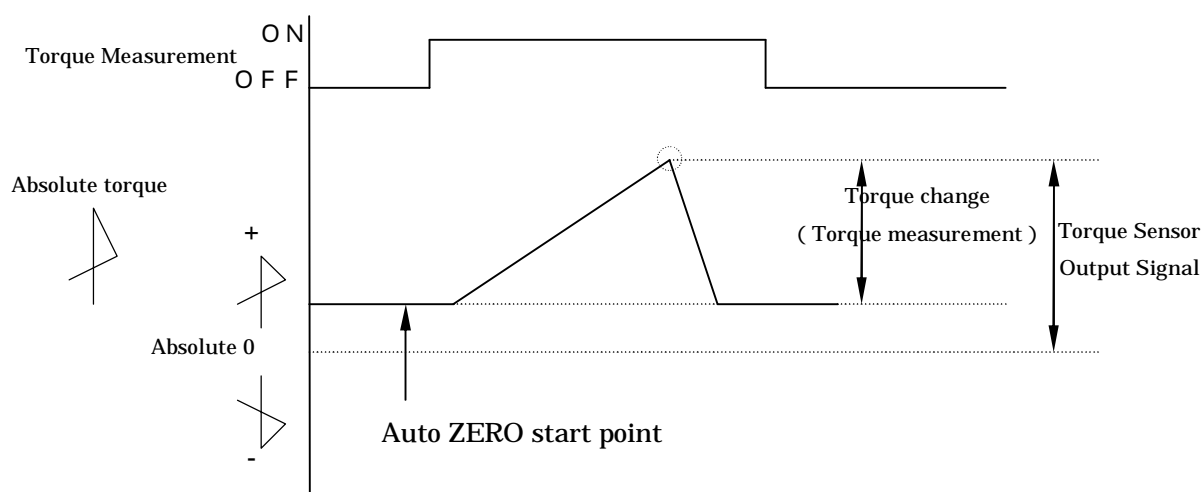
- DPM Window (at the time of ZERO Error) : [0.E.] and [Torque Measurement] will light up by turns.
- DPM Window (at the time of CAL Error) : 「 CAL.E. 」 and [Torque Measurement] will light up by turns.
- Buzzer Output will turn ON.
- In the case that Output Board is in use : TORQUE NOK will be output.

13. Auto ZERO

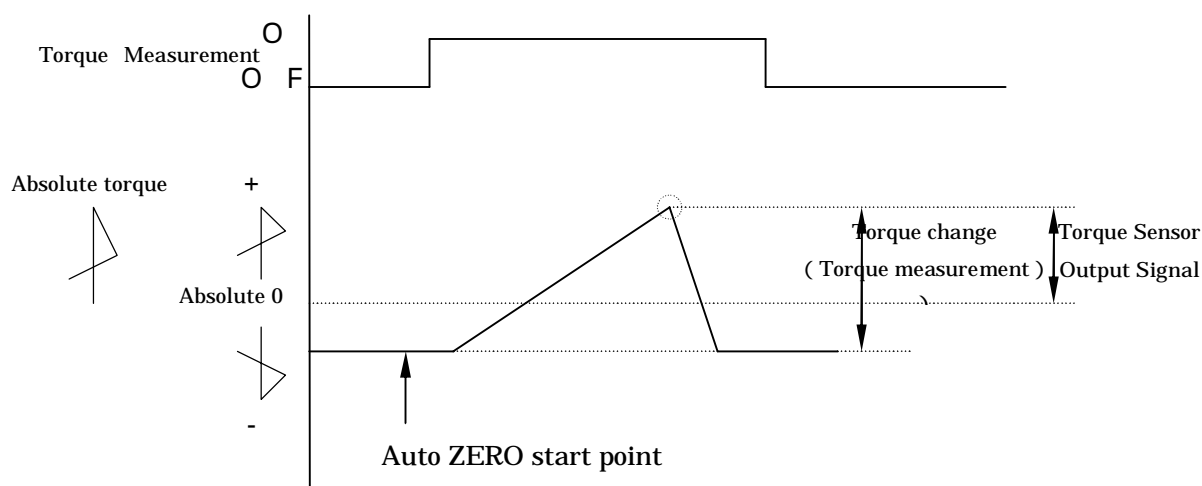
This function is specifically designed to obtain correct torque measurements, and errors occurring during Torque Measurement due to a ZERO Point torque deviation in Torque Sensor will be compensated automatically. When a ZERO Point torque deviation has been noticed, the same value will be saved in memory, and the exact torque change amount during actual fastening operation will be calculated by compensating (adding/deducting) the deviation at the time of converting the output signal from Torque Sensor into torque unit. Remember that this function will not work in the case of ZERO/CAL errors.

Movements in the process of Auto ZERO adjustment

1) In the case that Zero Point Deviation is on the plus side during Auto ZERO:



2) In the case that Zero Point Deviation is on the minus side during Auto ZERO:



Auto ZERO Start Timing

Auto ZERO will start after ZERO/CAL Check.

- The interval during Self-diagnosis Function is running after UEC power-on.
- At the time when RESET Terminal is input and at the time when RESET Key is input

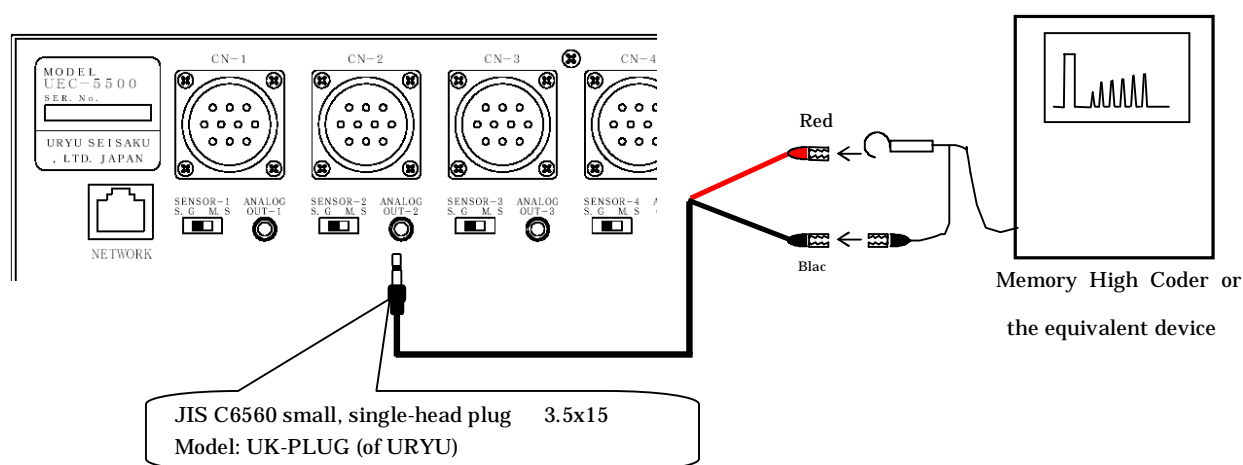
14. Torque Waveform Monitoring

Torque waveform monitoring methods using Memory High Coder or Memory Scope are explained in the following:

Check the settings to make sure that they have been correctly set.

(Closely check the conformity between the specifications of Torque Sensor connected to UEC and the Torque Sensor settings as well as CAL setting.)

Connect a waveform monitoring device to UEC-5500.



Note) The red side of UK PLUG : Torque Signal
The black side of UK-PLUG : 0V (GND side)

Touch **RES** Key to monitor CAL waveform height (voltage under rated torque application).
(CAL Check will be performed.)

Verify CAL waveform height, make settings, and add adjustments to the waveform monitoring device.

Carry out torque waveform measurement.

15. ANALOG OUTPUT Terminals

Torque sensor output signals will be amplified 1000 times, filtered and attenuated, and analog torque signal voltages obtained will be output in real time.

1) Torque Sensor Specifications & Output Voltages

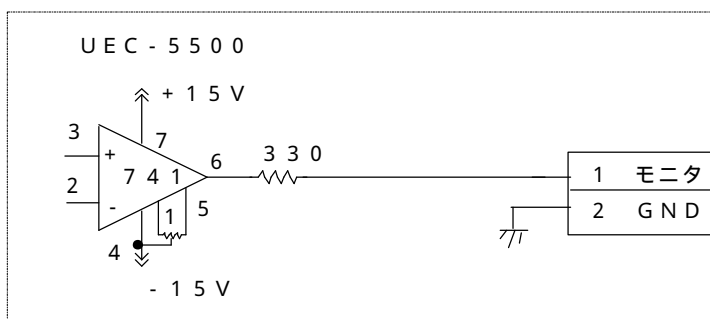
Output voltages (xV) with the rated load torque (CAL value) applied to Torque Sensors are listed below. Output voltages will vary according to each sensor specification.

Torque Sensor - Specifications	ANALOG OUTPUT Terminal Output Voltage (xV)
7 0 0 $7 5 0 \times 1 0^{-6}$	D C 0 . 7 5 V
7 0 0 $1 5 0 0 \times 1 0^{-6}$	D C 1 . 5 V
7 0 0 $1 6 0 0 \times 1 0^{-6}$	D C 1 . 6 V
Magnetostriction Type Sensor	D C 1 . 5 V

2) Conversion into Torque Value from ANALOG OUTPUT Terminal Output Voltage

Output Voltage in the process of fastening		
Torque	operation (V)	×
Value =	Output voltage under the rated load torque	
application (V)		
	Torque Rated Value	

3) ANALOG OUTPUT Terminal Output Specifications



4) ANALOG OUTOUT Terminals

Plug Size : JIS C6560 small, single head plug $\phi 3.5 \times 15$

Terminal Connecting Cable Type : UK-PLUG (of URYU)

(Part Code: 900-483-0)

16. 15 Errors

16.1. Errors traceable to Hardware

Spindle No. will be indicated in * column.

(1) ROM Error

* **Er.01**

【Meaning】

- On-board ROM is out of order or is showing unusual behavior for some reason.
- ROM Error will be detected during self-diagnos checks are running.

【Remedy】

- ROM exchange

(2) RAM Error

* **Er.02**

【Meaning】

- On-board RAM is out of order or is showing unusual behavior for some reason.
- RAM Error will be detected during self-diagnos checks are running.

【Remedy】

- RAM exchange

(3) A/D Error

* **Er.03**

【Meaning】

- On-board-A/D is out of order or is showing unusual behavior for some reason.
- A/D Error will be detected during self-diagnos checks are running.

【Remedy】

- A short circuit in Tool internal wiring/Sensor Cable wiring is highly possible when Er.03 has not been produced at power-on with Tool/Sensor Cable unplugged. Exchange Tool/Sensor Cable in this case.
- Exchange the main unit.

(4) D/A Error

* **Er.04**

【Meaning】

- On-board D/A is out of order or is showing unusual behavior for some reason.
- D/A Error will be detected during self-diagnos checks are running.

【Remedy】

- Exchange the main unit.

(5) Sum Check Error

Er.05

【Meaning】

- Erroneous setting data is saved in RAM.

【Remedy】

- Power OFF during memory recording and/or memory overwriting due to noise is highly possible in the case that error is eliminated upon turning the power on again or by RESET key operation. You must make all the settings once again when alarm resetting has been done by using RESET Key, as RESET Key operation effects initialization.

(6) ZERO Check Error

Light up
by turns

* **0.E.** \longleftrightarrow NG Value

【Meaning】

- More than a $\pm 6\%$ deviation against the rated value has been recognized at ZERO Check.

【Remedy】

- Add ZERO Point adjustments.
- Check Sensor Cable and Tool and replace them as necessary.
- Check to see if Tool is running during checking.
- Exchange the main unit.

(7) CAL Check Error

Light up
by turns

* **CAL.E.** \longleftrightarrow N G Value

【Meaning】

- More than a $\pm 6\%$ deviation against the rated value has been recognized at CAL Check.

【Remedy】

- See if SENSOR Setting agrees with Torque Sensor.
- Check [M. S.] [S. G.] Selection Switch.
- Check Sensor Cable and Tool and replace them as necessary.
- Check to see if Tool is running during checking.
- Exchange the main unit.

16.2. Setting Error & Fastening Error

(1) Setting Error

S.E.

【Meaning】

- Settings outside the confines of the prescribed operating range have been entered.

【Remedy】

- Input correct values in the case of an erroneous value input.
- See if an interlock mechanism comes into play or not.
LOW < CUT < HIGH

(2) Initial Error

LO.E.

【Meaning】

- Double fastening, galling and/or seizure
- The time required for torque to attain CUT Level from Start Level was longer than the time preset on TIMER 2.

【Remedy】

- Refastening
- Check to see if double fastening, galling and/or seizure exists or not.
- Check bolts and works.
- Review START Setting and CUT Setting.
- Check TIMER 2 setting when fastening operation is free of trouble. Set TIMER 2 again using MODE 19 or based upon printout TSC data (the time required from START to CUT) to be produced from the printer.
- When you do not use Initial Error Detecting Function, set MODE 1 to “0”.

(3) Cycle Error

CYL.E.

【Meaning】

- Reduction in Tool performance
- Bolt and/or socket disengagement

【Remedy】

- Refastening
- Check for galling.
- Examine bolts and works.
- Check START and CUT settings.
- Check air pressure.
- Check TIMER 3 setting when fastening operation is free of trouble. Set TIMER 3 again using MODE 19 or based upon printout TSC data to be produced from the printer.
- When you do not use Cycle Error Detecting Function, set MODE 2 to “0”.
- Exchange Tool.

(4) Start Level Error

SLE.

【Meaning】

- Gallings, seizure and/or double fastening

【Remedy】

- Refastening
- There is an error in bolt/nut temporary fastening.
- Check works and bolts.
- Check TIMER 7 setting when fastening operation is free of trouble.
- When you do not use Start Level Error Decetecting Function, set MODE 16 to “0”.
- Check Tool capacity/supply pneumatic pressure.
- TIMER 7: 1 ~ 9999 [msec]

Cycle Overtime Error

CYE.

【Meaning】

- Nutrunner Socket is not correctly engaged with Work and is running idle.
- Judgment Output is not produced even TIMER 8 has expired subsequent to External START inputting.

【Remedy】

- Refastening
- Check bolts and works.
- Check TIMER 8 setting when fastening operation is free of trouble.
- Check Tool capacity/supply pneumatic pressure.
- When you do not use Cycle Overtime Error Detecting Function, set MODE 17 to “0”.

Fastening Interruption Error

FIE.

【Meaning】

- Fastening Interruption Error will be detected when torque input has been interrupted from when Fastening Torque attained START Setting • LOWSetting to when Fastening Torque attained CUT Setting. (Tool Lever is released, by example.)

Note) Even if the final torque value is beyond LOW Setting and stayed within OK Range, Fastening Interruption Error judgment will be given in the case that Torque Input Interruption before CUT occurred.

【Remedy】

- Refastening
- When you do not use Fastening Interruption Error Detecting Function, set MODE 50 to “0”.
- Check Tool capacity/supply pneumatic pressure.
- See if TIMER 1 Setting is too low or not.
- Check if Tool Lever has been released before CUT Setting attained.

Note) This will become effective only when MODE9 : 3 setting.

Pulse LOW NOK

PLS.L.

【Meaning】

- Pulse Measurement fell short of Pulse Lower Limit.
- Galling and/or double fastening

【Remedy】

- Refastening
- Check to see if a sign of refastening, galling and/or seizure exists or not.
- Check bolts and works.
- Check START & CUT settings.
- Review MODE 34 setting when fastening operation is free of trouble. Set MODE 34 again using MODE 33 or based upon printout TSC data (Pulse number from START to CUT) to be produced from the printer.
- When you do not use Pulse LOW NOK Detecting Function, set MODE 34 to "0".

Pulse HIGH NOK

PLS.H.

【Meaning】

- Pulse Measurement stepped across Pulse Upper Limit.
- Reduction in Tool performance

【Remedy】

- Refastening
- Check for galling.
- Check bolts and works.
- Check START and CUT settings.
- Check supply pneumatic pressure.
- Review MODE 35 setting when fastening operation is free of trouble. Obtain pulse number at the time of proper fastening operation using MODE 33 or based upon printout Pulse Data to be produced from the printer and use the number as a reference setting value.
- When you do not use Pulse HIGH NOK Detecting Function, set MODE 35 to "9999".
- Exchange Tool (when underperformance or performance deterioration has been noticed) .