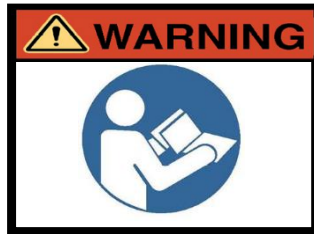


Original Instruction Handbook for UDP-A60LMC, A60MC, A80MC, UDP-A600LMC, A700MC, A100MC and A120MC series Electric Hydraulic Impulse Tools



Read all safety warnings, instructions, illustrations, and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.

Do not discard the safety and operating instructions. Give them to the operator. Save these instructions for future reference.



Edition 1-1

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Read Before Use


Read through this instruction handbook and familiarise yourself with the system before installation, operation, maintenance, and inspection. Take note that two different signs; 'WARNING' and 'CAUTION' are used in this handbook according to degrees of seriousness and urgency.



: The misuse of the product may cause the operators death or severe injury and the event shall be reported to all personnel immediately.



: The misuse of the product may cause the operators moderate injury and physical damage to your equipment.

 signs may also cause any possible acute event.

You shall follow all requirements described in this handbook. Please retain this instruction handbook for future reference.

Intended Use: The tool is designed to tighten or loosen threaded fasteners.

- The tool is intended for professional use only.
- Avoid misuse and abuse of the tool. (e.g. Do not throw the tool on the floor, strike the housing in any way or use the tool as a hammer to knock material into place.)



- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Do not modify the tool. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.
- Stop using the tool if discomfort, tingling feeling or pain occurs.

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Work Area Safety

- Keep work area clean and well lit. Cluttered or dark areas invite accidents.
- Do not operate power tools in potentially 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 children, bystanders and visitors away while operating the tool. Distraction can cause you to lose control.
- Indoor use only.
- Proceed with care in unfamiliar surroundings. Hidden hazards may exist.
- Always secure workpiece. Use clamps or other practical way to secure and support the workpiece to a stable platform. Holding the workpiece by hand or against your body is unstable and may lead to loss of control.
- Mount the system on incombustible component such as metal. There may be a fire risk.
- Keep flammable materials away from the system. There may be a fire risk.
- Mount the system on the place that can support its weight. Accidental drop may cause injury.
- Avoid any foreign materials' intrusion. There may be an electric shock or fire risk.



Electrical Safety

- Tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) tools. Unmodified plugs and matching outlets will reduce risk of electric shock.
- Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is earthed or grounded.
- Do not expose the tool to rain or wet conditions. Water entering a power tool will increase the risk of electric shock.
- Do not abuse the cables. Never use the cables for carrying, pulling or unplugging the tool. Keep cable away from heat, oil, sharp edges or moving parts. Damaged or entangled cords increase the risk of electric shock.
- Do not handle the tool with wet hands. There may be an electric shock.
- When operating a power tool outdoors, use an extension cord suitable for outdoor use. Use of a cord suitable for outdoor use reduces the risk of electric shock.
- Do not crush, puncture, shorten external contracts or circuits, dispose of in fire or water.
- Arrange the cables so that it may not be stepped, caught or stressed for damages.
- Do not use the tool if it is damaged by a drop or is with damaged cables.
- Make sure that the system is OFF before wiring. There may be an electric shock or fire risk.
- Place the molded case circuit breaker (MCCB). There may be a fire risk.
- Install the UECP controller firmly before wiring. There may be an electric shock or fire risk.
- Never touch the terminal block when the system is plugged in even when it is switched off.
- Avoid damage, mechanical stress and load to cables and never sandwich them forcibly to avoid an electric shock.
- Switch off the system when you do not run it.
- If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply. Use of an RCD reduces the risk of electric shock.



- Verify that the rated voltage of the system agrees with the connected AC power source to avoid personal injury and a possible fire.
- Wires shall be routed and fixed properly and securely to avoid personal injury and fire.



- Be sure to turn off the UECP controller before you attach / detach the joint cable assembly to / from tool.

Be sure to turn off the UECP controller when you replace a tool.



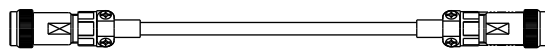
Tool

Joint Cable Assembly



UECP-4811E Controller

- If you attached / detached the joint cable assembly to / from a tool without turning off the UECP controller, the connector will be damaged tool due to the deteriorated condenser built in a tool.



Connector

- If you continue to operate a tool with the connector damaged, the cable connector will deteriorate. Further usage will cause the cable and tool to become overheated and burnt.

Personal Safety



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



- Use personal protective equipment. Always wear eye protection. Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.
- Prevent unintentional or inadvertent start. Ensure that the trigger is in the off-position before picking up or carrying the tool. Carrying the tool with your finger on the trigger or activating the tool that has the trigger on invites accidents.
- Do not overreach. Keep proper footing and balance at all times. This enables better control of the tool in unexpected situations.

Personal Safety



- Remove any adjusting wrench before turning the tool on. A wrench that is left attached to a rotating part of the tool may result in personal injury.
- Dress properly. Do not wear loose clothing, jewellery and neck ware. Keep your hair, clothing and gloves away from all moving parts. Loose clothes, jewellery or long hair can be caught in moving parts.
- Avoid awkward or off-balanced postures. Change the posture during extended tasks, which may help to avoid discomfort and fatigue. If the operator experiences symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensation or stiffness, the operator should tell the employer and consult a qualified health professional immediately.
- Carry the tool only by the handle.
- Never hold the drive socket or drive extension. Keep hands away from rotating drives.
- Ensure that the workpiece is securely fixed.
- Do not run the system excessively and/or more than necessary. Never touch the motor or the rotating part during operation or soon after the system is switched off. There may be an injury or burn risk.
- If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used. Use of dust collection can reduce dust-related hazards.
- Keep handles and grasping dry, clean and free from oil and grease. Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.

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- Unprotected exposure to high noise levels can cause permanent disabling, hearing loss and other problems such as tinnitus (ringing, buzzing, whistling or humming in the ears).
- Risk assessment and implementation of appropriate controls for these hazards are essential.
- Use hearing protection in accordance with employer's instructions and as required by occupational health and safety regulations. Look after your hearing protection.



- Exposure to vibration can cause disabling damage to the nerves and blood supply of the hands and arms. If you experience numbness, tingling, pain or whitening of the skin in your fingers or hands, stop using the tool, tell the employer and consult a physician immediately.
- Hold the tool with a light but safe grip taking account of the required hand reaction forces. The risk from vibration is generally greater when the grip force is higher.
- Wear warm clothing when working in cold conditions and keep your hands warm and dry.



Products Use and Care

- Do not force the 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 the tool if the valve lever does not turn it on and off. Any tool that cannot be controlled with the valve lever is dangerous and must be repaired.
- Disconnect the plug from the power source before making any adjustments, changing accessories, or storing power tools. Such preventive safety measures reduce the risk of starting the power tool accidentally.
- Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool. Power tools are dangerous in the hands of untrained users.
- Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
- Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the working conditions and the work to be performed. Use of the power tool for operations different from those intended could result in hazardous situations.
- Hold the tool correctly: be ready to counteract normal or sudden movements have both hands available.
- Keep handles and grasping surfaces dry, clean and free from oil and grease. Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.
- Overwork applications can cause not only smoke or fire from the motor but also anvil breakage, resulting in injuries.
- Unless otherwise required, do not make idle running at free speed.
- Keep cutting tools sharp and clean. Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.

Products Use and Care



- Hold the power tool by insulated gripping surfaces, when performing an operation where the fastener may contact hidden wiring or its own cord. Fasteners contacting a “live” wire may make exposed metal parts of the power “live” and could give the operator an electric shock.

Service



- Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the power tool is maintained.

Residual Risks



- Gloves can become entangled with the rotating drive, causing severed or broken fingers. Rotating drive sockets and drive extensions can easily entangle rubber coated or metal reinforced gloves.
- Additional residual risks may arise when using the tool which may not be included in the safety warnings. These risks can arise from misuse, prolonged use and so on. Even with the application of the relevant safety regulations and the implementation of safety devices, certain residual risks cannot be avoided. (e.g. injuries caused when changing any parts or accessories)

General Precautions

- Note that the drawings and pictures in this handbook may not show all the accessories needed for safety measure to explain the details. Be sure to put the regular accessories back to the system as specified in this handbook before operation.
- Never connect other tools than UDP tool to UECP controller.
- This system is not waterproof. Never expose the system to water or moisture. Otherwise the system will be short-circuited and there may be an electric shock or fire risk.
- Magnetostrictive sensor is built in the UDP-MC tool. Keep magnets away from UDP-MC tools to avoid any magnetic field effect. Otherwise, UDP-MC tool may malfunction.



Disclaimer

- The contents of this instruction handbook are subject to change without prior notice.

1. Overview & Features

1.1 Overview

Taking environmental issue into consideration, UDP-MC series adopt electricity as the drive source. UDP-MC tool has an electric motor driving a hydraulic impulse mechanism for tightening and loosening threaded fasteners. UDP-MC (with auto-relief function and DC brushless electric motor) provides you with ergonomic fastening solution (low noise, low vibration and low torque reaction) and high energy efficiency.

[Features]

- 1) UDP-MC provides you with flexible production line build and layout change as it is driven by the commercial electricity from power plant.
- 2) UDP-MC and UECP controller can be connected by one cable. It cuts down on a burden of operator. Also, the cable can be mounted to top port depending on the construction of production line.
- 3) The plastic housing contributes to its light-weight design and insulation properties.
- 4) Adopted DC brushless motor emits no noise and vibration generated from brushes and reduces running cost.
- 5) URYU genuine technology, Auto-Relief (PAT.) function, is adopted in the pulse mechanism, which realises high accuracy, high-efficiency and high durability.
- 6) UDP-MC stops its operation to minimise impacts from e.g. excessive operation and short circuit, to operator and workpiece.
- 7) The ventilation system equipped for cooling the tool enables you to do the tightening at quicker cycle time.
- 8) The free speed can be increased every 100 rpm. Also, the current value can be adjusted at 4 levels.
- 9) UDP-MC provides you with the 2-step tightening, which will help you minimise the hike in torque in bolt seating.

1.2 Products supplied

◆ Check the followings when you open the package.

- 1) Make sure that you receive the correct model that you ordered.
- 2) Make sure that no breakage is acknowledged with the supplied product.

Contact the URYU distributor that you have ordered if there is anything wrong.

Please refer to the instruction manual of UECP controller regarding the above check points.

1.3 Precautions for Correct Use

Misuse of the product will not enable you to run the system correctly and it may also break the tool itself. Be sure to run the system as per the below points.

- 1) Switch off the device when you do not run for a long time. There may be an injury risk and electric shock due to accidental start.
- 2) Install the UECP controller firmly before wiring. The improper installation may cause an injury in the event of earthquake.

- 3) Make sure that there is no loose connection or no damage to the system. There is a risk of injury as well as the deteriorated performance and/or possible breakage. We highly recommend that you send the system for PM purpose to avoid any unexpected malfunction and accident.

How to choose the correct tool UDP-A * * MC (TL)



No letters: Standard type (TL): Top Load Type

1.4 Installation

Familiarise yourself with the followings to install and fix the device firmly. Please refer to the instruction manual of UECP-controller for installation.

1.4.1 Place to install UDP-MC system

- 1) Install the UDP-MC system inside a building. Never expose it to rain or direct sunshine. It is not waterproof.
- 2) Never expose the system to corrosive and flammable gas, cutting oil, oil mist and metal chips.
- 3) Install the system with good ventilation. Neither of moisture nor dust is good.
- 4) Do not expose the system to vibration.

1.4.2 Workstation Requirements

Check Items	Requirements
Place	Indoor use only
Ambient Temperature	5 ° C- 40 ° C (no dew) *1
Ambient Humidity	Less than 80%RH (no dew)
Storage Temperature	0 ° C - 40 ° C (no dew / no frost) *2
Ambience	No hazardous components such as corrosive and explosive gas, dust and other components which threaten the performance of motor are included.

*1: Due to viscosity of hydraulic fluid, especially where the ambient temperature is low (about below 5 ° C), impulse action may not be generated at the beginning of use. Warm up the tool for approximately ten (10) seconds by fixing the anvil on a vice before use.

*2: This is the temperature range for transport.

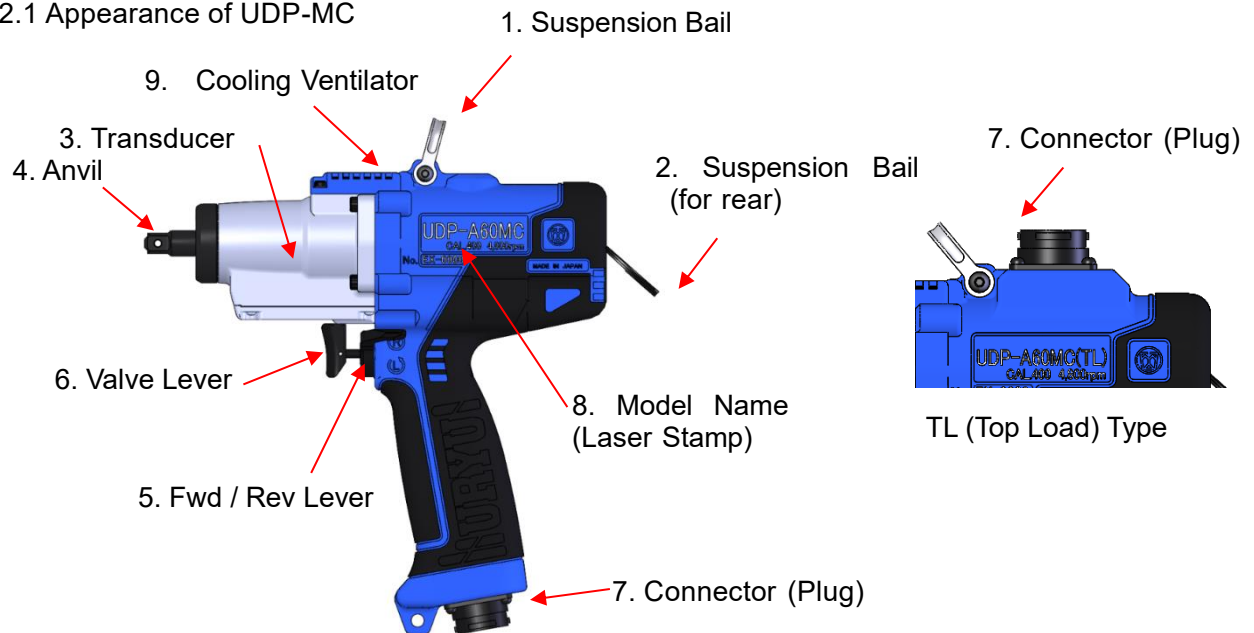
1.5 Power Supply

Refer to the below for power supply requirements.

Check Items	Contents
Power Supply	Single Phase AC100V/115V ※ from UECP-4811E
Power Socket	3 prongs AC inlet with earth terminal
Allowable Voltage Range	+/- 10% of each power supply
Power Frequency	50Hz or 60Hz

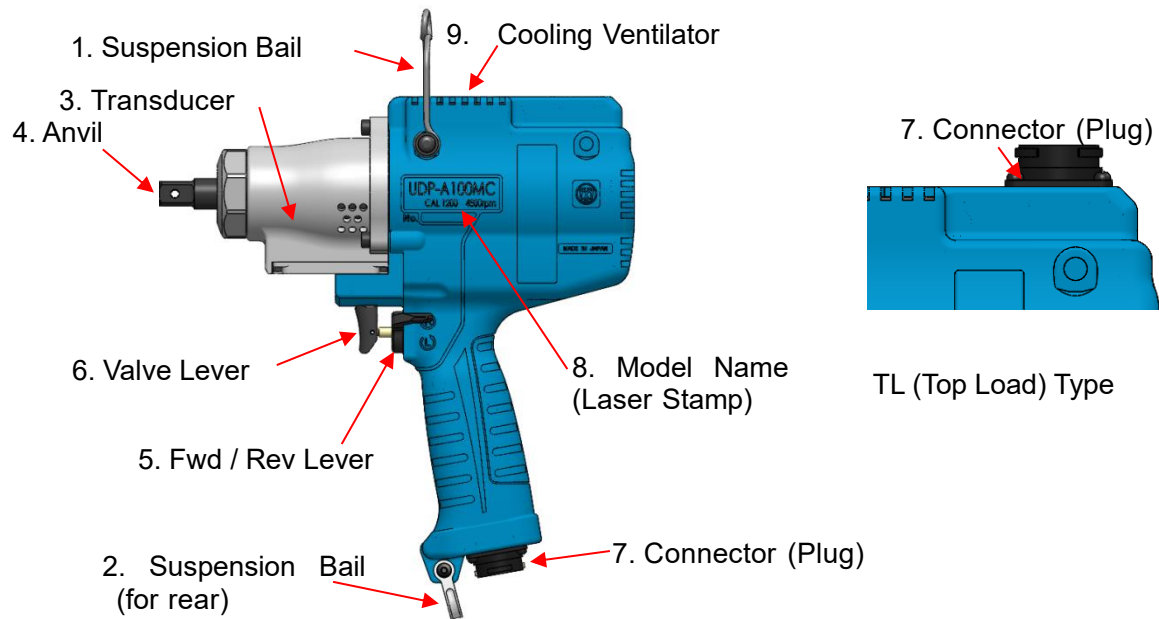
2. Parts' Descriptions and Functions

2.1 Appearance of UDP-MC



UDP-A60LMC , A60MC , A80MC , A600LMC , A700MC

1. Suspension Bail	...	You can suspend the tool with this suspension bail. You can also suspend the tool for vertical fastening by connecting it to the bottom part of tool.
2. Suspension Bail (for rear)	...	You can suspend the tool for vertical fastening with this suspension bail.
3. Transducer	...	Magnetostrictive type transducer for torque detection
4. Anvil	...	Rotating part to fit socket depending upon purpose
5. Fwd / Rev Lever	...	To change the direction of rotation
6. Valve Lever	...	To operate (ON/OFF) the tool
7. Connector (Plug)	...	To connect to controller by joint cable
8. Model Name (Laser Stamp)	...	Indication of model name
9. Cooling Ventilator	...	To minimise rise in temperature of tool



UDP-A100MC, A120MC

- | | | |
|-------------------------------|-----|--|
| 1. Suspension Bail | ... | You can suspend the tool with this suspension bail. You can also change the direction to suspend the tool by connecting it to the rear part of tool. |
| 2. Suspension Bail (for rear) | ... | You can suspend the tool for vertical fastening with this optional suspension bail. |
| 3. Transducer | ... | Magnetostrictive type transducer for torque detection |
| 4. Anvil | ... | Rotating part to fit socket depending upon purpose |
| 5. Fwd / Rev Lever | ... | To change the direction of rotation |
| 6. Valve Lever | ... | To operate (ON/OFF) the tool |
| 7. Connector (Plug) | ... | To connect to controller by joint cable |
| 8. Model Name (Laser Stamp) | ... | Indication of model name |
| 9. Cooling Ventilator | ... | To minimise rise in temperature of tool |

2.2 Technical Specifications

Item / Model Name		UDP-A60LMC	UDP-A60MC	UDP-A80MC
Controller		UECP-4811E		
Nominal Bolt Capacity	mm	5~6	6~8	8~12
Torque Range	N・m	4~20	5~25	25~55
Free Speed *1	rpm	4,800 (Max Speed)		
CAL Value	—	250	400	600
Anvil SQ. Size	mm	9.5Sq	9.5Sq	9.5Sq
Overall Length	mm	214	214	242
Weight	kg	1.53	1.53	1.78
Sound Pressure Level (Lpa) *2	dB(A)	74	74	76
Vibration Value (ahd)	m/sec ²	< 2.5	< 2.5	< 2.5
Vibration Uncertainty (K)	m/sec ²	0.6	0.6	0.63
Torque Reaction	Nm	0.7	0.72	0.91
Trigger Force	N	8.0		
Rated Power Consumption*3	kw	0.49	0.49	0.6

Item / Model Name		UDP-A600LMC	UDP-A700MC	UDP-A100MC	UDP-A120MC
Controller		UECP-4811E			
Nominal Bolt Capacity	mm	5~6	6~12	10~12	12~14
Torque Range	N・m	4~20	10~50	45~100	55~120
Free Speed *1	rpm	4,800 (Max Speed)			
CAL Value	—	250	600	1200	1200
Anvil SQ. Size	mm	9.5Sq	9.5Sq	12.7Sq	12.7Sq
Overall Length	mm	214	242	248	248
Weight	kg	1.53	1.78	2.85	2.85
Sound Pressure Level(Lpa) *2	dB(A)	74	76	76	78
Vibration Value (ahd)	m/sec ²	< 2.5	< 2.5	< 2.5	< 2.5
Vibration Uncertainty (K)	m/sec ²	0.6	0.63	0.62	0.64
Torque Reaction	Nm	0.72	0.91	2.3	2.4
Trigger Force	N	8.0			
Rated Power Consumption*3	kw	0.49	0.6	0.66	0.72
∴ IEC 60745-1 and -2-2 are applied. Protection against electric shock is Class I.					

These declared sound and vibration values given in the above table were obtained by laboratory type testing in accordance with **EN 62841-1 for sound levels** and **ISO 28927-2 for vibration values** and are not adequate for use in risk assessments. Values measured in individual work places may be higher than the declared values. The actual exposure values and risk of harm experienced by an individual user are unique and depend upon the way the user works, the workpiece and the workstation design, as well as upon the exposure time and the physical condition of the user.

We, URYU SEISAKU, LTD., cannot be held liable for the consequences of using the declared values, instead of values reflecting the actual exposure, in an individual risk assessment in a work place situation over which we have no control.

*1: Speed Adjustment Range: 1000r/min.-4800r/min., setting available per 100r/min.

*2: The uncertainty in the sound levels is 3dB(A).

*3: The maximum instantaneous power consumption.

No load: approx. 0.06kW, Standby: approx. 0.02kW

List of Optional Items

Item	Description	Code	Remarks
Cables	5m Joint Cable	910-807-0	Common Parts for UDP-A60LMC,A60MC, A80MC,A600LMC, A700MC,A100MC
	10m Joint Cable	910-808-0	
	15m Joint Cable	910-809-0	
	20m Joint Cable	910-810-0	
	5m Joint Cable	910-567-0	For UDP-A120MC
	10m Joint Cable	910-568-0	
	15m Joint Cable	910-569-0	
	20m Joint Cable	910-625-0	

3. Fastening

3.1 Fastening Control Function

UDP-MC can be controlled by the parameter setting on UECP controller. See the UECP controller instruction manual for details.

3.2 Motor Setting

Motor-mode setting in UECP controller is recommended to be set as [2] for UDP-A60LMC, A60MC and A80MC, and set as [4] for UDP-A600LMC, A700MC, A100MC and A120MC.

Also, the following parameters can be adjusted by the setting of controller.

Initial Speed Setting: Rotation speed setting from valve lever ON to START torque. See the phase 1 on the below timing chart. Its RPM ranges from 1,000 to 4,800, incremented by 100 rpm.

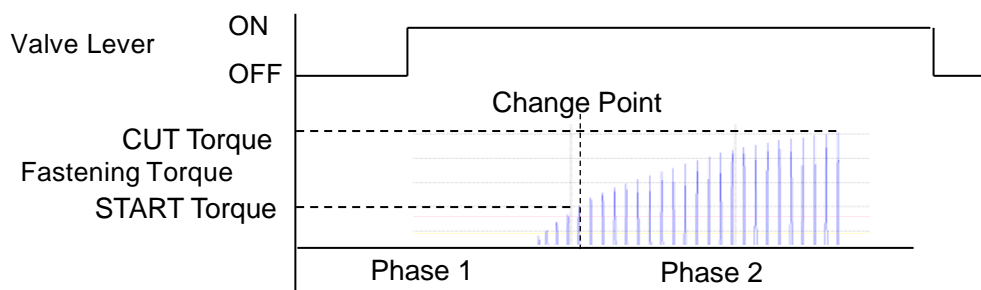
Initial Current Setting: Motor current setting from switch lever ON to START torque. See the phase 1 on the below timing chart. 4-step-adjustment is available.

Speed Setting : Rotation speed setting from START torque to CUT torque. See the phase 2 on the below timing chart. Its RPM ranges from 1,000 to 4,800, incremented by 100 rpm.

Current Setting : Motor current setting from START torque to CUT torque. See the phase 2 on the below timing chart. 4-step-adjustment is available.

Note that too low RPM will lead to the too low motor power. This will cause the tool not to shut off at the cut torque and/or to be serviced more frequently than it should be. You can refer to the Setting Manual in the last page to better understand how to set the speed and current settings.

Timing Chart



Reverse Speed Setting: Reverse rotation speed setting when the Lever is set to Rev. position.

Its RPM ranges from 1,000 to 4,800, incremented by 100 rpm.

Note that the reverse current is not programmable.

Standard functions equipped in UDP-A600LMC, A700MC, A100MC and A120MC

Duty Ratio Setting: Power to run motor setting. Its power ranges from 10% to 100%, incremented by 10%. Note that this is available with UECP-4810E & UECP-4811E only. It is recommended that you should set this setting to 100% normally. This setting should be changed when you find it difficult to achieve CUT torque with the combination of RPM and current settings.

Double-hitting Error Detection available with UECP-4810E & UECP-4811E controller

UECP-4810E & UECP-4811E will help you detect the double-hitting error when its error detection is activated under Motor-mode [4] and if motor rotation angle from triggering to START torque was lower than predetermined setting value. Please refer to the UECP-4810E & UECP-4811E instruction manual for further info.

External Start: UDP-MC tools start running with no triggering by allocating signal inputs of CW or CCW to UECP controller. Please refer to the UECP-4810E & UECP-4811E instruction manual for further info. (It is not possible to activate Double-hitting Error Detection when UDP-MC is controlled by External Start.)

3.3 Operation of Cooling Ventilator

The cooling ventilator operates when the switch lever is triggered. When the motor temperature exceeds 50° C, the cooling ventilator keeps rotating. When the motor temperature went down below 50° C, the ventilator stop rotating after a twenty-minute rotation.

3.4 Heat Protection

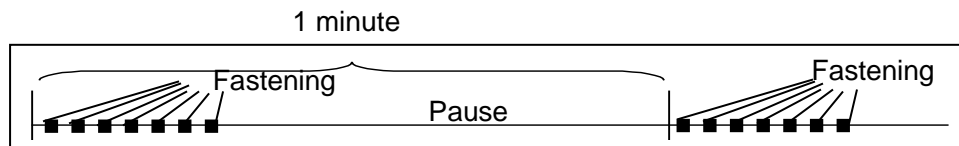
When the motor is overheated, red LED flashes in the cycle of 0.8 sec. on and 0.2 sec. off and the tool stops regardless of the setting on the controller. In this case, the tool will be able to restart if you push the reset button on the controller, but the heat protection will function immediately. Once the red LED flashes, do not use the tool for 30 minutes at least until the motor temperature decreases.

Re-start after the temperature has reached the ambient temperature. Also, there is a possibility that the tool is overloaded when red LED flashes. Then, cross-check your tool model selection for the job or cycle time for the tool model.

Guideline

UDP tools can perform with no heat protection triggered when total pulse numbers per minutes are within the allowable pulse numbers mentioned as below. Please avoid the consecutive tightening in short cycle and/or excessive workload to the tools as such operations lead to the damage to motor.

Model Number	Nominal Bolt Capacity	Torque Range	Allowable pulse numbers(pulse/min.)
UDP-A60LMC	5~6	4~20	103 (0.5 sec fastening time x 6 cycles)
UDP-A60MC	6~8	5~25	84 (0.5 sec fastening time x 7 cycles)
UDP-A80MC	8~12	25~55	84 (0.5 sec fastening time x 7 cycles)
UDP-A600LMC	5~6	4~20	103 (0.5 sec fastening time x 6 cycles)
UDP-A700MC	8~12	10~50	84 (0.5 sec fastening time x 7 cycles)
UDP-A100MC	10~12	45~100	120 (1.0 sec fastening time x 6 cycles)
UDP-A120MC	12~14	55~120	100 (1.0 sec fastening time x 5 cycles)



NOTE: Number of allowable pulse numbers varies depending on working conditions.

3.5 Buzzer

The buzzer sounds one time per fastener for Torque OK. The buzzer keeps sounding when any kind of Error / NG is detected by controller.

The use of buzzer can be selected by the controller. (See the instruction manual for controller.)

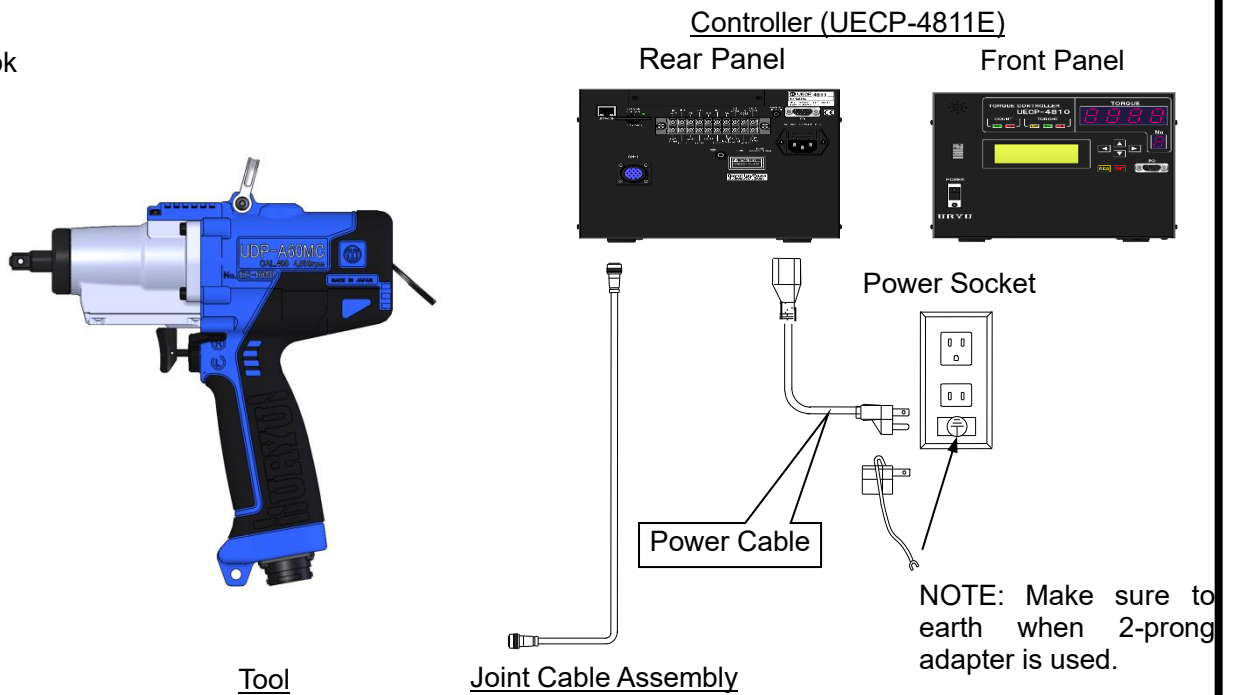
3.6 Display of LED Indicator

You can find the status of tool from the LED indicator on the rear top of tool.

Status of LED Indicator	Status of Tool	Remarks
GREEN	Torque OK	Measured torque value is within the setting value.
AMBER	Torque LOW NOK	Measured torque value is less than low limit setting value.
RED	Torque HIGH NOK	Measured torque value is over upper limit setting value.
AMBER Long Flushing (0.8 sec. on / 0.2 sec. off cycle)	Pulse LOW NOK	Measured pulse number is less than low limit setting value.
AMBER Short Flushing (0.3 sec. on / 0.2 sec. off cycle)	Pulse HIGH NOK	Measured pulse number is over upper limit setting value.
RED Short Flushing (0.3 sec. on / 0.2 sec. off cycle)	Cycle Error, Initial Error, Incomplete Job Error, Cycle Over Error	See the instruction manual of controller for details.
RED and GREEN Flushing in turn	Controller under programming mode Communication Error including ZERO/CAL & Self-Diagnostic Check	See the instruction manual of controller for details. There is a possibility of disconnection or damage in case the operation does not return even if you push the reset button.
	Double-hitting Error	Tool Retighten a bolt.
RED Long Flushing (0.8 sec. on / 0.2 sec. off cycle) RED Long Flushing (0.8 sec. on / 0.2 sec. off cycle)	Motor Overheat	The self-protection of motor causes the motor to stop operating due to the high temperature inside the motor.
	Motor Protection	Too much current has been provided to motor due to the 6 seconds or longer consecutive tightening. Or, the anvil is overloaded (Rock Protection). There is a possibility of breakage of motor in case the motor protection functions again even if you push the reset button.

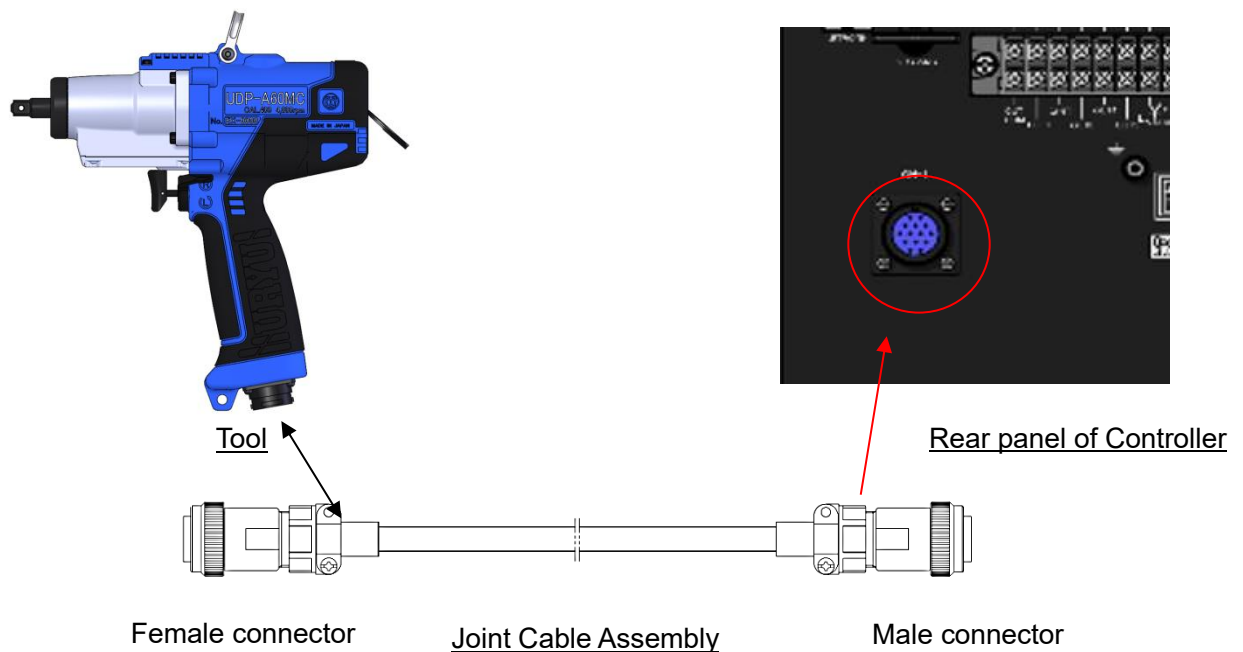
4. Layout

4.1 Outlook



4.2 How to connect

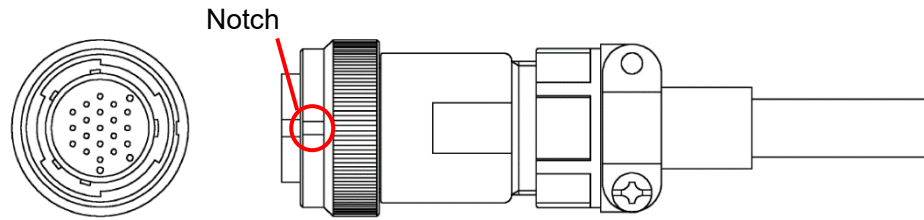
Connect the connector in the bottom part of tool to the female connector of the joint cable assembly. Continue to connect the connector in the rear panel of the controller to the male connector of the joint cable assembly. Note that the threaded screw connectors are used for UDP system. Be sure to tighten the threaded screw connectors firmly for proper connection.



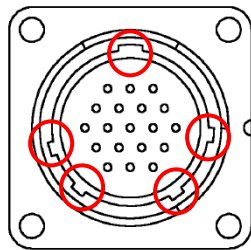
For connection of controller with external input/output terminal, see the instruction manual of controller.

How to make a firm connection of the threaded screw connectors

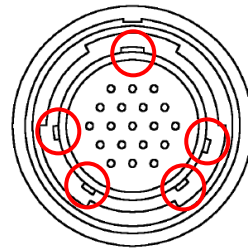
1. Make sure that the connector of the joint cable assembly is unlocked. If the notch on the connector is located as shown in the below picture, the connector is unlocked.



2. Make sure to install the locator male keys in the corresponding female slots, as shown in the below picture. *The configuration of locator slots for UDP-A120MC differs from other UDP tools.

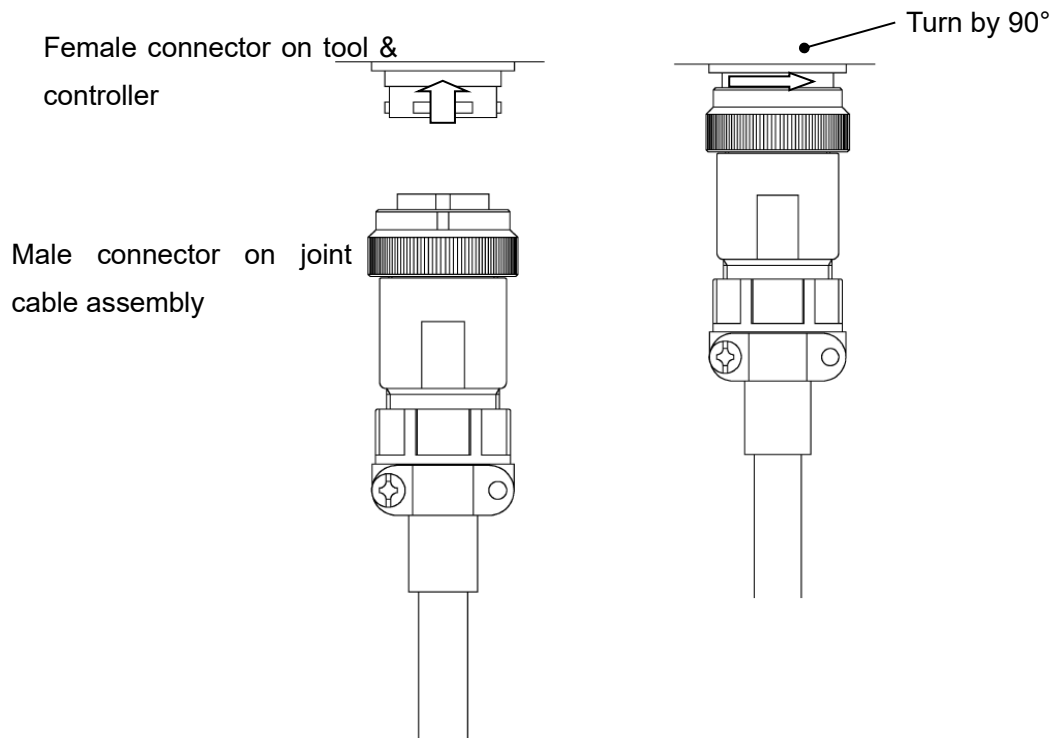


Female slots on tool connector



Locator male keys on joint cable assembly

3. Turn the screw in a right-hand direction by 90 degrees to lock up the connectors.



5. Operation

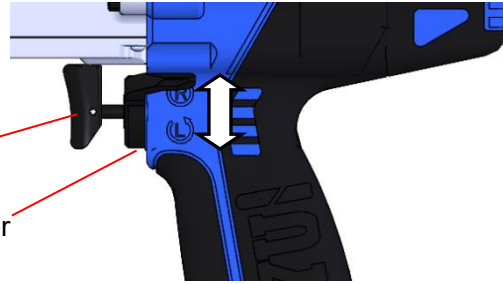
5.1 How to decide CW/CCW rotation

Set the Fwd / Rev lever to R for CW.

Set the Fwd / Rev lever to L for CCW.

Valve Lever

Fwd / Rev Lever



5.2 How to pull a Valve Lever

RPM increases in 3 steps as you pull the valve lever to the end for CW and CCW rotation.

Slow	Middle	High
About 500 rpm	About 1,000 rpm	The tool will run at the preset Initial Speed RPM or Speed RPM. Note that max. speed is 4,800 RPM. For programming of controller, see the instruction manual of controller.

If you release your finger from the valve lever, the brake will work to stop the tool.

5.3 How to operate

Hold the handle and pull valve lever firmly until the tool automatically shuts off.

If you release the trigger, the tool will not shut off at the preset cut torque.

For programming of controller, see the instruction manual of controller.



Caution: Do not cover the cooling ventilator during operation.

Insufficient ventilation may result in heat or smoke.

Keep pulling the valve lever till automatic shut-off.

Cooling Ventilator



Useful information to achieve the better accuracy

1. Working Condition

The various factors including torque coefficient, which is decided by bolt finish and application, grade, and length of fastener will have a great influence over torque, even if you tighten the fasteners with same diameter. The surface finish of application and the alignment of application will also have a great influence over torque. If a nut is not placed well to hold a bolt during operation, the torque will not be properly delivered.

2. Worn-out Socket

Use a guided impact sockets in good condition. Worn or ill-fitting sockets reduce power. Replace worn sockets to prevent vibration, loss in torque output, poor accuracy and damage to the output drive. Poor condition or hand sockets and accessories can shatter and become a projectile.

3. Valve Lever

Pull the valve lever to start operation. If you do not pull the valve lever properly, the tool may not shut off automatically.

4. Usage of Accessories Including Socket Adapter

If the tool fitted to universal joint and/or socket adapter, torque may not be delivered to fasteners properly.



Maintenance Instructions

- Continuous satisfactory operation depends upon proper tool care and regular maintenance.
- Have the tool serviced by a qualified repair person.
- Use URYU genuine parts for replacement. This will ensure that the safety and the optimum performance of the tool are maintained. Refer to the parts list supplied along with the tool and use correct jigs for proper service. Contact your local URYU distributor or URYU Japan.

Overhaul

- It is recommended that after every 100,000 fasteners or 3 months, whichever comes earlier, the fluid, Hyrando Jinen TX46 oil (see the right table) in the pulse unit should be changed and grease the bearing.

Hyrando Jinen TX46 Oil

Part No.	Quantity
998-735-0	20L

Do not substitute any other fluid. Failure to use Hyrando Jinen TX46 oil could damage the tool, increase maintenance and decrease performance.

- It is recommended that after every 200,000 fasteners or 6 months, the pulse unit should be inspected with care. Inspect hard parts for damages or wearing. Replace damaged parts, all sealing materials such as SU-ring, O-rings and supporter rings and consumable materials such as springs in the pulse unit each time you disassemble the pulse unit.
- More frequent overhaul may be needed when the tool is in heavy duty operation.
- Wipe the casing with a soft cloth. Do not use volatile liquid or a wet cloth as it would cause deterioration of its strength and discoloration.
- Ensure that any labels on the tool are kept in legible condition. Replace any damaged label.

Disposal



- Separate collection of used tools and packaging allows materials to be recycled and used again. Re-use of recycled materials helps to prevent environmental pollution and reduces the demand for raw materials.

- The tool is made of steel, aluminium alloy, plastic and rubber. When disposing the tool, make sure not to cause pollution to human being and the environment. Follow your local laws and regulations relating to disposal.



- (In EU) The products are covered by the European Parliament and the Council directive, 2002/96/EC (27 January 2003) on waste electrical and electronic equipment (WEEE). The tools should be disposed of separately from normal household waste so that they can be recycled.

Troubleshooting

Symptom	Possible Reasons	Possible Solutions
UECP will not start.	<ul style="list-style-type: none"> • Power-Cable is not connected. • Controller fuse blown • Controller breakage 	<ul style="list-style-type: none"> • Make sure the power cable is firmly plugged in. • Replace the fuse.(Refer to the controller manual) • Repair or replace UECP.
UECP will not start. The power-switch will return to "OFF" - position.	<ul style="list-style-type: none"> • Tool breakage • Controller breakage 	<ul style="list-style-type: none"> • Repair or replace. (Be sure not to use a tool and replace it. If UECP still does not start even after tool replacement, UECP may be out of order.
Tool will not start. (LED Indicator is not on.)	<ul style="list-style-type: none"> • Joint Cable is wrongly connected. • Cable disconnection inside Cable • Cable disconnection inside a tool • Broken Valve Lever • Controller breakage 	<ul style="list-style-type: none"> • Make sure the Joint cable is firmly connected. • Replace the Joint Cable. • Repair or replace a tool. • Repair or replace UECP.
Tool will not start. (The RED and GREEN LED indicators flash in turn. UDP.E, UdP.4, UdP.5 and UdP.6 is shown in UECP controller.)	<ul style="list-style-type: none"> • Joint Cable is wrongly connected. • Cable disconnection inside Cable • Cable disconnection inside a tool • Motor breakage • Controller breakage 	<ul style="list-style-type: none"> • Make sure the Joint cable is firmly connected. • Enable the setting of "Automatic Return" (when using UECP-4800) • Hit the RESET button on UECP. • Replace the Joint Cable. • Repair or replace a tool. • Repair or replace UECP.
Tool will not start. (The RED LED indicator flashes and UDP.E is shown in UECP controller.)	<ul style="list-style-type: none"> • The self-protection of motor causes the motor to stop operating due to the high temperature inside the motor. • Abnormal lowering of driving voltage due to controller breakage. 	<ul style="list-style-type: none"> • Reduce the workload to UDP system. • Repair or replace UECP.
Tool will not start. (“Udn.E” is shown in UECP controller.)	<ul style="list-style-type: none"> • Torque sensor error due to wrong Connection or cable disconnection in Joint Cable. • Cable disconnection inside a tool • Torque sensor breakage • Controller breakage 	<ul style="list-style-type: none"> • Make sure the Joint cable is firmly connected. • Hit the RESET button on UECP. • Replace the Joint Cable. • Repair or replace a tool. • Repair or replace UECP.
Tool will not start. (message other than above is shown in UECP controller.)	<ul style="list-style-type: none"> • Error from controller 	<ul style="list-style-type: none"> • Refer to the controller manual.
Tool will run in incorrect direction.	<ul style="list-style-type: none"> • Fwd / Rev lever is set to incorrect direction. • Broken Fwd / Rev lever 	<ul style="list-style-type: none"> • Set the Fwd / Rev Lever to the correct direction. • Repair or replace a tool.
Operating noise in free running at “slow”(rpm) or “middle”(rpm) is louder than that of “high”(rpm).	<ul style="list-style-type: none"> • The noise is not abnormal, but is due to cogging-torque as a characteristic of magnetic force in Motor. 	<ul style="list-style-type: none"> • Tool is available for use.
Abnormal noise and unstable speed in free running.	<ul style="list-style-type: none"> • Motor breakage 	<ul style="list-style-type: none"> • Repair or replace a tool.

Symptom	Possible Reasons	Possible Solutions
Tool rotates in low speed (approx.1000rpm) even when fully pulled the Valve Lever.	<ul style="list-style-type: none"> •Socket is too heavy. • Initial speed setting is set to 1,000(rpm). •Motor settings are reset to default value due to instant disconnection of joint cable assembly and/ or connector. 	<ul style="list-style-type: none"> ●Reduce the load on Anvil. ●Check the controller settings. ●Enable the setting of "Automatic Return" (when using UECP-4800) ●Replace the Joint Cable.
It takes longer to reach the CUT torque or tool will not reach the CUT torque.	<ul style="list-style-type: none"> •Worn or broken Socket •Low setting values of current and / or rpm of controller •Influence by the characteristics of work piece, bolt-seating-face, and /or tightening on soft joint. • Maintenance period of the oil-pulse unit has come. • Worn or broken Bearing in a Motor 	<ul style="list-style-type: none"> ●Replace a Socket. ●Check the controller settings. (Refer to the setting manual in page) ●Review the "Proof-Ratio" setting. (Refer to the controller manual) ●Repair or replace a tool.
Cooling-ventilator will not work.	<ul style="list-style-type: none"> •Motor breakage •Broken cooling ventilator and / or wiring disconnection 	<ul style="list-style-type: none"> ●Repair or replace a tool.
Tool becomes hot.	<ul style="list-style-type: none"> • Stop using a tool when heat protect function gets activated. 	<ul style="list-style-type: none"> ●Make sure the cooling ventilator runs correctly when triggering the valve lever. ●Choose one size up larger tool ●Reduce the workload to UDP system and / or reduce the cycle number.
Tool will not stop at the CUT torque.	<ul style="list-style-type: none"> • "Additional-pulse" is set in the controller. 	<ul style="list-style-type: none"> ●Check the controller settings. (Refer to the controller manual.)
Torque display on UECP differs greatly from the break torque.	<ul style="list-style-type: none"> •Incorrect CAL value •Influence by the characteristics of work piece, bolt-seating-face, worn and /or heavy socket, etc. 	<ul style="list-style-type: none"> ●Check the CAL value setting. ●Review Proof ratio so as to match UCC display with break torque. (Refer to the controller manual)
Bad tightening accuracy	<ul style="list-style-type: none"> •Pulse numbers are too low (less than 5 pulse numbers.) •Worn or Socket breakage •Too heavy Socket •Influence by Inertia force at bolt seating 	<ul style="list-style-type: none"> ●Review the motor settings. (Refer to the setting manual in page) ●Replace a Socket. ●Review the Socket size.
Tool will not start. (CAL.E or O.E. is shown in UECP controller.)	<ul style="list-style-type: none"> •Sensor breakage •Cable disconnection • Zero/Cal is checked during tightening. 	<ul style="list-style-type: none"> ●Repair or replace. ●Be sure not to hit RES button during tightening. ●Refer to the controller manual.

Should the above steps fail to remedy a problem with the tool, immediately stop using the product and contact local URYU distributor or URYU Japan.

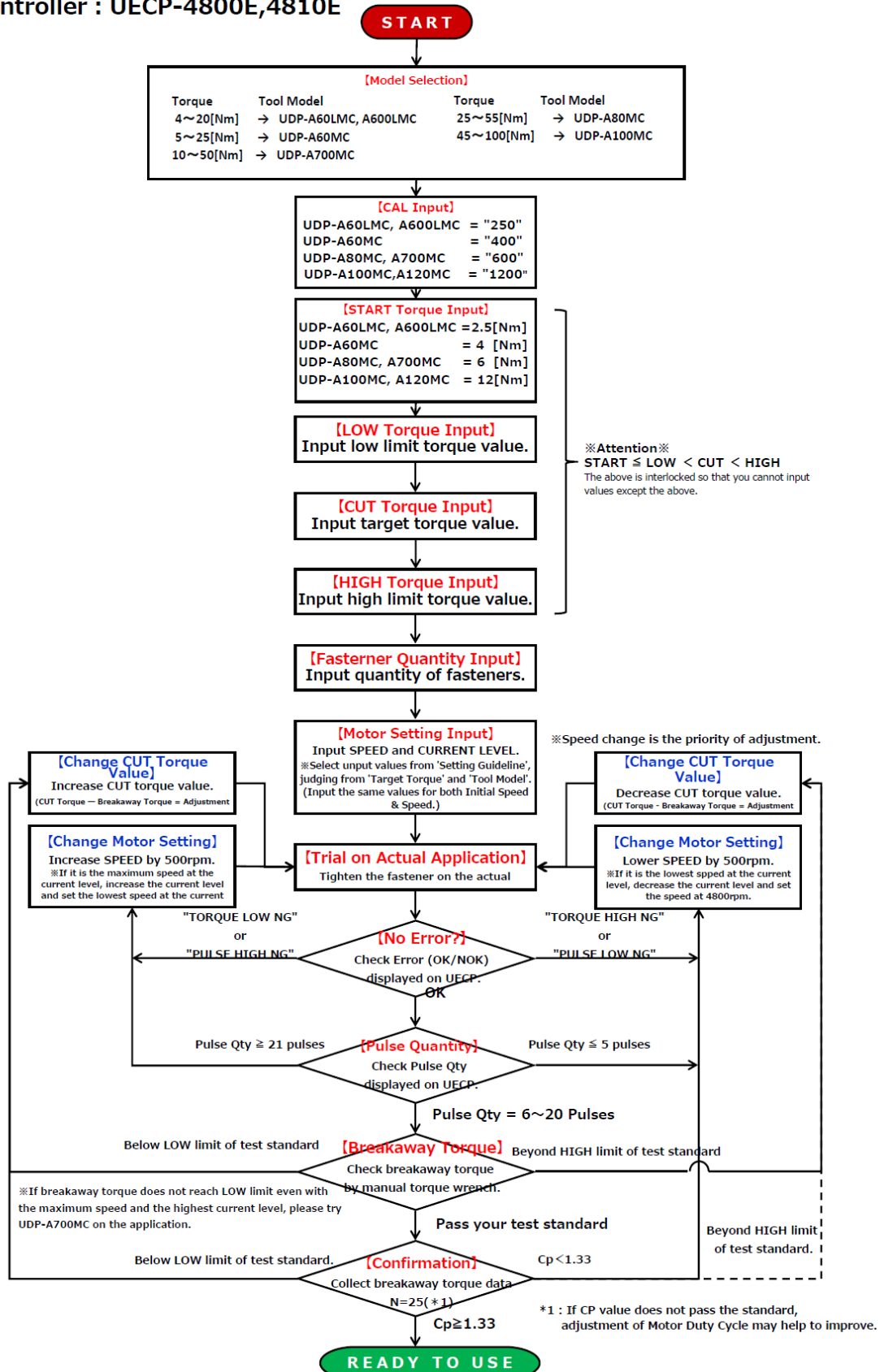
Find URYU distributor in your country at www.uryu.co.jp/english/network.html.

Starter Guide (Installation)

[Models]

Tool : UDP-A60LMC, A60MC, A80MC, A600LMC, A700MC, A100MC, A120MC

Controller : UECP-4800E, 4810E



※Attention※
START ≤ LOW < CUT < HIGH
The above is interlocked so that you cannot input values except the above.

※Speed change is the priority of adjustment.

※If breakaway torque does not reach LOW limit even with the maximum speed and the highest current level, please try UDP-A700MC on the application.

Beyond HIGH limit of test standard.

Setting Guideline (Combination of CURRENT & SPEED)

Numbers in the table= N · m

Bolt Size		UDP-A60LMC															
		Hard Joint (General Fasteners)				Medium Joint (Fasteners coated with FIPG)				Soft Joint (Deformable Fasteners)							
		Current				Current				Current							
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
M5	Speed[r.p.m.]	4800				4800			8~9					4800			9
		4500				4500			7					4500			8
		4000		8~9		4000								4000		5	7
		3500				3500			6					3500			
		3000		7		3000			5					3000		4	6
		2600				2600								2600			
		2500		6		2500			4					2500			
		2100				2100								2100			
		2000		5		2000								2000			
		1700		4		1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			
	Speed[r.p.m.]	4800				4800								4800			
		4500		12~15		4500			14~15					4500		7	12
		4000		11		4000			10					4000			11
		3500		10		3500			13					3500			10
		3000		9		3000			12					3000			9
		2600		8		2600			9					2600			8
		2500				2500			7					2500			
		2100		7		2100								2100			
		2000				2000								2000			
		1700				1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			
M6	Speed[r.p.m.]	4800				4800								4800			
		4500				4500								4500			
		4000				4000			20					4000			20
		3500				3500			19					3500			19
		3000				3000			18					3000			18
		2600				2600			17					2600			17
		2500				2500			15~16					2500			15~16
		2100				2100								2100			
		2000				2000								2000			
		1700				1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			
	Speed[r.p.m.]	4800				4800								4800			
		4500				4500								4500			
		4000				4000								4000			
		3500				3500								3500			
		3000				3000								3000			
		2600				2600								2600			
		2500				2500								2500			
		2100				2100								2100			
		2000				2000								2000			
		1700				1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			
M8	Speed[r.p.m.]	4800				4800								4800			
		4500				4500								4500			
		4000				4000								4000			
		3500				3500								3500			
		3000				3000								3000			
		2600				2600								2600			
		2500				2500								2500			
		2100				2100								2100			
		2000				2000								2000			
		1700				1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			
	Speed[r.p.m.]	4800				4800								4800			
		4500				4500								4500			
		4000				4000								4000			
		3500				3500								3500			
		3000				3000								3000			
		2600				2600								2600			
		2500				2500								2500			
		2100				2100								2100			
		2000				2000								2000			
		1700				1700								1700			Invalid
		1500			Invalid	1500								1500			Invalid
		1300				1300								1300			

URYU

Bolt Size		UDP-A80MC															
		Hard Joint (General Fasteners)								Medium Joint (Fasteners coated with FIPG)							
		Current				Current				Current				Current			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
M8	Speed[r.p.m.]	4800				4800				4800				4800			
		4500	30			4500				4500				4500			
		4000	29			4000				4000				4000			
		3500	28			3500				3500			29~30	3500			29~30
		3000	27			3000				3000			27~28	3000			27~28
		2600				2600				2600			25~26	2600			25~26
		2500	26			2500				2500				2500			
		2100				2100				2100				2100			
		2000	25			2000				2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			
M10	Speed[r.p.m.]	4800	40	51		4800		35		4800				4800		32	
		4500	39	49~50	55	4500		34	49~55	4500				4500		31	49~55
		4000	38	47~48	54	4000		33	44~48	4000				4000		30	45~48
		3500	36~37	45~46	53	3500		32	40~43	3500				3500			41~44
		3000	34~35	43~44	52	3000		30~31	36~39	3000				3000			33~40
		2600				2600				2600				2600			
		2500	31~33	41~42		2500				2500				2500			
		2100				2100				2100				2100			
		2000	30			2000				2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			
M12	Speed[r.p.m.]	4800	51			4800		52		4800				4800		52	
		4500	50			4500		51		4500				4500		51	
		4000				4000		50		4000				4000		50	
		3500				3500				3500			55	3500			55
		3000			55	3000				3000			54	3000			54
		2600			54	2600				2600			53	2600			53
		2500			53	2500				2500				2500			
		2100			52	2100				2100				2100			
		2000				2000				2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			

		UDP-A600LMC															
Bolt Size		Hard Joint (General Fasteners)				Medium Joint (Fasteners coated with FIPG)				Soft Joint (Deformable Fasteners)							
		Current				Current				Current							
		1	2	3	4	1	2	3	4	1	2	3	4				
M5	Speed[r.p.m.]	4800				4800			8~9	4800				4800			9
		4500				4500			7	4500				4500			8
		4000		8~9		4000				4000				4000		5	7
		3500				3500			6	3500				3500			
		3000		7		3000			5	3000				3000		4	6
		2600				2600				2600				2600			
		2500		6		2500			4	2500				2500			
		2100				2100				2100				2100			
		2000		5		2000				2000				2000			
		1700		4	Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			
M6	Speed[r.p.m.]	4800				4800				4800				4800			
		4500		12~15		4500			10	4500				4500			13~15
		4000		10		4000				4000				4000			11
		3500		9		3500		8		3500				3500			10
		3000		8		3000			9	3000			11	3000			9
		2600				2600				2600				2600			8
		2500		7		2500		7		2500				2500			
		2100				2100				2100				2100			
		2000				2000				2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			
M8	Speed[r.p.m.]	4800			17	4800				4800				4800			
		4500			16	4500				4500			20	4500			20
		4000			15	4000				4000			19	4000			19
		3500				3500				3500			18	3500			18
		3000				3000				3000			17	3000			17
		2600				2600				2600			15~16	2600			15~16
		2500				2500				2500				2500			
		2100				2100				2100				2100			
		2000				2000				2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid
		1500				1500				1500				1500			
		1300				1300				1300				1300			

		UDP-A700MC																
Bolt Size		Hard Joint (General Fasteners)				Medium Joint (Fasteners coated with FIPG)				Soft Joint (Deformable Fasteners)								
		Current				Current				Current								
		1	2	3	4	1	2	3	4	1	2	3	4					
M6	Speed[r.p.m.]	4800				4800			12	4800				4800			13~15	
		4500				4500			11	4500				4500			12	
		4000	DUTY70 % 15			4000			10	4000				4000				
		3500	DUTY70 % 14			3500			15	3500				3500				
		3000	DUTY70 % 13			3000			14	3000				3000				
		2600				2600				2600				2600				
		2500	DUTY70 % 11~12			2500			13	2500				2500				
		2100				2100				2100				2100				
		2000	DUTY50 % 10			2000				2000				2000				
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid	
		1500				1500				1500				1500				
		1300				1300				1300				1300				
M8	Speed[r.p.m.]	4800				4800			21	4800				4800			35~40	
		4500	24	30	38	4500			20	4500				4500			31~34	
		4000	23	29	37	4000			19	4000				4000			29~30	
		3500	22	28	36	3500			18	3500				3500			27~28	
		3000	DUTY90 % 19~21	27	35	40	3000			17	3000				3000			15~26
		2600				2600				2600				2600				
		2500	DUTY70 % 16~18	26	32~34		2500			16	2500				2500			
		2100				2100				2100				2100				
		2000	DUTY50 % 15	25			2000			15	2000				2000			
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid	
		1500				1500				1500				1500				
		1300				1300				1300				1300				
M10	Speed[r.p.m.]	4800				4800			35	4800				4800				
		4500		39	49~50	4500			34	4500				4500			49~50	
		4000		38	47~48	4000			33	4000				4000			45~48	
		3500		36~37	45~46	3500			32	3500				3500			41~44	
		3000		34~35	43~44	3000			30~31	3000				3000			33~40	
		2600		33		2600				2600				2600				
		2500		31~32	41~42	2500				2500				2500				
		2100				2100				2100				2100				
		2000		30		2000				2000				2000				
		1700			Invalid	1700			Invalid	1700			Invalid	1700			Invalid	
		1500				1500				1500				1500				
		1300				1300				1300				1300				

URYU

Bolt Size		UDP-A100MC															
		Hard Joint (General Fasteners)				Medium Joint (Fasteners coated with FIPG)				Soft Joint (Deformable Fasteners)							
		Current				Current				Current							
		1	2	3	4	1	2	3	4	1	2	3	4				
M12	Speed[r.p.m.]	4800			91~100	4800			51~52	71~100	4800				57~100		
		4500		57~60		4500			49~50	61~70	4500				54~56		
		4000		53~56	71~80	81~90	4000			48	58~60	4000				51~53	
		3500		50~52			3500			47	55~57	3500				48~50	
		3000		47~49	61~70		3000			46	53~54	3000				45~47	
		2600					2600					2600					
		2500		45~46			2500			45		2500					
		2100					2100					2100					
		2000					2000					2000					
		1700				Invalid	1700				Invalid	1700				Invalid	
		1500					1500					1500					
		1300					1300					1300					
	Speed[r.p.m.]	4800					4800				91~100	4800				91~100	
		4500		81~83			4500				77~79	88~90	4500			86~90	
		4000		78~80	88~90	91~100	4000				75~76	85~87	4000			81~85	
		3500		76~77	85~87		3500				73~74	82~84	3500			75~80	
		3000		70~75	83~84		3000				70~72	80~81	3000			70~74	
		2600					2600						2600				
		2500					2500						2500				
		2100					2100						2100				
		2000					2000						2000				
		1700				Invalid	1700				Invalid	1700				Invalid	
		1500					1500					1500					
		1300					1300					1300					
	M16	Speed[r.p.m.]	4800					4800				97~100	4800				96~100
			4500					4500				93~96	4500				90~95
			4000					4000				90~92	4000				
			3500				97~100	3500					3500				
			3000				93~96	3000					3000				
			2600					2600					2600				
			2500				90~92	2500					2500				
			2100					2100					2100				
			2000					2000					2000				
			1700				Invalid	1700				Invalid	1700				Invalid
			1500					1500					1500				
			1300					1300					1300				

Bolt Size		UDP-A120MC															
		Hard Joint (General Fasteners)				Medium Joint (Fasteners coated with FIPG)				Soft Joint (Deformable Fasteners)							
		Current				Current				Current							
		1	2	3	4	1	2	3	4	1	2	3	4				
M12	Speed[r.p.m.]	4800			101~120	4800				91~120	4800				66~120		
		4500			81~90	4500				66~70	81~90	4500			61~65		
		4000				91~100	4000				62~65	78~80	4000			55~60	
		3500					3500				58~61	75~77	3500				
		3000		67~70	71~80		3000				55~57	71~74	3000				
		2600					2600						2600				
		2500		60~66			2500						2500				
		2100					2100						2100				
		2000		55~59			2000						2000				
		1700				Invalid	1700				Invalid	1700				Invalid	
		1500					1500					1500					
		1300					1300					1300					
	Speed[r.p.m.]	4800					4800				111~120	4800				86~120	
		4500					4500					4500				82~85	
		4000		82~100	105~110	111~120	4000				86~110	4000				78~81	
		3500					3500				78~81	3500				74~77	
		3000		78~81	101~104		3000				73~77	82~85	3000			70~73	
		2600					2600						2600				
		2500		73~77			2500				70~72	2500					
		2100					2100					2100					
		2000		70~72			2000					2000					
		1700				Invalid	1700				Invalid	1700				Invalid	
		1500					1500					1500					
		1300					1300					1300					
	M14	Speed[r.p.m.]	4800					4800				116~120	4800				100~120
			4500					4500				111~115	4500				
			4000				116~120	4000				106~110	4000				
			3500				111~115	3500				100~105	3500				
			3000				106~110	3000					3000				
			2600					2600					2600				
			2500				100~105	2500					2500				
			2100					2100					2100				
			2000					2000					2000				
			1700				Invalid	1700				Invalid	1700				Invalid
			1500					1500					1500				
			1300					1300					1300				
M16	Speed[r.p.m.]	4800					4800				116~120	4800				100~120	
		4500					4500				111~115	4500					
		4000				116~120	4000				106~110	4000					
		3500				111~115	3500				100~105	3500					
		3000				106~110	3000					3000					
		2600					2600					2600					
		2500				100~105	2500					2500					
		2100					2100					2100					
		2000					2000					2000					
		1700				Invalid	1700				Invalid	1700				Invalid	
		1500					1500					1500					
		1300					1300					1300					

• Basis for Recommended Setting Value for CUT Torque Value

Setting value for CUT torque is decided by the following four (4) points.

