

Tension Controller



Transition from LE-40MT Series, LE-30CTN(A) to
LE7-40GU-L Handbook

SAFETY PRECAUTIONS

(Read these precautions before use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety in order to handle the product correctly.

This manual classifies the safety precautions into two categories: [⚠️ WARNING] and [⚠️ CAUTION].

| | |
|--|---|
|  WARNING | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
|  CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage. |

Depending on the circumstances, procedures indicated by [⚠️ CAUTION] may also cause severe injury.

It is important to follow all precautions for personal safety.

Store this manual in a safe place so that it can be read whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

WARNING

- Make sure to set up the following safety circuits outside the tension controller to ensure safe system operation even during external power supply problems or tension controller failure. Otherwise, malfunctions may cause serious accidents.
 - Note that when an error occurs in a relay or transistor of an output circuit, the output might stay on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
 - Most importantly, set up the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower torque limits and upper and lower tension limits).
 - In an output circuit, when a load current exceeding the current rating or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
 - For the operating status of each station after a communication failure of the network, refer to relevant manuals for the network. Incorrect output or malfunction may result in an accident.
-

[DESIGN PRECAUTIONS]

CAUTION

- If a power failure or an abnormal voltage drop occurs, the tension controller stops, and output is turned off.
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[INSTALLATION PRECAUTIONS]

WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
 - Use the product within the generic environment specifications described in LE7-40GU-L APPLICATION MANUAL (SH-170022ENG). Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl₂, H₂S, SO₂ or NO₂), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind. If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
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[INSTALLATION PRECAUTIONS]

CAUTION

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
 - Always wear an anti-static wristband and discharge static electricity from the body before handling the extension option. Failure to do so may cause the extension option to fail or malfunction.
 - When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits of the tension controller. Failure to do so may cause fire, equipment failures or malfunctions.
 - For the product supplied together with a dust proof sheet, the sheet should be affixed to the ventilation slits before installation and wiring work to prevent foreign objects such as cutting and wiring debris. However, when the installation work is completed, make sure to remove the sheet to provide adequate ventilation.
 - Install the product on a flat surface. If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
 - Install the product securely using mounting screws or fixtures.
 - Connect the extension options securely to their designated connectors. Loose connections may cause malfunctions.
 - Make sure to affix the extension option with tapping screws. Tightening torque should follow the specifications in the manual. If the screws are tightened outside of the specified torque range, poor connections may cause malfunctions.
 - Work carefully when using a screwdriver such as installation of the product. Failure to do so may cause damage to the product or accidents.
 - Connect the input/output cables and power cable securely to their designated connectors. Loose connections may cause malfunctions.
 - Turn off the power to the tension controller before attaching or detaching the optional devices. Failure to do so may cause equipment failures or malfunctions.
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[POWER SUPPLY WIRING PRECAUTIONS]

CAUTION

- Use an online UPS (uninterruptible power supply) with a power distortion factor of 5% or less or a line interactive UPS. If a standby UPS is used, use a Mitsubishi low-capacity UPS "FREQUPS FW-F series" (hereinafter FW-F series). (Example: FWF10-0.3K/0.5K)
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[WIRING PRECAUTIONS]

WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
 - Make sure to properly wire to the terminal block (Spring clamp type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Twist the ends of stranded wires and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.
-

[WIRING PRECAUTIONS]

CAUTION

- Perform class D grounding (grounding resistance: 100 Ω or less) of the grounding terminal on the tension controller with a wire 0.2 to 1.5 mm². Do not use common grounding with heavy electrical systems.
 - Connect the power supply wiring to the dedicated terminals described in this manual. If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the tension controller will burn out.
 - Do not wire vacant terminals externally. Doing so may damage the product.
 - Install module so that excessive force will not be applied to terminal blocks, power wire, or communication cables. Failure to do so may result in wire damage/breakage or tension controller failure.
 - Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to malfunction of the tension controller due to the effects of noise.
 - Do not bundle the power line and communication cables together with or lay them close to the main circuit, high-voltage line, load line or power line. As a guideline, lay the power line, control line and communication cables at least 100 mm away from the main circuit, high-voltage line, load line or power line.
 - Ground the shield of the shielded wire or shielded cable at one point on the tension controller. However, do not use common grounding with heavy electrical systems.
 - Ground the shield of the analog input/output cable at one point on the signal receiving side. However, do not use common grounding with heavy electrical systems.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

WARNING

- Do not touch any terminal while the tension controller's power is on. Doing so may cause electric shock or malfunctions.
 - Before cleaning, cut off all phases of the power supply externally. Failure to do so in the power ON status may cause electric shock.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

CAUTION

- Do not disassemble or modify the product. Doing so may cause fire, equipment failures, or malfunctions.
*For repair, contact your local Mitsubishi Electric representative.
 - Turn off the power to the tension controller before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions.
 - Turn off the power to the tension controller before attaching or detaching the optional devices. Failure to do so may cause equipment failures, or malfunctions.
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[DISPOSAL PRECAUTIONS]

CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.
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[TRANSPORTATION PRECAUTIONS]

CAUTION

- The tension controller is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications described in LE7-40GU-L APPLICATION MANUAL (SH-170022ENG) by using dedicated packaging boxes and shock-absorbing palettes. Failure to do so may cause failures in the tension controller. After transportation, verify operation of the tension controller and check for damage of the mounting part, etc.
 - When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.
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INTRODUCTION

Thank you very much for purchasing the tension controller.

Before using, read this document, and thoroughly understand the functions and performance of the tension controller to use it correctly.

Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed, without a notice, for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please contact the nearest Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.

CONTENTS

| | |
|--|-----------|
| SAFETY PRECAUTIONS | 1 |
| INTRODUCTION | 5 |
| RELEVANT MANUALS | 8 |
| TERMS | 8 |
| CHAPTER 1 OUTLINE | 9 |
| 1.1 Request to Customers | 9 |
| 1.2 Recommended Alternative Models | 9 |
| CHAPTER 2 TRANSITION FROM LE-40MTA, B(-E) TO LE7-40GU-L | 10 |
| 2.1 Differences | 10 |
| 2.2 Comparison of I/O Terminal Blocks | 11 |
| 2.3 Comparison Between Optional Terminal Blocks | 14 |
| CHAPTER 3 TRANSITION FROM LE-30CTN(A) TO LE7-40GU-L | 16 |
| 3.1 Differences | 16 |
| 3.2 Comparison of I/O Terminal Blocks | 17 |
| CHAPTER 4 DIFFERENCES IN SEQUENCE OPERATION | 20 |
| 4.1 Stall Memory | 20 |
| Differences in operation | 20 |
| 4.2 Output Gain Function | 22 |
| CHAPTER 5 DIFFERENCES IN FLOW AT MACHINE STARTUP ADJUSTMENT | 23 |
| 5.1 Differences in Operation Flow | 23 |
| 5.2 Difference in Operation Mode | 23 |
| 5.3 Protection Functions | 24 |
| REVISIONS | 25 |
| TRADEMARKS | 26 |

RELEVANT MANUALS

| Manual name <Manual number> | Description |
|---|---|
| LE7-40GU-L APPLICATION MANUAL <SH-170022ENG> | How to handle, install and set the tension controller LE7-40GU-L |
| LE-40MTA-E INSTRUCTION MANUAL <JZ990D30601> | How to handle, install and set the tension controller LE-40MTA-E |
| LE-40MTB-E INSTRUCTION MANUAL <JZ990D30801> | How to handle, install and set the tension controller LE-40MTB-E |
| LE-30CTN APPLICATION MANUAL <JZ990D33401> | How to handle, install and set the tension controller LE-30CTN |
| LE-30CTA APPLICATION MANUAL <JZ990D33001> | How to handle, install and set the tension controller LE-30CTA |
| LE7-DCA APPLICATION MANUAL <SH-081825ENG> | How to handle, install and set the reel diameter calculation option LE7-DCA |
| LE7-CCL APPLICATION MANUAL <SH-081828ENG> | How to handle, install and set the network option LE7-CCL |
| LE-40MD INSTRUCTION MANUAL <JZ990D41301> | How to handle, install and set the diameter calculation unit LE-40MD |
| LE7-ATT INSTRUCTION MANUAL <IB-0800588> | How to handle and install the attachment LE7-ATT |

TERMS

Unless otherwise specified, this manual uses the following terms.

| Terms | Description |
|----------------------------------|---|
| Option | Generic term for extension options, memory cassette |
| Extension options | Generic term for reel diameter calculation option, network option |
| Reel diameter calculation option | Generic term for the reel diameter calculation option LE7-DCA |
| Network option | Generic term for the network option LE7-CCL |
| LE7-40GU-L | Abbreviation for the tension controller LE7-40GU-L |
| LE7-DCA | Abbreviation for the reel diameter calculation option LE7-DCA |
| LE7-CCL | Abbreviation for the network option LE7-CCL |
| LE7-ATT | Abbreviation for the attachment LE7-ATT |
| LE-40MTA(-E) | Abbreviation for the tension controller LE-40MTA(-E) |
| LE-40MTB(-E) | Abbreviation for the tension controller LE-40MTB(-E) |
| LE-40MD | Abbreviation for the diameter calculation unit LE-40MD |
| LE-30CTN(A) | Abbreviation for the tension controller LE-30CTN(A) |

1 OUTLINE

1.1 Request to Customers

Selection other than the recommended models may be possible depending on the usage situation of your system. Please select a model after checking the specifications and scope of your existing system.

1.2 Recommended Alternative Models

The recommended alternative models are listed below.

| Model currently used | Recommended alternative model | Panel cut compatibility | Attachment used |
|---------------------------------|-------------------------------|-------------------------|-----------------|
| LE-40MTA, B(-E) | LE7-40GU-L | None | LE7-ATT |
| LE-40MTB(-E)+LE-40MD | LE7-40GU-L+LE7-DCA | | |
| LE-40MTB(-E)+FX2N-32CCL | LE7-40GU-L+LE7-CCL | | |
| LE-40MTB(-E)+LE-40MD+FX2N-32CCL | LE7-40GU-L+LE7-DCA+LE7-CCL | | |
| LE-30CTN(A) | LE7-40GU-L | | |

Refer to the following.

 LE7-40GU-L APPLICATION MANUAL

 LE7-DCA APPLICATION MANUAL

 LE7-CCL APPLICATION MANUAL

 LE7-ATT INSTRUCTION MANUAL

2 TRANSITION FROM LE-40MTA, B(-E) TO LE7-40GU-L

2.1 Differences

The differences between LE-40MTA, B(-E) and LE7-40GU-L are listed below.

| Item name | LE-40MTA(-E) | LE-40MTB(-E) | LE7-40GU-L |
|--|--|---|---|
| Outer dimensions | 156(H)×246(W)×156.5(D) mm | 156(H)×246(W)×156.5(D) mm | 105(H)×170(W)×125(D) mm |
| Setting method | Key | Key+Dial | Dial+Touch panel |
| LCD | 20×2-line characters | 20×2-line characters | 320×128 dots |
| Output for powder | 4.0 A max. | 4.0 A max. | 2.7 A max. |
| Terminal block | Screw type (fixed) | Screw type (fixed) | Spring clamp type (removable type: signal terminal) |
| Resolution of manual setting | Depends on the manual control | 1% output unit | 0.1% output unit |
| Optional function | None | <ul style="list-style-type: none"> Reel diameter calculation module (LE-40MD) CC-Link block (FX2N-32CCL) | <ul style="list-style-type: none"> Reel diameter calculation option (LE7-DCA) Network option (LE7-CCL) |
| Control method | Feedback control | Feedback control | <ul style="list-style-type: none"> Feedback control Open-loop control Feed Forward/Feedback Combined Control |
| Corresponding tension detector | <ul style="list-style-type: none"> LX-TD tension detector LX7-F tension detector | <ul style="list-style-type: none"> LX-TD tension detector LX7-F tension detector | <ul style="list-style-type: none"> LX-TD tension detector LX7-F tension detector Strain gauge sensor (2 mV/V) |
| Tension detector polarity automatic judgment function | None | None | Yes |
| Tension detector real voltage monitor | None | None | Yes |
| Two-reel switching function (when option is installed) | None | <ul style="list-style-type: none"> Predrive control Two-reel switching support output (separate power amplifier required) | <ul style="list-style-type: none"> Predrive control Two-reel switching support output |
| Communication function | None | <ul style="list-style-type: none"> RS-485 communication - Parallel link (FX2N series) CC-Link (option) | <ul style="list-style-type: none"> Ethernet communication - CC-Link IE Field Network Basic - SLMP - MODBUS/TCP (Slave) RS-485 communication - N:N Network - MODBUS/RTU and ASCII (Slave) CC-Link (option) |
| Contact input sink/source switching | Sink input | Sink input | Sink/source input |
| Zero tension detection output | Relay output | Relay output | Open collector output |

2.2 Comparison of I/O Terminal Blocks

Perform wiring by referring to the comparison between the I/O terminal blocks of LE-40MTA, B(-E) and LE7-40GU-L.
For the wiring method, refer to the following.

LE7-40GU-L APPLICATION MANUAL

| Item name | | LE-40MTA, B(-E) | | LE7-40GU-L | |
|--------------|---------|--|---|---|---|
| Function | | Terminal | Specifications | Terminal | Specifications |
| Power supply | Input | PSL | 100 to 240 V AC (-15% to +10%) 50/60 Hz | L | 100 to 240 V AC (-15% to +10%) 50/60 Hz |
| | | PSN | Power consumption 400 VA, built-in power fuse 250 V, 8 A | N | Maximum apparent power 200 VA, built-in power fuse 250 V, 8 A×2 |
| | | \perp | Rush current 30 A 300 ms, momentary power failure permissible time 10 ms | \perp | Rush current 45 A 1 ms, momentary power failure permissible time 10 ms |
| | Output | RED | Tension detector power | RED | Tension detector power |
| | | BLK | 5 V DC, 40 mA or less Up to two LX tension detectors can be connected. | BLK | <ul style="list-style-type: none"> The rated voltage: 5 V DC Voltage range: 4.75 to 5.25 V DC Current value: 40 mA or less Up to two LX tension detectors can be connected. |
| | | +5V | Service power supply for external control | 5V | Potentiometer power |
| | | AIC | Output voltage: 5 ±0.2 V DC 5 V DC 50 mA or less | AIC | <ul style="list-style-type: none"> The rated voltage: 5 V DC Voltage range: 4.75 to 5.25 V DC Current value: 20 mA or less Available volume: 0.5 to 2.0 kΩ |
| | | — | — | 24V | Contact input power |
| | | — | — | 0V | <ul style="list-style-type: none"> The rated voltage: 24 V DC Voltage range: 20.4 to 28.8 V DC Current value: 55 mA or less |
| | Control | Output | P | Tension control output for 24 V DC series powder clutch/brake | PP |
| N | | | 0 to 24 V DC 4 A or less | PN | <ul style="list-style-type: none"> 0 to 24 V DC 2.7 A or less PWM output |
| S1 | | Auxiliary power supply | S1 | Two-reel's switching new reel output for 24 V DC powder clutch/brake | |
| S2 | | 12 V DC 2 A 10 seconds rated | S2 | <ul style="list-style-type: none"> 0 to 24 V DC The total current value with PP-PN output is 2.7 A or less. PWM output | |
| SA | | Control output signal | SA | Tension control output for motor | |
| SN | | 0 to 5 V DC when "powder" is selected 0 to ±5 V DC when "servomotor" is selected Load resistance: 1 kΩ or more | SN | <ul style="list-style-type: none"> Output range switchable (1) -5 to +5 V DC resolution: Approx. 358 μV (2) -8 to +8 V DC resolution: Approx. 358 μV (3) -10 to +10 V DC resolution: Approx. 358 μV (4) -2.7 to +2.7 V DC resolution: Approx. 358 μV (5) 0 to 5 V DC resolution: Approx. 358 μV (6) 0 to 8 V DC resolution: Approx. 358 μV (7) 0 to 10 V DC resolution: Approx. 358 μV (8) 0 to 2.7 V DC resolution: Approx. 358 μV Load resistance: 1 kΩ or more | |
| NRO | | New-reel preset output (enabled only when multi-reel mode is selected) | NRO | Two-reel's switching new reel output for motor | |
| AOC | | 0 to 5 V DC Load resistance: 1 kΩ or more | SN | <ul style="list-style-type: none"> Output range switchable (1) -5 to +5 V DC resolution: Approx. 358 μV (2) -8 to +8 V DC resolution: Approx. 358 μV (3) -10 to +10 V DC resolution: Approx. 358 μV (4) -2.7 to +2.7 V DC resolution: Approx. 358 μV (5) 0 to 5 V DC resolution: Approx. 358 μV (6) 0 to 8 V DC resolution: Approx. 358 μV (7) 0 to 10 V DC resolution: Approx. 358 μV (8) 0 to 2.7 V DC resolution: Approx. 358 μV Load resistance: 1 kΩ or more | |
| EAP | | Tension control signal output for electro-pneumatic regulator | EAP | Tension control output for electro-pneumatic regulator | |
| EAN | | 4 to 20 mA DC or less Load resistance: 470 Ω or less | EAN | <ul style="list-style-type: none"> 0 to 20 mA DC resolution: Approx. 1.43 μA Load resistance: 500 Ω or less | |

| Item name | | LE-40MTA, B(-E) | | LE7-40GU-L | | | |
|------------------|---|-----------------------|--|--|---|---------------------|---|
| Function | Terminal | Specifications | | Terminal | Specifications | | |
| Tension detector | Input | GRL | Left | Tension detector input Connect the lead wires GR=green (blue) and WH=white. Use the parameter to specify the number of detectors to be used: one or two. The connection varies depending on the compression/tensile load. When one detector is used, it is necessary to make a short circuit between GRL and WHL. | GRL | Left | Tension detector input • Input range switchable (1) -150 to +150 mV DC (LX tension detector) resolution: Approx. 7.90 μ V (2) -15 to -15 mV DC (strain gauge) resolution: Approx. 0.790 μ V When only the detector on one side is used, it is necessary to make a short circuit between GR and WH on the other side. The compression/tensile load is determined automatically. |
| | | WHL | | | WHL | | |
| | | GRR | Right | | GRR | Right | |
| | | WHR | | | WHR | | |
| | SG | For shield connection | | SLD | For shield connection | | |
| Analog | Input | AI1 | External tension setting: 0 to full scale tension at 0 to 5 V DC Internal resistance: 100 k Ω Recommended potentiometer (control): 5 V 10 k Ω | AI1 | Selection from tension setting, stall, taper ratio, new-reel preset, manual, tension input, and reel • Input range switchable (1) 0 to 5 V DC resolution: Approx. 193 μ V (2) 0 to 10 V DC resolution: Approx. 193 μ V • Input resistance 38 k Ω | | |
| | | AI2 | | AI2 | | | |
| | | AI3 | | AI3 | | | |
| | | AIC | | AIC | | Analog input common | |
| | Output | TMO | Output for tension monitor Filter adjustable by parameter 0 to 5 V DC Load resistance: 1 k Ω or more | AO1 | Selection from tension monitor, reel diameter monitor, tension setting monitor, A-reel shaft rotation speed output, and B-reel shaft rotation speed output selection • Output range switchable (1) 0 to 5 V DC resolution: Approx. 358 μ V (2) 0 to 10 V DC resolution: Approx. 358 μ V • Load resistance: 1 k Ω or more | | |
| | | | | AO2 | | | |
| | | AOC | Analog output common | AOC | Analog output common | | |
| | | MC1 | Operation/stop: ON=automatic operation, OFF=stop | DI1 | Selection from operation/stop, control output OFF/ON, stall memory, inching ON/OFF, constant tension ON/OFF, gain 1 ON/OFF, gain 2 ON/OFF, auto/manual, reel change ON/OFF, cut torque ON/OFF, and alarm reset ON/OFF • Input signal voltage 24 to 28.8 V DC • ON current about 5 mA • Sink/source input | | |
| MC2 | Reel change signal: OFF=A reel, ON=B reel | DI2 | | | | | |
| MC3 | Gain 1 operation: Gain 1 enabled during ON | DI3 | | | | | |
| MC4 | Stall memory reset: About 0.5 second one-shot input | DI4 | | | | | |
| MC5 | Assigned by parameter settings and used. • Gain 2: Gain 2 enabled during ON • Inching: Output lower limit restriction, stall memory update stop • OUT remote: Control output ON during ON • Cut torque: During ON, output lower limit restriction, cutter | DI5 | | | | | |
| MC6 | | DI6 | | | | | |
| MCC | Contact input common | 0V | In sink input mode, 0 V becomes contact input common. | | | | |
| — | — | S/S | In sink input mode, this terminal connects to 24 V. | | | | |
| Contact | Output | ZT | • Zero tension detection output: Set value 0 to 1999 N (199.9 \times 10 N) • Output ON at tension below the set value: Always OFF when the set value is 0 (however, the output is ON regardless of the set value and tension when the watchdog timer is operating). • Relay output (250 V AC 0.5 A or 30 V DC 0.5 A) | DO1 | Selection from no function, tension lower limit detection, tension upper limit detection, tension out of range detection, and alarm occurrence detection • Open collector output (30 V DC, 0.1 A or less) | | |
| | | | | DO2 | | | |
| | ZT | DOC | Contact output common | | | | |

Terminal specifications

Since the terminal type changes from a screw type terminal to a spring clamp type terminal, stranded wires and bar type crimp terminals are used for wiring. Therefore, when using a round terminal and Y terminal, terminal processing of the wiring is necessary.

Tension control output for powder clutch/brake

The rated current of LE-40MTA and LE-40MTB(-E) is 4.0 A, and the rated current of LE7-40GU-L is 2.7 A. When the powder clutch whose rated current exceed 2.7 A is used, an amplifier for clutch (separately sold) is necessary.

Control output signal

When "powder" has been selected with the LE-40MTA, B(-E), set the control output mode to 0 to 5 V. When "servomotor" has been selected, set the control output mode to -5 to +5 V DC.

Tension detector input

The tension detector that has been used with the LE-40MTA, B(-E) can be used as is. A strain gauge type load sensor can also be used with the LE7-40GU-L.

When substituting for the LE-40MTA, B(-E), it is necessary to change the [white] - [green (blue)] wiring if the tension detector has been used in the pulling direction. When substituting for the LE7-40GU-L, however, it is unnecessary to change the wiring and operation is enabled even if wiring is made to the terminal of the color indicated by the terminal block.

Also, when using one tension detector with the LE-40MTA, B(-E), the tension detector is connected between the right input [WHR] and [GRR] and the line between [WHL] and [GRL] is shorted. With the LE7-40GU-L, however, the detector is connected to the input of either left or right tension detector and the opposite input is shorted and used. When a single tension detector is used, left and right imbalance or small load alarm will be generated during span adjustment, but ignore it and use the detector.

Analog input

When it is used for general-purpose input, function assignment is required (same as the AI2 and AI3 terminals of the LE-40MTA, B(-E)). Be aware that even if the LE-40MT mode is set, the external tension setting (the function of the AI1 terminal of LE-40MTA, B(-E)) will not be automatically assigned.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Analog output

When LE-40MT mode is selected in the initial setting mode, the same voltage range and function assignment as the LE-40MTA, B(-E) are used.

However, when it is used in operation mode 8, the A-reel shaft rotational speed output and the B-reel shaft rotational speed output are assigned to the AO1 and AO2 terminals, respectively.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Contact input

When LE-40MT mode is selected in the initial setting mode, the same input as the LE-40MTA, B(-E) can be used.

Since LE7-40GU-L has the sink/source switching function, it is recommended to use sink wiring when replacing from LE-40MTA, B(-E). Note that stall memory and output gain operation are different.

 Page 20 DIFFERENCES IN SEQUENCE OPERATION

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Contact output

When LE-40MT mode is selected in the initial setting mode, the same output as the LE-40MTA, B(-E) can be used.

The LE-40MTA uses a relay output, but the LE7-40GU-L has changed to an open collector transistor output. When ZT (zero tension detection output) is used, pay attention to the power supply (AC, DC) and current direction after replacing to the LE7-40GU-L.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

2.3 Comparison Between Optional Terminal Blocks

Perform wiring by referring to the comparison between the I/O terminal blocks of LE-40MD and LE7-DCA.

For the wiring method, refer to the following.

LE7-40GU-L APPLICATION MANUAL

LE7-DCA APPLICATION MANUAL

| Item name | | LE-40MTB(-E) (LE-40MD) | | LE7-40GU-L (LE7-DCA) | | |
|--------------|--------|------------------------|--------------------------------------|-------------------------|---|--|
| Function | | LE-40MD | Function | LE7-40GU-L | LE7-DCA | Function |
| Power supply | Output | — | — | 24V | — | Contact input power |
| | | — | — | 0 V | — | |
| | | +24V DC | Sensor power supply 24 V DC | — | 12V DC | Power terminal for sensor, for pulse input |
| | | COM | | — | 0V DC | |
| For sensor | Input | SPL | Measure pulse | — | SPL | Measure pulse input terminal |
| | | SPA | Reel shaft pulse (reel A) | — | SPRA | Reel shaft pulse input (reel A) terminal |
| | | SPB | Reel shaft pulse (reel B) | — | SPRB | Reel shaft pulse input (reel B) terminal |
| | | COM | Common | — | 0V DC | In sink input mode, the 0 V DC becomes common. |
| | | — | — | — | SPS/S | In sink input mode, connect to the 12 V terminal. |
| | Shield | SG | Shield connection | — | SLD | Shield connection terminal |
| Contact | Input | BWD | Reverse rotation/Normal rotation | BWD | — | Reverse rotation/Normal rotation |
| | | DRST | Reel diameter reset | DRST | — | Reel diameter reset |
| | | LRST | Measurement length reset | LRST | — | Measurement length reset |
| | | MEM | Memory hold | MEM | — | Memory hold |
| | | PDRV | Predrive | PDRV | — | Predrive |
| | | RUN | Running/Stopped | DI1 ^{*1} | — | Interlocks with the operation/stop of the main unit. |
| | | RCH | Reel change | DI2 ^{*1} | — | Interlocks with the reel change of the main unit. |
| | | COM | Common | 0 V | — | In sink input mode, the 0 V terminal becomes common. |
| | — | — | S/S | — | In sink input mode, connect to the 24 V terminal. | |
| | Output | Y1 | Reel diameter (measurement length) 1 | Y1 | — | Reel diameter/Measurement length/remaining length detection 1 to 3 |
| | | Y2 | Reel diameter (measurement length) 2 | Y2 | — | |
| | | Y3 | Reel diameter (measurement length) 3 | Y3 | — | |
| | | SNCR | Peripheral speed synchronization | SNCR | — | Peripheral speed synchronization detection |
| | | COM1 | Common | DOC | — | Contact output common |
| Analog | | Output | ROTA | A-reel rotational speed | AO1 ^{*2} | — |
| | ROTB | | B-reel rotational speed | AO2 ^{*2} | — | |
| | DOUT | | Reel diameter signal output | — | — | |
| | AOC | | Analog output common | AOC | — | Analog output common |

*1 In operation mode 4, 6, or 8

*2 In operation mode 8

Power output

While the sensor power supply output of the LE-40MD is 24 V DC, the specification has been changed to 12 V DC for LE7-DCA. Since the power supply voltage specifications of many rotary encoders feature dual system of 24 V DC and 12 V DC, the sensor can often be used as it is after replacement. However, if a 24 V DC only product is used, the rotary encoder needs to be replaced to one which can operate at 12 V DC.

Sensor input

Although the specifications of the sensor input have not been changed from both the major roll sensor and reel shaft rotation detection sensor, the common terminal has been changed from COM to 0 V and it is necessary to connect SPS/S to 12 V.

Contact input

The contact input terminal of the LE7-DCA is provided on the LE7-40GU-L unit.

In LE-40MD, [RUN]: operation/stop and [RCH]: reel change inputs need to be connected to [MC1]: operation/stop and [MC2]: reel change of LE-40MTB. In LE-40GU, it can be used only by wiring to the operation/stop and reel change signal input of the main unit.

Contact output

While the LE-40MD uses a relay output, the LE7-40GU-L has been changed to an open collector transistor output. When contact output (reel diameter/measurement length/remaining length detection output, peripheral speed synchronization detection output) is used, pay attention to the power supply (AC, DC) and current direction after replacing to the LE7-40GU-L.

Analog output

The analog output related to the LE7-DCA uses the analog output terminal on the LE7-40GU-L unit.

When LE-40MT mode is selected in the initial setting mode, the same voltage range and function assignment as the LE-40MTA, B(-E) are used. However, when it is used in operation mode 8, the A-reel shaft rotational speed output and the B-reel shaft rotational speed output are assigned to the AO1 and AO2 terminals, respectively.

3 TRANSITION FROM LE-30CTN(A) TO LE7-40GU-L

3.1 Differences

The differences between LE-30CTN(A) and LE7-40GU-L are listed below.

| Item name | LE-30CTN(A) | LE7-40GU-L |
|--|--|---|
| Outer dimensions | 156 × 246 × 156.5 mm | 105 × 170 × 125 mm |
| Setting method | Dial | Dial+Touch panel |
| LCD | 128 × 64 dot | 320 × 128 dot |
| Output for powder | 3.0 A max. | 2.7 A max. |
| Terminal block | Screw type (fixed) | Spring clamp type (removable type: signal terminal) |
| Resolution of manual setting | 1% output unit | 0.1% output unit |
| Optional function | None | <ul style="list-style-type: none"> • Reel diameter calculation option (LE7-DCA) • Network option (LE7-CCL) |
| Control method | Feedback control | <ul style="list-style-type: none"> • Feedback control • Open-loop control • Feed Forward/Feedback Combined Control |
| Corresponding tension detector | <ul style="list-style-type: none"> • LX-TD tension detector • LX7-F tension detector | <ul style="list-style-type: none"> • LX-TD tension detector • LX7-F tension detector • Strain gauge sensor (2 mV/V) |
| Tension detector polarity automatic judgment function | Yes | Yes |
| Tension detector real voltage monitor | None | Yes |
| Two-reel switching function (when option is installed) | None | <ul style="list-style-type: none"> • Predrive control • Two-reel switching support output |
| Communication function | None | <ul style="list-style-type: none"> • Ethernet communication - CC-Link IE Field Network Basic - SLMP - MODBUS/TCP (Slave) • RS-485 communication - N:N Network - MODBUS/RTU and ASCII (Slave) • CC-Link (option) |
| Contact input sink/source switching | None | Yes |

3.2 Comparison of I/O Terminal Blocks

Perform wiring by referring to the comparison between the I/O terminal blocks of LE-30CTN(A) and LE7-40GU-L.
For the wiring method, refer to the following.

LE7-40GU-L APPLICATION MANUAL

| Item name | | LE-30CTN(A) | | LE7-40GU-L | |
|--------------|--------|--|---|---|---|
| Function | | Terminal | Specifications | Terminal | Specifications |
| Power supply | Input | PSL | 100 to 240 V AC (-15% to +10%) 50/60 Hz | L | 100 to 240 V AC (-15% to +10%) 50/60 Hz |
| | | PSN | Power consumption 400 VA, built-in power fuse 250 V, T5AH×2 | N | Maximum apparent power 200 VA, built-in power fuse 250 V, 8 A×2 |
| | | ⏏ | Rush current 30 A 300 ms, momentary power failure permissible time 10 ms | ⏏ | Rush current 45 A 1 ms, momentary power failure permissible time 10 ms |
| | Output | RED | Tension detector power | RED | Tension detector power |
| | | BLK | 5 V DC, 40 mA or less Up to two LX tension detectors can be connected. | BLK | <ul style="list-style-type: none"> The rated voltage: 5 V DC Voltage range: 4.75 to 5.25 V DC Current value: 40 mA or less Up to two LX tension detectors can be connected. |
| | | +5V | Service power supply for external control | 5V | Potentiometer power |
| | | AIC | 5 V DC, 50 mA or less | AIC | <ul style="list-style-type: none"> The rated voltage: 5 V DC Voltage range: 4.75 to 5.25 V DC Current value: 20 mA or less Available volume: 0.5 to 2.0 kΩ |
| | | — | — | 24V | Contact input power |
| | | — | — | 0V | <ul style="list-style-type: none"> The rated voltage: 24 V DC Voltage range: 20.4 to 28.8 V DC Current value: 55 mA or less |
| | | — | — | — | — |
| Control | Output | PP | Tension control output for 24 V DC series powder clutch/brake | PP | Tension control output for 24 V DC series powder clutch/brake |
| | | PN | 0 to 24 V DC 3 A or less | PN | <ul style="list-style-type: none"> 0 to 24 V DC 2.7 A or less PWM output |
| | — | — | S1 | Two-reel's switching new reel output for 24 V DC powder clutch/brake | |
| | — | — | S2 | <ul style="list-style-type: none"> 0 to 24 V DC The total current value with PP-PN output is 2.7 A or less. PWM output | |
| | TOUT | Control output 0 to 5 V DC For power amplifier and AC servo amplifier | SA | Tension control output for motor | |
| | AOC | Analog output common | SN | <ul style="list-style-type: none"> (1) -5 to +5 V DC resolution: Approx. 358 μV (2) -8 to +8 V DC resolution: Approx. 358 μV (3) -10 to +10 V DC resolution: Approx. 358 μV (4) -2.7 to +2.7 V DC resolution: Approx. 358 μV (5) 0 to 5 V DC resolution: Approx. 358 μV (6) 0 to 8 V DC resolution: Approx. 358 μV (7) 0 to 10 V DC resolution: Approx. 358 μV (8) 0 to 2.7 V DC resolution: Approx. 358 μV Load resistance: 1 kΩ or more | |
| | — | — | NRO | Two-reel's switching new reel output for motor | |
| | — | — | SN | <ul style="list-style-type: none"> Output range switchable (1) -5 to +5 V DC resolution: Approx. 358 μV (2) -8 to +8 V DC resolution: Approx. 358 μV (3) -10 to +10 V DC resolution: Approx. 358 μV (4) -2.7 to +2.7 V DC resolution: Approx. 358 μV (5) 0 to 5 V DC resolution: Approx. 358 μV (6) 0 to 8 V DC resolution: Approx. 358 μV (7) 0 to 10 V DC resolution: Approx. 358 μV (8) 0 to 2.7 V DC resolution: Approx. 358 μV Load resistance: 1 kΩ or more | |
| | — | — | EAP | Tension control output for electro-pneumatic regulator | |
| | — | — | EAN | <ul style="list-style-type: none"> 0 to 20 mA DC resolution: Approx. 1.43 μA Load resistance: 500 Ω or less | |

| Item name | | LE-30CTN(A) | | LE7-40GU-L | | | |
|------------------|----------|-----------------------|---|--|---|--|---|
| Function | Terminal | Specifications | | Terminal | Specifications | | |
| Tension detector | Input | GRL | Left | Connect the lead wires GR=green (blue) and WH=white of the tension detector inputs. When only the detector on one side is used, it is necessary to make a short circuit between GR and WH on the other side. The compression/tensile load is determined automatically. | GRL | Left | Tension detector input • Input range switchable (1) -150 to +150 mV DC (LX tension detector) resolution: Approx. 7.90 μ V (2) -15 to -15 mV DC (strain gauge) resolution: Approx. 0.790 μ V When only the detector on one side is used, it is necessary to make a short circuit between GR and WH on the other side. The compression/tensile load is determined automatically. |
| | | WHL | | | WHL | | |
| | | GRR | Right | | GRR | Right | |
| | | WHR | | | WHR | | |
| | SG | For shield connection | | SLD | For shield connection | | |
| Analog | Input | AI1 | Select from the following functions. Tension setting signal, reel diameter signal, external tension signal, taper ratio setting signal, manual setting signal 1, manual setting signal 2, and voltage signal of 0 to 5 V DC or 10 k Ω potentiometer | AI1 | Selection from tension setting, stall, taper ratio, new-reel preset, manual, tension input, and reel • Input range switchable (1) 0 to 5 V DC resolution: Approx. 193 μ V (2) 0 to 10 V DC resolution: Approx. 193 μ V • Input resistance 38 k Ω | | |
| | | AI2 | | AI2 | | | |
| | | | | AI3 | | | |
| | | AIC | | Analog input common | | AIC | Analog input common |
| | Output | AO1 | Output for tension monitor/tension setting monitor 0 to 5 V DC Function selection by DIP switch | AO1 | Selection from tension monitor, reel diameter monitor, tension setting monitor, A-reel shaft rotation speed output, and B-reel shaft rotation speed output selection • Output range switchable (1) 0 to 5 V DC resolution: Approx. 358 μ V (2) 0 to 10 V DC resolution: Approx. 358 μ V • Load resistance: 1 k Ω or more | | |
| | | | | AO2 | | | |
| | | AOC | Analog output common | AOC | | Analog output common | |
| Contact | Input | RUN | Operation/stop: ON=automatic operation, OFF=stop | DI1 | Selection from operation/stop, control output OFF/ON, stall memory, inching ON/OFF, constant tension ON/OFF, gain 1 ON/OFF, gain 2 ON/OFF, auto/manual, reel change ON/OFF, cut torque ON/OFF, and alarm reset ON/OFF • Input signal voltage 24 to 28.8 V DC • ON current about 5 mA • Sink/source input | | |
| | | MI1 | Select from the following functions. Output memory, output gain 1, output gain 2, output ON-OFF, manual output 1, and manual output 2 | DI2 | | | |
| | | MI2 | | DI3 | | | |
| | | MI3 | | DI4 | | | |
| | | — | | DI5 | | | |
| | | — | DI6 | | | | |
| | | MIC | Contact input common | 0V | | In sink input mode, the 0 V terminal becomes common. | |
| | — | — | S/S | In sink input mode, connect to the 24 V terminal. | | | |
| | Output | ZT | • Zero tension detection output: Set value 0 to 2000N (N, $\times 10$ N) • Output ON with tension below the set value: Always OFF when 0 is set. • Relay output (250 V AC 0.5 A or 30 V DC 0.5 A) | DO1 | Selection from no function, tension lower limit detection, tension upper limit detection, tension out of range detection, and alarm occurrence detection • Open collector output (30 V DC, 0.1 A or less) | | |
| | | ZT | | DOC | | Contact output common | |

Terminal specifications

Since the terminal type changes from a screw type terminal to a spring clamp type terminal, stranded wires and bar type crimp terminals are used for wiring. Therefore, when using a round terminal and Y terminal, terminal processing of the wiring is necessary.

Tension control output for powder clutch/brake

After replacement from LE-30CTN(A), the same function as before replacement can be used by selecting the LE-30CT mode in the initial setting (operation mode selection).

Control output signal

After replacement from the control output of the LE-30CTN(A), set the motor tension control output to 0 to 5 V and use it. For LE7-40GU-L, it can also be set to \pm output as for motor control.

Tension detector input

The tension detector that has been used with the LE-30CTN(A) can be used as it is. A strain gauge type load sensor can also be used with the LE7-40GU-L.

Analog input

When it is used for general-purpose input, function assignment is required (same as the LE-30CTN(A)). The voltage range can also be switched in the LE-40GU.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Analog output

When the LE-30CT mode is selected in the initial setting mode, function assignment is performed as follows: the AO1 terminal is assigned to the tension monitor and the AO2 terminal is assigned to the tension setting monitor. When the LE7-40GU-L mode is used as it is, the AO1 terminal is assigned to the tension monitor and the AO2 terminal is unassigned.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Contact input

Since LE7-40GU-L has the sink/source switching function, it is recommended to use sink wiring when replacing from LE-30CTN(A). Note that stall memory and output gain operation are different.

 Page 20 DIFFERENCES IN SEQUENCE OPERATION

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

Contact output

The LE-30CTN(A) uses a relay output, but the LE7-40GU-L has been changed to an open collector transistor output. When ZT (zero tension detection output) is used, pay attention to the power supply (AC, DC) and current direction after replacing to the LE7-40GU-L.

For details of function assignment in each operation mode, refer to the following.

 LE7-40GU-L APPLICATION MANUAL

4 DIFFERENCES IN SEQUENCE OPERATION

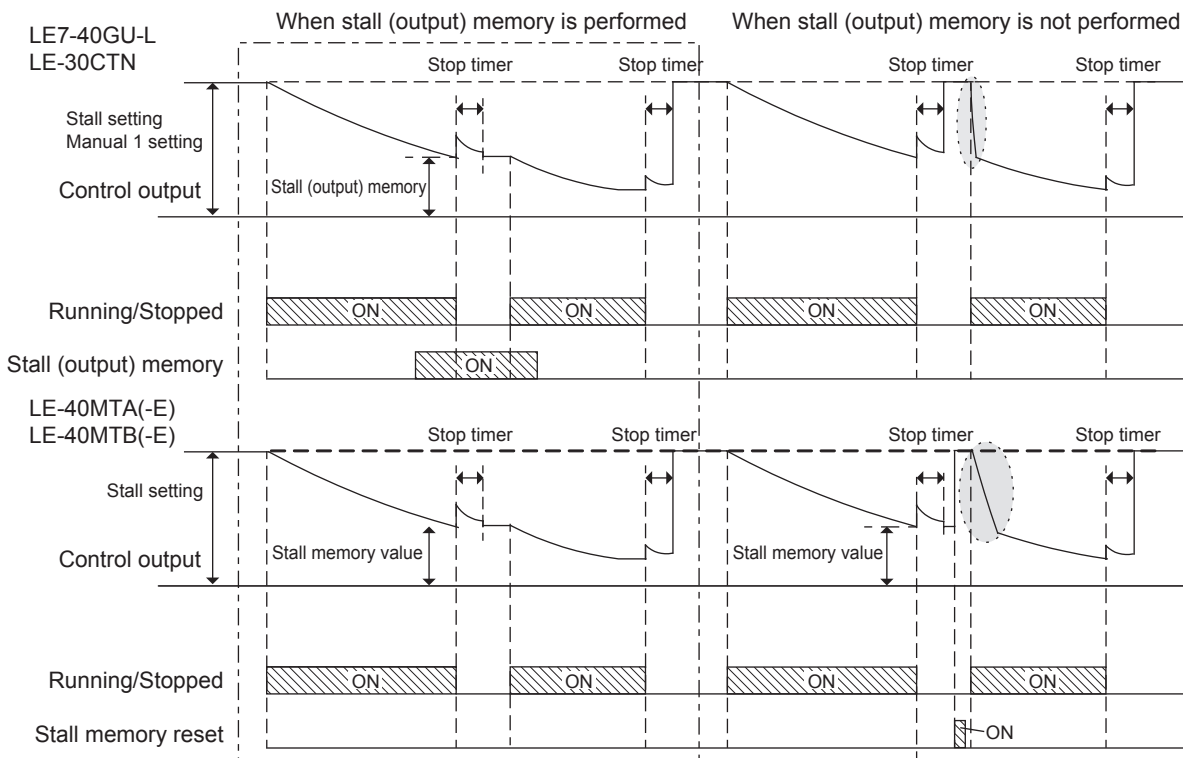
This section describes the differences in sequence operation.

4.1 Stall Memory

Stall memory is a function to memorize the control output at the moment when the operation/stop command has changed from operation to stop. In unwinding and winding control, in case the system stops while the material on the reel shaft is not completely finished, the control output at the moment the system makes a stop is memorized. When it restarts, automatic control can be continued with the stored control output as stall output.

Differences in operation

| Model | LE-40MTA, B(-E) | LE-30CTN(A) | LE7-40GU-L |
|--|---|--|------------|
| Stall memory operation | Run→stop (MC1) | With stall (output) memory input turns ON and state changes from run to stop | |
| Stall memory→stall setting switch | Stall memory reset (MC4) to ON or control output to OFF | Stall (output) memory input turns from ON to OFF | |
| Operation at power OFF | Stall memory value held | Output memory if power OFF with stall (output) memory input ON | |
| Operation when the power is turned ON. | Stall memory value held | Output memory continued if power OFF with stall (output) memory input ON | |



When LE-30CTN(A) is used

The term output memory used in LE-30CTN(A) has been changed to stall memory in LE7-40GU-L (the sequence operation remains unchanged). In the LE-30CTN(A) there is no setting parameter called stall setting and the control output at stop is manual 1. By entering the same setting % as LE-30CTN(A) 's manual 1 in the stall setting of LE7-40GU-L, the same output operation can be performed as in the LE-30CTN(A).

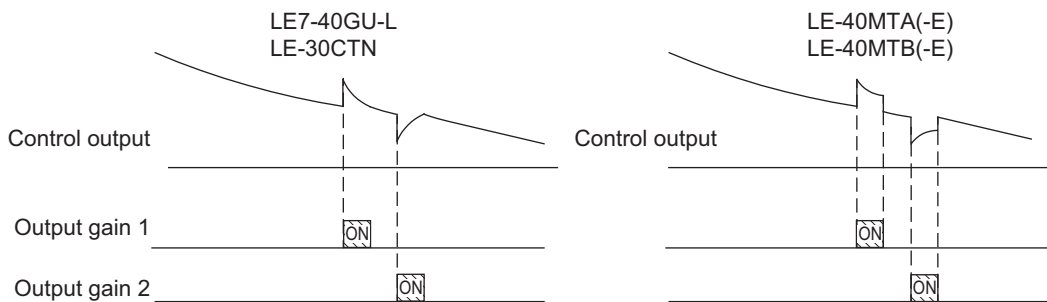
When the stall memory reset input is used with LE-40MTA, B(-E)

In the LE7-40GU-L, the response of the automatic control output is faster than the LE-40MTA, B(-E), and therefore there is no problem if it is used with only stall setting without using stall memory (when the stall memory reset input is short-circuited in the LE-40MTA, B(-E), the contacts of stall memory need not be short-circuited in the LE7-40GU-L). However, if a problem such as a half-way stop or misalignment of winding during restarting occurs, use the output memory function of the LE7-40GU-L.

4.2 Output Gain Function

The output gain function mitigates the tension fluctuation due to the moment of inertia of the reel shaft materials during acceleration or deceleration. In the LE-40MTA, B(-E), since the control output changes either when the gain input changes from OFF to ON or ON to OFF, tension fluctuation may occur when the gain input changes from ON to OFF. Therefore, in the LE-30CTN(A) and LE7-40GU-L, the specifications have been changed lest that the gain input affects the control output at the time of turning from ON to OFF. In the LE7-40GU-L, the followability of the control output itself has been improved, and therefore the tension fluctuation has been mitigated compared to the LE-40MTA, B(-E) even when not using the output gain function.

| Model | LE-40MTA, B(-E) | LE-30CTN(A) | LE7-40GU-L |
|--|---|-------------|------------|
| Gain 1 or 2 turns off to on | Causes a change of control output×gain 1 or 2 | | |
| Gain 1 or 2 turns off to on or on to off | Causes a change of control output×gain 1 or 2 | No change | |

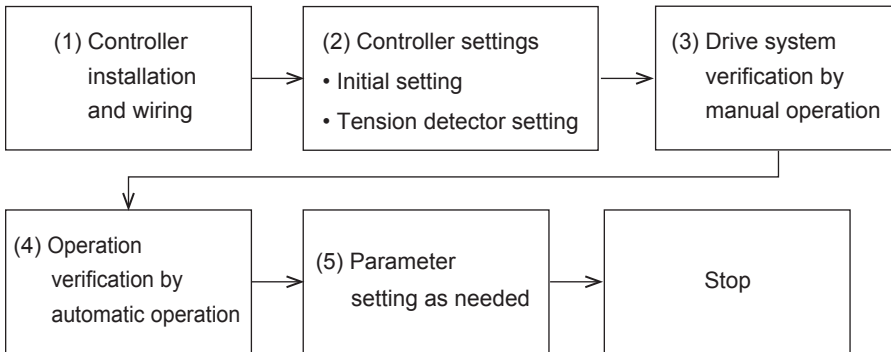


5 DIFFERENCES IN FLOW AT MACHINE STARTUP ADJUSTMENT

This section describes the differences in flow at machine startup adjustment.

5.1 Differences in Operation Flow

An operation flowchart is shown below. There is no difference in the basic operation flow till the test operation among LE-40MTA, B(-E), LE-30CTN(A), and LE7-40GU-L.



5.2 Difference in Operation Mode

LE7-40GU-L has the following operation modes.

| Mode | Explanation | Function availability | |
|----------------------|--|-----------------------|-------------|
| | | LE-40MTA, B(-E) | LE-30CTN(A) |
| Initial setting mode | Initial setting mode at startup of equipment | ○ | × |
| Adjustment Mode | Parameter detail setting mode | ○ | ○ |
| Operation mode | Yes | ○ | ○ |

Initial setting mode

- The LE7-40GU-L has an initial setting mode and is set in the initial setting mode from the factory shipment until the initial setting completion operation is executed. In the initial setting mode, the setting items that are indispensable for the operation of the tension controller are set in order. The LE-30CTN(A) does not have a function corresponding to the initial setting mode.
- The items that can be set in the initial setting mode differ between LE-40MTA, B(-E) and LE7-40GU-L. The parameters that can be set in the initial setting mode are compared below. The parameters that can not be set should be changed in adjustment mode.

| Parameter | Setting location | |
|---|--------------------------|----------------------------|
| | LE-40MTA, B(-E) | LE7-40GU-L |
| Password registration | Initial Setting | Adjustment |
| Tension display unit setting | Initial setting/engineer | Initial setting/adjustment |
| Selection of control target reel | Initial setting/engineer | Adjustment |
| Number of control target reels (selection of two-reel's switching function) | Initial setting/engineer | Initial setting/adjustment |
| Taper setting | Initial setting/engineer | Adjustment |
| Actuator setting | Initial setting/engineer | Adjustment**1 |
| Usage of stall function | Initial setting/engineer | Adjustment |
| I/O terminal function setting | Initial setting/engineer | Adjustment |
| Full scale tension setting | Initial setting/engineer | Initial setting/adjustment |
| Zero span adjustment of tension detector | Initial setting/engineer | Initial setting/adjustment |

| Parameter | Setting location | |
|--|------------------|----------------------------|
| | LE-40MTA, B(-E) | LE7-40GU-L |
| Language selection | Unavailable | Initial setting/adjustment |
| Control mode selection* ² | Unavailable | Initial setting/adjustment |
| Maximum diameter/minimum diameter | Engineer | Initial setting/adjustment |
| Operation mode selection* ³ | Unavailable | Initial Setting |
| Velocity electronic gear ratio | Engineer | Initial setting/adjustment |

*1 For the setting of the actuator, set the output voltage range on LE7-40GU-L screen number 452 "Control output mode selection".

*2 The control mode selection is the function to switch the control method between open loop control and feedback control. When using it same as with the LE-40MTA, B(-E), select feedback control. This selection screen is displayed only when LE7-DCA is connected.

*3 The operation mode selection is the mode to preset the set value according to the specifications of LE-40MTA, B(-E) and LE-30CTN(A). Parameters related to new functionality that are not included in conventional models can automatically be disabled to simplify screen operation (parameter setting). When using only the conventional functions, select the LE-40MT or LE-30CT mode. When using the new functions of the LE7-40GU-L, select the LE7-40GU-L mode.

Adjustment mode and operation mode

The operation of the tension controller involves a situation where machine adjustment is performed and another situation where daily operation is performed. In accordance with this, the operation mode of the LE7-40GU-L is divided into the adjustment mode and the operation mode. The engineer screen of LE-40MTA, B(-E) corresponds to the adjustment mode of LE7-40GU-L.

5.3 Protection Functions

The tension controller has a protect function to prevent an operator who does not know the machine specifications from changing the set value. LE7-40GU-L has the following five protection functions.

| Protection name | Function |
|-----------------------------|--|
| Set password | Restricts changing the set value in adjustment mode. In the case of password mismatching, the restricted set value can be monitored but cannot be changed. |
| Monitor password | Restricts changing and monitoring the set value in adjustment mode. In the case of password mismatching, the restricted set value cannot be monitored and changed. |
| All operation key lock | Can be set by pressing down the key lock key and dial key on the main unit panel for three seconds. While the key lock is set, the screen operation, key input, and dial input functions are disabled and the settings cannot be changed from the panel. |
| Parameter key lock | Disables setting individual parameters that affect operation, in the operation mode screen. Can be set by pressing down the key lock key on the main unit panel for three seconds. The parameter that has been set on the screen can be monitored but cannot be changed. |
| Protection during operation | Protects the parameters, which may have a serious effect during operation of the equipment, from being changed during operation. Whether or not the protection function is set, it is automatically enabled when the run/stop input signal goes ON. |

The compatibilities of the LE-40MTA, B(-E) and LE-30CTN(A) for the protection function of the LE7-40GU-L are as follows.

| Function | LE-40MTA, B(-E) | LE-30CTN(A) | LE7-40GU-L |
|-----------------------------|-----------------|-----------------|------------|
| Set password | × | × | ○ |
| Monitor password | △* ¹ | ○* ¹ | ○ |
| All operation key lock | × | × | ○ |
| Parameter key lock | △* ² | ○* ³ | ○ |
| Protection during operation | ○ | ○ | ○ |

○: Compatible, △: Equivalent function available (be aware of notes*), ×: Incompatible

*1 The method of protecting the monitor password is different. (The LE-40MTA, B(-E) and LE-30CTN(A) cannot go to Engineer screen and cannot open the Adjustment screen when the password mismatches, while the LE7-40GU-L can display the Adjustment screen but numerical values disappear so they are invisible. In the LE-40MTB(-E), monitoring and setting are enabled from CC-Link even while the monitor password is valid, but monitoring and setting are disabled in the LE7-40GU-L.

*2 The method of setting the parameter key lock is different. (In the LE-40MTA, B(-E), the key lock target parameter is selected from the N/A setting on the Engineer screen, while, in the LE7-40GU-L, it is set by pressing the key lock key on the main unit panel for 3 seconds with the target parameter setting screen displayed.)

*3 The time during which the key lock key is pressed down is different. (LE-30CTN(A): Press and hold for 5 seconds, LE7-40GU-L: Press and hold for 3 seconds)

REVISIONS

| Revision date | Revision | Description |
|---------------|----------|---------------|
| July 2019 | A | First edition |

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