

4CH(2CH) ENCODER COUNTER
ER4C-04A, ER2C-04A

User's Manual

No.4011, 4388 (Rev.2)



TSUJICON

APPLICATION OF ELECTRONIC DEVICES

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4CH(2CH) ENCODER COUNTER <<ER4C-04A, ER2C-04A>>

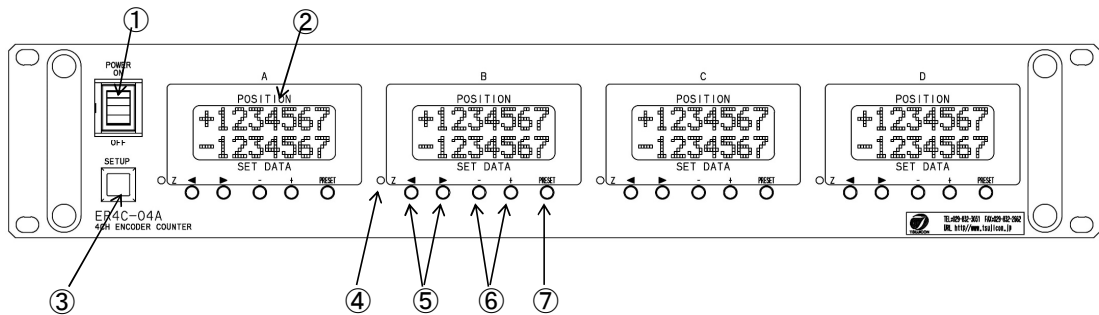
User's Manual

1. Specification

- 1) Power Supply AC100V-220V 50/Hz
- 2) Power Consumption 100V Maximum
- 3) Backup Memory backup by internal Batteries during power off state.
(More than 5years)
- 4) Counter 32bit 10decimal digit (-2147483648 ~ 2147483647)
- 5) Preset Data of LCD indicator are set as present data by Preset SW.
Data are also set by LAN Communication Command.
- 6) A-Phase Counter Clear Clear Counter by Z-Phase Signal Input.
Each channel, can set by LAN Communication Commands.
- 7) Z-Phase Logic Inversion Z-Phase Logic can be inverted by a
Push Button or LAN Communication Commands.
- 8) Scaling Can Scaled value = (pulse-0 ~ ± 2147483647 (initial data:0)
parameter (they $\varepsilon \pm 0.000001 \sim 999.999999$ (initial data:1)
•offset
•multiplier
- 9) Terminator Can select using terminator(120 Ω) or not,
when Encoder is Line Driver type.
- 10) Indicator ± 7 digit $\times 4$ CH(2CH) (-9999999 ~ +9999999)
- 11) Encoder Type A-phase and B-phase type of line driver or open collector output
- 12) Interface LAN (10/100BASE-T)
- 13) Case Size (H)88 (W)482.6 (D)324.5

2. Panel Layout

1) Front Panel (4CH)



- ① POWER SW for Power on/off

- ② LCD indicator ● Scaling Parameter is default value
 LCD indicate encoder pulse count.
 (the least significant 7 decimal digit)
 * if count value is more than +2147483647 or less than -2147483648,
 the polarity will be reversed
 upper :current counter value
 lower :preset value (can be changed by ⑤ and ⑥)
 when SETUP mode, display setting item

 ● Scaling Parameter is not default value
 LCD indicate scaled value.
 When the most significant 7 decimal digit does not include a decimal
 point, the most significant 7 digit is displayed.
 When the most significant 7 decimal digit include a decimal point,
 the most significant 6 digit is displayed.
 upper :scaled value
 lower :preset value (can be changed by ⑤ and ⑥)
 when SETUP mode, display setting item

- ③ SETUP SW for SETUP mode

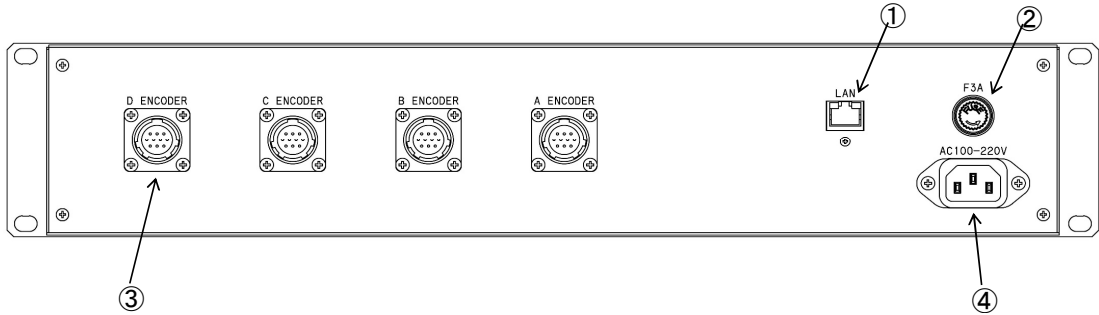
- ④ Phase Z LED monitor of Phase Z pulse
 (can be turn off by setting)

- ⑤ Degit when setting preset value and IP address, change degit.
 If you press both (←)button and (→)button for 3 seconds,
 scaling parameter is initialized.

- ⑥ INC/DEC increase or decrease preset value and IP address
 If you press both INC and DEC for 3 seconds, preset-data turns to zero.

- ⑦ PRESET Preset data to each Position Counter
 If you press this button for 3 seconds, preset enable to maximum ± 9999999
 when SETUP mode, change setting item

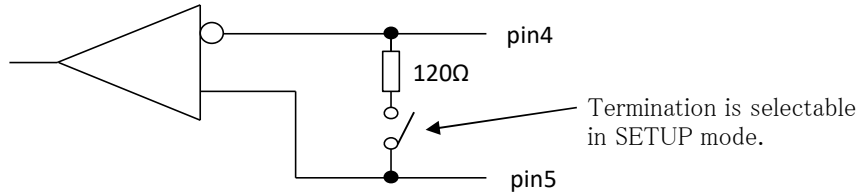
2) Rear Panel (4CH)



- ① LAN Connector for LAN(10/100BASE-T)
- ② F3A Fuse holder for AC220V
if necessary use 3A midget fuse
- ③ A,B,C,D ENCORDER Encoder input connector
for A,B-phase type incremental Encoder
Encoder type selections between Line driver and Open
collector are available individually by setting.
Line driver type is selected at the time of factory shipment.
+5V power supply for encoder
panel receptacle SRCN2A16-10S(JAE)
cable plug SRCN6A16-10P(JAE)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------|-----|-----|-------|---------|----------------------|---------|----------------------|---------|----------------------|-----|
| line driver | +5V | GND | (N.C) | Phase A | Phase A ⁻ | Phase B | Phase B ⁻ | Phase Z | Phase Z ⁻ | F.G |
| open collector | +5V | GND | (N.C) | Phase A | (N.C) | Phase B | (N.C) | (N.C) | Phase Z | F.G |

Line Driver Circuit (ex:pin4-5) (pin6-7 and pin8-9 are same as pin4-5)



※ When line driver input and terminating resistance setting,
Channels to which this connector is not connected
may have an indeterminate input and may display unintended count values.

- ④ AC100V-220V Plug for AC100-220V power supply

3. SETUP mode

You can setup Encoder Counter in SETUP mode.

*When SETUP mode, Encoder Counter stops counting.

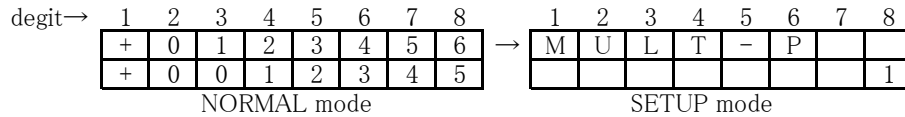
1) Setting Preparation and Completion

Turn on the Power ON SW, and you can use Encoder Counter in a few seconds.

Setting values(MULT-P, DIR, Z-LED, Z-POL, ENCTYPE, LANCTRL, LAN IP:1, LAN IP2, Port no) are kept by battery backup.

a) Push SETUP SW (then SETUP SW is lighted.)

LCD indicator display Setting Item.



You can change setting by using (+)/(-) button under the LCD indicator.

Appearance of Cursor depends on setting item.

When Cursor appears, You can change the position by using (←)/(→) button.

You can change setting item by using PRESET SW.

See the order of setting items below.

MULT-P → DIR → Z-LED → Z-POL → ENCTYPE → TERMINTR →

LAN IP:1 → LAN IP:2 → Port no → MAC

Setting items from LAN IP:1 to MAC are common for each channel.

So they are displayed only in A channel LCD indicator. (MAC is Read-Only.)

b) Push SETUP SW again, then all LCD return to NORMAL mode.

Encoder Counter starts running in a new setting, except for "LAN IP:1", "LAN IP:2" and "Port no". If you change those setting value, turn off POWER ON SW after the display returns to NORMAL mode, and turn on POWER ON SW again.

See the explanation of each setting item below.

2) MULT-P

You can select count rate from 1,2,4 times of encoder input pulse by using (+)/(-) button.

3) DIR

You can change the relation between the direction of rotation(CW/CCW) and count up/down direction(U:up/D:down).

4) Z-LED

You can select ENABLE/DISABLE by using (+)/(-) button.

5) Z-POL

You can select NORMAL/REVERSE by using (+)/(-) button.

6) ENCTYPE

You can select encoder type(L.D:Line Driver or O.C:Open Collector) by using (+)/(-) button.

7) Terminator

You can select ENABLE/DISABLE by using (+)/(-) button.

8) LAN IP:1 (upper 2byte of IP address)

You can change IP address by using (+)/(-) button and (←)/(→) button.

Setting value is decimal number only. Default value is "192.168."

9) LAN IP:2 (lower 2byte of IP address)

You can change IP address by using (+)/(-) button and (←)/(→) button.

Setting value is decimal number only. Default value is ".1.55"

10) Port no

You can set Port Number by using (+)/(-) button and (←)/(→) button.

Setting value is decimal number only. Default value is "07777".

11) MAC

You can see MAC address, but cannot change the address.

4. Communication Command

- 1) De-limiter is fixed to be CR+LF.
- 2) Command format except command type will be ignored.

| command type | reply | explanation |
|---|---|---|
| S20 | RA±□□□□□□□ | A position counter read request (the least significant 7 digit) |
| S22 | RB±□□□□□□□ | B position counter read request (the least significant 7 digit) |
| S24 | RC±□□□□□□□ | C position counter read request (the least significant 7 digit) |
| S26 | RD±□□□□□□□ | D position counter read request (the least significant 7 digit) |
| SA±□□□□□□□ (must be in within 10digit) | | A position counter preset If the value is over the range, maximun(or minimum) value is set. |
| SB±□□□□□□□ (must be in within 10digit) | | B position counter preset If the value is over the range, maximun(or minimum) value is set. |
| SC±□□□□□□□ (must be in within 10digit) | | C position counter preset If the value is over the range, maximun(or minimum) value is set. |
| SD±□□□□□□□ (must be in within 10digit) | | D position counter preset If the value is over the range, maximun(or minimum) value is set. |
| VER? | 1.00 20-10-06 ER4C-04A (in case of Ver.1.00) | Firmware version read request |
| FROM? | FROM0 or FROM1 | current FROM read |
| FROM0, FROM1 | | FROM select |

(□ : decimal ASCII data)

Command related the Z-Phase Counter Clear

| command type | reply | explanation |
|--------------|----------------------------------|--|
| ZC□ | | Z-phase counter clear request (channel A~D) The request is cancelled by Z-phase signal input or “ZN□” command. |
| ZN□ | | Z-phase counter clear cancel (channle A~D) |
| ZT□△ | | Select “Z-phase rising edge” or “Z-phase falling edge”, to set the timing of clearing the counter. (channel A~D) |
| ZS□ | Z□○△ | Z-phase counter clear status read (channel A~D) |
| VERH? | HD-Ver.01 (in case of Ver.01) | Hardware version read request |

□: A~D (channel A~D)
○: C or N (C: clear flag ON, N: clear flag OFF)
△: U or D (U: rising edge, D: falling edge)

※ When MULT-P is 1times, the setting of counter clear timing by Z-phase is ignored.
Counter clear timing is synchronized with couting.

※ When Z-Phase Logic is inverted,
counter clear timing is performed according to the inverted logic.

Command related the Scaling

| command type | reply | explanation |
|--|--|---|
| S30 | RA±□□□□□□□□□□ (10 digit format) | A position counter read request (10 digit) |
| S32 | RB±□□□□□□□□□□ (10 digit format) | B position counter read request (10 digit) |
| S34 | RC±□□□□□□□□□□ (10 digit format) | C position counter read request (10 digit) |
| S36 | RD±□□□□□□□□□□ (10 digit format) | D position counter read request (10 digit) |
| MW△±□□□□□□□□□□ (must be in the format) | | Scaling Parameter: multiplier setting (channel A~D) range: ±0.000001~999.999999 |
| MR△ | M△±□□□□□□□□□□ | Scaling Parameter: multiplier read request |
| OW△±□□□□□□□□□□ (must be in within 10 digit) | | Scaling Parameter: offset setting (channel A~D) range: 0~±2147483647 If the value is over the range, maximun(or minimum) value is set. |
| OR△ | O△±□□□□□□□□□□□□ (10 digit format) | Scaling Parameter: offset read request (channel A~D) |
| D△ | D△±□□□□□□□□□□□□□□□ (19 digit format) (number of decimal places: 6) | Scaled value read request (channel A~D) |

□: decimal ASCII data
△: A~D (channel A~D)

Command related the Z-Phase Logic Inversion

| command type | reply | explanation |
|--------------|-------|--|
| ZP□△ | | Switches the Z-Phase Input Logic to "NORMAL (positive logic)" or "REVERSE (negative logic)". |
| ZP□? | ZP□△ | Reads the Z-phase Input Logic. |

□: A~D (channel A~D)
△: N or R (N: NORMAL (positive logic), REVERSE (negative logic))

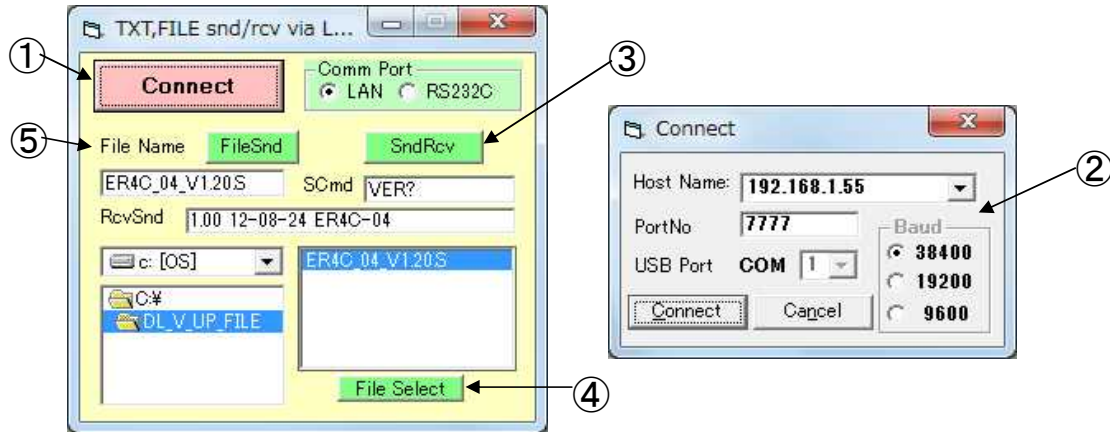
※ When Z-Phase Logic is inverted,
counter clear timing is performed according to the inverted logic.

5. Firmware Version Up

You can update firmware.

When you update firmware, cut connection between Encorder Counter and Encorder for safety.

Download version-up software(for Windows) from Tsuji Electronics Homepage(<https://www.tsujicon.jp/>).



Download version-up file from Tsuji Electronics Homepage and extract it.

- ① Select "LAN" and click "Connect" button.
- ② New Window for connection will display.
Input IP address and Port number and click "Connect" button.
- ③ Input command into "Scmd" and click "SndRcv" button.
The reply will show at "RcvSnd".
To confirm the connection, use some command. (for example VER? command)
- ④ Select version-up file from your directory and click "File Select" button.
- ⑤ The file name you selected will be shown at "File Name".
If the file name is correct, click "File Snd" button. Then version up software starts sending.
While Encorder Counter is receiving the file, SETUP SW will blink slowly.
When Encorder Counter finishes receiving, SETUP SW will blink fast and Encorder Counter starts writing the file into ROM.
When the writing finish, SETUP SW will go out.

Turn off POWERON SW and turn on it again. Encorder Counter will run in a new firmware.

If the data transfer to Encorder Counter fails, SETUP SW lamp will not go out.

In this case, turn off POWER ON SW and turn on again. Then try again.

If the writing into ROM fails, Encorder Counter will not run correctly.

In this case, turn off POWER ON SW and turn on again with pushing SETUP SW.

Then turn off POWER ON SW again and turn on again.

Encorder Counter will run in a old firmware.

Please try version-up again.

(this recovery is useful when you want to use old firmware)

If Encorder counter doesnot run in a old firmware, use another way of recovery below.

For safety reasons, unplug the appliance from the outlet when you open cover.
If you worry, please contact us.

- ① Turn off POWER ON SW and open the cover. There is DSW1 on Printed Circuit Board "TEP178". Set DSW1's switch1 on.
- ② Turn on POWER ON SW with pushing SETUP SW. SETUP SW will blink and go out.
- ③ Turn off POWER ON SW again and set DSW1's switch1 off.
- ④ Turn on POWER ON SW again. Encoder Counter will run using firmware version 1.00.

Then try update again by using new firmware file.

* After firmware version up, position data will clear and setting value will be default value.

See default value below

| | |
|------------|--------------|
| counter | 0 |
| preset | 0 |
| MULT-P | 1 |
| DIR | CW=U, CCW=D |
| Z-LED | DISABLE |
| ENCTYPE | L.D |
| TERMINTR | ENABLE |
| IP address | 192.168.1.55 |
| Port no | 7777 |