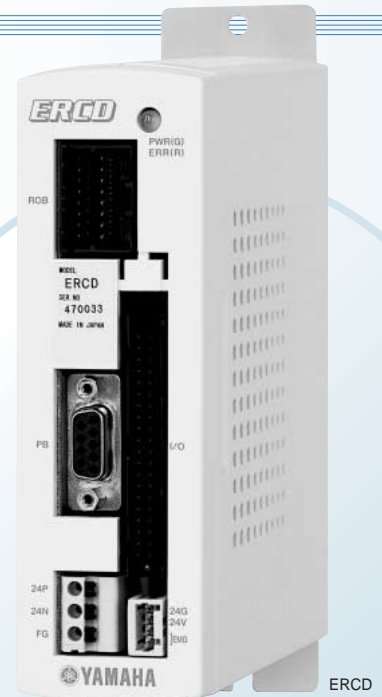


Single-axis  
robot controller

# ERC D

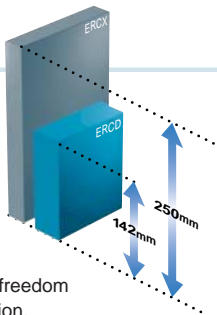
**Low price and compact in size.  
Multi function controller performing 3 roles.  
In addition to the conventional functions,  
a pulse train function is added  
for a wider application range.**



## Features

### 1 Compact design

The unit provides high performance and yet the box is as compact as 44mm (width), 142mm (height) and 117mm (depth), which is about 62% as compared with our conventional product (ERCX: 30mm (width), 250mm (height), 157mm (depth)), There is more freedom in selecting the installation position.



### 2 Three roles with one unit

Applicable to the pulse train input operation, program operation where various commands are usable and point trace operation where only instruction of the point number is required.

### 3 Pulse train input

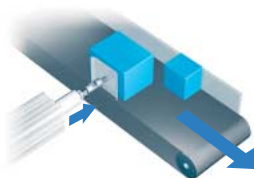
In addition to the conventional YAMAHA controller control, this unit has a new pulse train input function which provides a wider application range including application to the drive axis of the special machine.

### 4 Reinforced sequence function

The feedback pulse output is effective in the program operation as well as the point trace operation. The output count can be changed freely by setting the frequency division. Also, the current position can be controlled easily with the upper control equipment. Also, as it is possible to output the transfer point number in binary when using the point trace function, operation point can be confirmed easily. With the teaching function by I/O added, freedom in constructing the system and ease of use are improved.

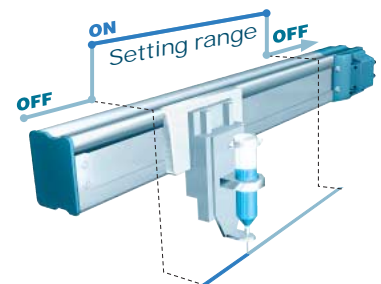
### 5 Torque restriction control

As the torque restriction can be controlled using the program command, the axis can be stopped with the torque applied. This function is usable for continuous positioning of works of different sizes, press-fitting work and work retaining operation.



### 6 Zone output function

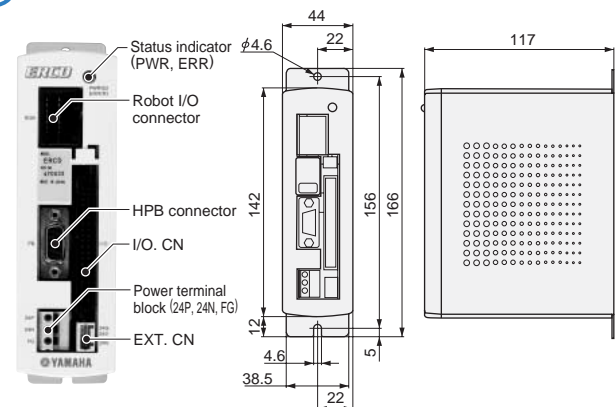
It is possible to set ON / OFF of the general purpose output between any points by using the parameter setting. Also, the axis position can be judged easily by using an external equipment as positive logic / negative logic settings can be made. Settings are acceptable up to 4 patterns.



### 7 Applicability to mechanisms of wide variation

The unit is applicable not only to slider type T4 / T5 and clean specification C4 / C5 but also to the rod type YMS series.

## ERC D part names / dimensions



## ERCDC ordering method

**T5 - 12 - BK -600- 3L -ERCDC- CN1**



Note 1 : For details of the mechanical section, refer to Yamaha FLIP-X catalog.

## ERCDC basic specifications

|  | Item   | Model                              | ERCDC  |  |
|--|--|------------------------------------|--|--|
| Basic specifications                     | Applicable robot                             |                                    | One single-axis robot ( exclusively for T4 / T5 / C4 / C5 / YMS )  |  |
|  | Applicable motor output                      |                                    | DC24V 30W or less  |  |
|  | Dimensions / Weight                          |                                    | W44 x H142 <sup>Note 1</sup> x D117mm / 450g   |  |
|  | Power supply voltage                         |                                    | DC24V+/-10% 3 to 4.5A (Variable depending on robots in use.)   |  |
| General specifications                   | Operating temperature / Storage temperature  |                                    | 0°C to 40°C / -10°C to 65°C  |  |
|  | Operating humidity                           |                                    | 35% to 85%RH (non-condensing)  |  |
|  | Noise resistance capacity                    |                                    | IEC61000-4-4 level 2   |  |
| Axis control                             | Number of controllable axes / Control system |                                    | Single-axis / AC full-digital software servo   |  |
|  | Operation mode                               |                                    | Point trace operation, program operation, Operation by RS232C communication (normal mode), pulse train operation (pulse train mode)  |  |
|  | Position detection method                    |                                    | Resolver   |  |
|  | Servo adjustment                             |                                    | Adjustable with parameter (special), servo gain, current limit, etc.   |  |
| Memory                                   | Resolution                                   |                                    | 16384 P/rev (quadruple)  |  |
|  | ROM  |                                    | 256KB (with built-in CPU)  |  |
|  | RAM  |                                    | Provided with a 32 KB lithium battery as a backup (effective for 5 years) Program, point, parameter and error histories retained   |  |
|  | Programs                                     |                                    | 1024 steps / total or less, 255 steps / 1 program  |  |
|  | Number of Programs / Multitasks              |                                    | 100 / 4  |  |
| I/O interface                            | Points / Point-data input method             |                                    | 1000 / MDI (icoordinate value input), remote teaching, direct teaching   |  |
|  | Normal mode <sup>Note 2</sup>                | Sequence input                     | Dedicated input 8 points (ABS-PT, INC-PT, AUTO-R, STEP-R, ORG-S, RESET, SERVO, LOCK), General input 6 points (DI0 to DI5)  |  |
|  |  | Sequence output                    | Dedicated output 3points (READY, BUSY, END), General output 6 points (DO0 to DO5), Open collector output   |  |
|  |  | Speed setting                      | 1% to 100% in 1% increments  |  |
|  | Pulse train mode <sup>Note 2</sup>           | Acceleration setting               | Automatically set according to robot type and carrying weight, Setting with acceleration parameter, 1% to 100% in 1% increments  |  |
|  |  | Sequence input                     | Dedicated input 5 points (SERVO, ORG-S, INH, PCLR, RESET), Dedicated input 6 points (DI0 to DI5)   |  |
|  |  | Sequence output                    | Dedicated output 3 points (ALM, SRDY, IN-POS), Dedicated output 6 points (DO0 to DO5), Open collector output (50mA/24V max. per 1 output)  |  |
|  |  | Command pulse input                | Type   | 1) Phase A / phase B 2) Pulse / code 3) CW / CCW |
|  |  |                                    | Form   | Line driver (+5V)                                |
|  |  |                                    | Frequency  | 2 Mpps at max.                                   |
| Feedback pulse output                    |  | Type                               | Phase A / phase B / phase Z  |  |
|  | Form   | Line driver (+5V)                  |  |  |
|  | Pulse count                                  | 16 to 4096 P/rev <sup>Note 3</sup> |  |  |
| Power source for sequence input / output |  | DC+24V external input              |  |  |
| Function                                 | Serial communication (RS232C)                |                                    | 1) Various data transmission/reception, parameter setting, robot operation by using the communication command<br>2) Various data transmission/reception, parameter setting, point teaching, robot operation by using HPB / HPB-D, POPCOM (both option) |  |
|  | Emergency stop input                         |                                    | Normal close contact point input   |  |
|  | Brake output                                 |                                    | Relay output (for 24V/300mA brake) 1CH   |  |
|  | Protective function                          |                                    | Over load, over voltage, voltage drop, disconnection of resolver line, detection of abnormal operation, etc.   |  |

Note 1 : The stay is 166mm high.

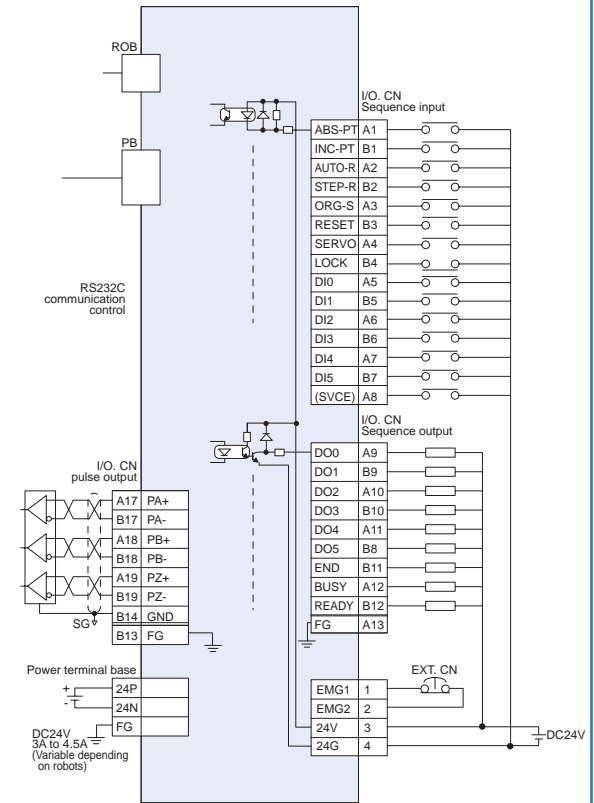
Note 2 : Switching between the normal mode and pulse train mode is done by use of the parameter.

Note 3 : The frequency division can be set using a parameter. ( setting at shipment : 1024 P/rev )

## ERC D command list

| Command | Function   |
|---------|--|
| MOVA    | Move to a specified point (absolute position movement)   |
| MOVI    | Move to a specified point (relative position movement)   |
| MOVF    | Move until the specified DI number is entered  |
| JMP     | Jump to a specified label of the program   |
| JMPF    | Jump to a specified label of the program when conditional jump input matches the set value                     |
| JMPB    | Jump to a specified label of the program when a DI number input matches the condition                          |
| L       | Set the location label   |
| CALL    | Call another program   |
| DO      | Turn general output and internal memory output ON/OFF  |
| WAIT    | Wait until the input/output condition is entered   |
| TIMR    | Set the standby time   |
| P       | Set the execution point number   |
| P+      | Add 1 to the execution point number  |
| P-      | Subtract 1 from the execution point number   |
| SRVO    | Turn servo of all or specified axes ON / OFF   |
| STOP    | Halt execution of the program  |
| ORGN    | Return all or specified axes to the origin   |
| TON     | Start a specified task   |
| TOFF    | End a specified task   |
| JMPP    | Jump to a label designated by axis positioning   |
| MAT     | Define the pallet matrix   |
| MSEL    | Select the pallet number   |
| MOV M   | Move to a the designated pallet work position  |
| JMPC    | Jump to a specified label when the counter variable C matches with the set value                               |
| JMPD    | Jump to a specified label when the counter variable D matches with the set value                               |
| CSEL    | Select the array number of counter array variable C  |
| C       | Set the value at counter array variable C  |
| C+      | Add a specified value to counter array variable C  |
| C-      | Subtract a specified value from counter array variable C   |
| D       | Set the value at counter array variable D  |
| D+      | Add a specified value to counter array variable D  |
| D-      | Subtract a specified value from counter array variable D   |
| SHFT    | Shift the position of specified coordinate data  |
| IN      | The bit information of the specified general purpose input or memory input is stored in the counter variable D |
| OUT     | The value of the counter variable D is output to the specified general purpose output or memory output         |
| LET     | The value of the specified variable is substituted into another variable                                       |
| TORQ    | Definition of maximum torque command value   |

## ERC D input / output wiring diagram



## ERC D connector I/O signals

| Terminal number | Signal name | Function                                 | Terminal number | Signal name | Function                 |
|-----------------|-------------|--|-----------------|-------------|--------------------------|
| A-1             | ABS-PT      | Move the point from the origin position  | A-11            | DO4         | General output 4         |
| B-1             | INC-PT      | Move the point from the current position | B-11            | END         | End normal execution     |
| A-2             | AUTO-R      | Start automatic operation                | A-12            | BUSY        | Executing the command    |
| B-2             | STEP-R      | Start step operation                     | B-12            | READY       | Ready for operation      |
| A-3             | ORG-S       | Return to the origin                     | A-13            | FG          | Frame ground             |
| B-3             | RESET       | Reset                                    | B-13            | FG          | Frame ground             |
| A-4             | SERVO       | Return to servo on                       | A-14            | GND         | Signal ground            |
| B-4             | LOCK        | Interlock                                | B-14            | GND         | Signal ground            |
| A-5             | DI0         | General input 0                          | A-15            | NC          | Reserved (use inhibited) |
| B-5             | DI1         | General input 1                          | B-15            | NC          | Reserved (use inhibited) |
| A-6             | DI2         | General input 2                          | A-16            | NC          | Reserved (use inhibited) |
| B-6             | DI3         | General input 3                          | B-16            | NC          | Reserved (use inhibited) |
| A-7             | DI4         | General input 4                          | A-17            | PA +        | Feedback pulse output    |
| B-7             | DI5         | General input 5                          | B-17            | PA -        | Feedback pulse output    |
| A-8             | (SVCE)      | Service mode input                       | A-18            | PB +        | Feedback pulse output    |
| B-8             | DO5         | General output 5                         | B-18            | PB -        | Feedback pulse output    |
| A-9             | DO0         | General output 0                         | A-19            | PZ +        | Feedback pulse output    |
| B-9             | DO1         | General output 1                         | B-19            | PZ -        | Feedback pulse output    |
| A-10            | DO2         | General output 2                         | A-20            | NC          | Reserved (use inhibited) |
| B-10            | DO3         | General output 3                         | B-20            | NC          | Reserved (use inhibited) |

## ERCD pulse mode function

### 1 Features of pulse train mode

The input exclusively for return to the origin function is provided. After detecting the torque by the mechanism end contacting method, the PHASER stops at the same position each time.

### 2 Electronic gear function

The robot moves by the pulse number as a product of the input command pulse multiplied by the electronic gear ratio. It is effective in the following cases.

- When the pulse output capacity of the upper device is low
- When setting the moving distance for each input pulse arbitrarily

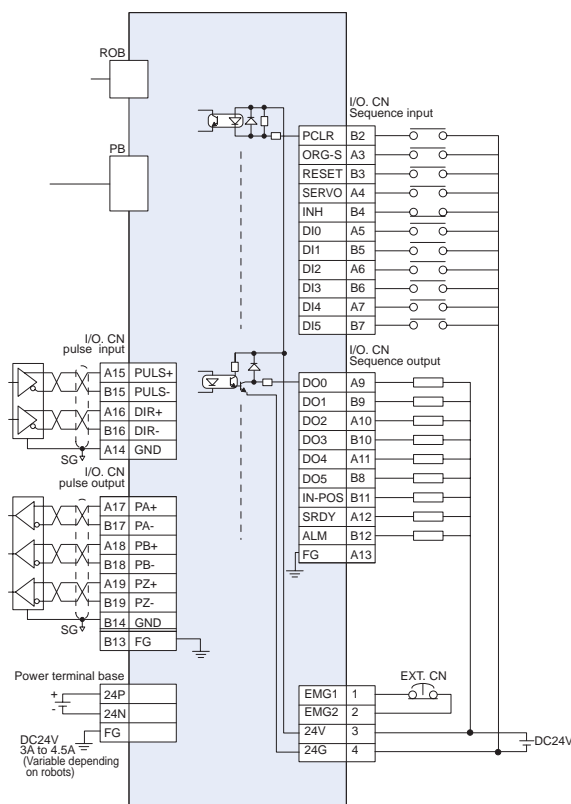
### 3 Feedback pulse output

It is possible to perform differential output of the position data. This function enables the upper equipment to grasp the current position of the robot by real-time.

## ERCD pulse train input form

| Positive logic | Command pulse form | CW direction | CCW direction |
|----------------|--------------------|--------------|---------------|
| Positive logic | Phase A / phase B  |              |               |
|                | Pulse / code       |              |               |
|                | CW / CCW           |              |               |
| Negative logic | Phase A / phase B  |              |               |
|                | Pulse / code       |              |               |
|                | CW / CCW           |              |               |

## ERCD pulse train input / output wiring diagram



## ERCD pulse train I/O connector signals

| Terminal number | Signal name | Function                       | Terminal number | Signal name | Function                 |
|-----------------|-------------|--------------------------------|-----------------|-------------|--------------------------|
| A-1             | NC          | Reserved (use inhibited)       | A-11            | DO4         | General output 4         |
| B-1             | NC          | Reserved (use inhibited)       | B-11            | IN-POS      | In-position output       |
| A-2             | NC          | Reserved (use inhibited)       | A-12            | SRDY        | Servo ready output       |
| B-2             | PCLR        | Differential clear input       | B-12            | ALM         | Alarm output             |
| A-3             | ORG-S       | Return to the origin input     | A-13            | FG          | Frame ground             |
| B-3             | RESET       | Alarm reset input              | B-13            | FG          | Frame ground             |
| A-4             | SERVO       | Servo-ON input                 | A-14            | GND         | Signal ground            |
| B-4             | INH         | Command pulse inhibition input | B-14            | GND         | Signal ground            |
| A-5             | DI0         | General input 0                | A-15            | PULS +      | Command pulse input      |
| B-5             | DI1         | General input 1                | B-15            | PULS -      | Command pulse input      |
| A-6             | DI2         | General input 2                | A-16            | DIR +       | Command direction input  |
| B-6             | DI3         | General input 3                | B-16            | DIR -       | Command direction input  |
| A-7             | DI4         | General input 4                | A-17            | PA +        | Feedback pulse output    |
| B-7             | DI5         | General input 5                | B-17            | PA -        | Feedback pulse output    |
| A-8             | NC          | Reserved (use inhibited)       | A-18            | PB +        | Feedback pulse output    |
| B-8             | DO5         | General output 5               | B-18            | PB -        | Feedback pulse output    |
| A-9             | DO0         | General output 0               | A-19            | PZ +        | Feedback pulse output    |
| B-9             | DO1         | General output 1               | B-19            | PZ -        | Feedback pulse output    |
| A-10            | DO2         | General output 2               | A-20            | NC          | Reserved (use inhibited) |
| B-10            | DO3         | General output 3               | B-20            | NC          | Reserved (use inhibited) |