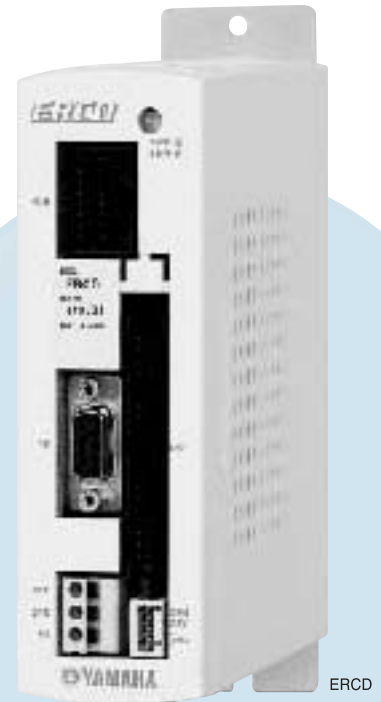


Single-axis
robot controller

ERC D

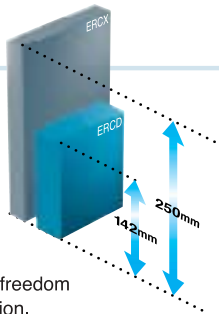
Low price and compact in size.
Multi function controller performing 3 roles.
In addition to the conventional functions,
a pulse train function is added
for a wider application range.



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

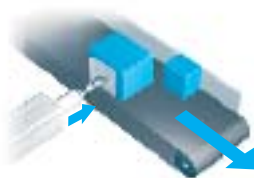
In addition to the conventional YAMAHA controller control, this unit has a new pulse train input function which provides a wider application range including application to the drive axis of the special machine.

4 Reinforced sequence function

The feedback pulse output is effective in the program operation as well as the point trace operation. The 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.

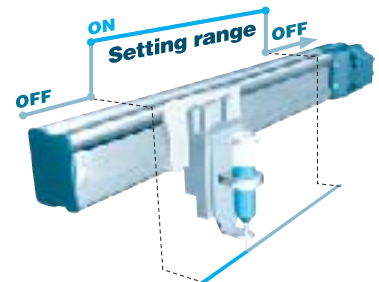
5 Torque restriction control

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

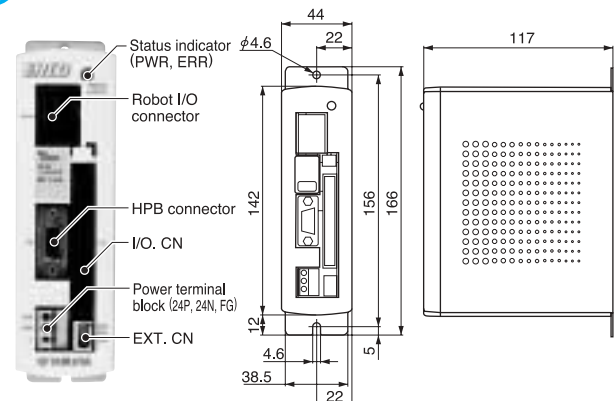
It is possible to set ON/OFF of the general purpose output between any points by using the parameter setting. Also, the axis position can be judged easily by using an external equipment as positive logic/negative logic settings can be made. Settings are acceptable up to 4 patterns.



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



ERCD ordering method

T5 - 12 - BK - 600 - 3L - ERCD - E - CN1



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

ERCD basic specifications

Item	Model	ERCD		
Basic specifications	Applicable robot	Single-axis robot : FLIP-X series (T4 / T5 / C4 / C5), YMS series		
	Applicable motor output	DC24V 30W or less		
	Dimensions/Weight	W44 x H142 ^{Note 1} x D117 / 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.		
	Resolution	16384 P/rev		
Memory	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		
	Points / Point-data input method	1000 / MDI (icoordinate value input), remote teaching, direct teaching		
I/O interface	Normal mode ^{Note 2}	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	
		Acceleration setting	Automatically set according to robot type and carrying weight, Setting with acceleration parameter, 1 to 100% in 1% increments	
	Pulse train mode ^{Note 2}	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	4096 P/rev (quadruple)			
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 2) Various data transmission/reception, parameter setting, point teaching, robot operation by using HPB / HPB-E, 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.		

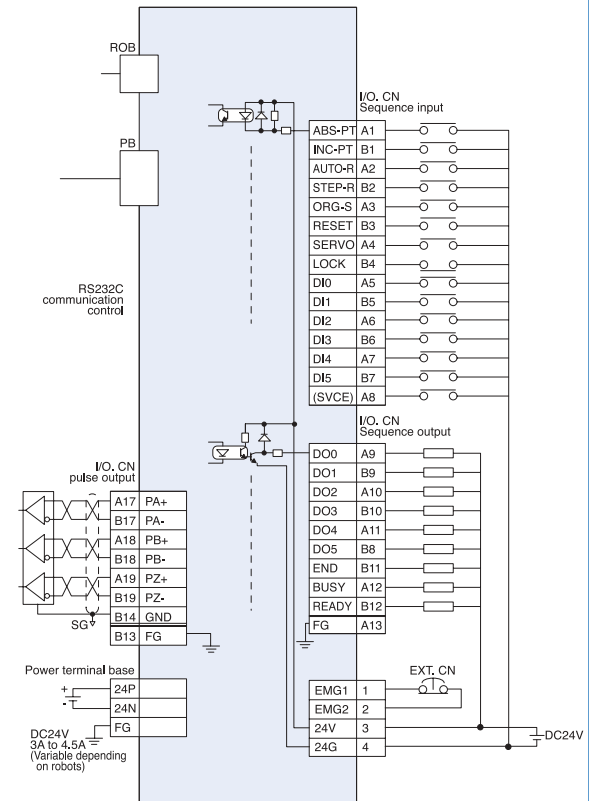
Note 1 : The stay is 166mm high.

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

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

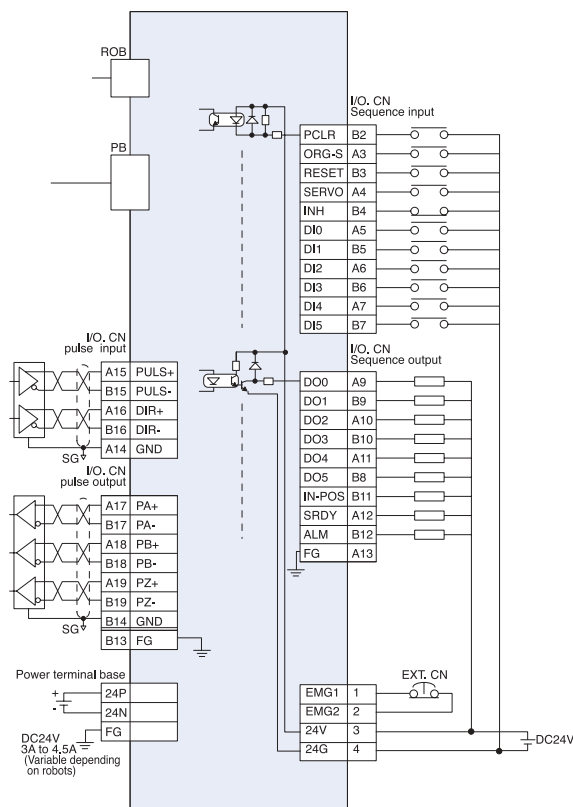
3 Feedback pulse output

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)