

# EDX series Electric Slide Table

Product features/ Code of order

**CHELIC**

## Feature

- Belt and screw moving type
- Close-Loop step motor
- High precision



## Specification

Item	Model	EDX 16	
Gripper stroke	mm	30, 50, 75, 100	
Lead	mm	1	2
Max. thrust	N	466	233
Work load	kg		
	Horizontal	6	3
	Vertical	2	1
Speed	mm/s	0~50	0~100
Actuation type		Worm wheel, Belt drive	
Ambient and fluid temperature	°C	5~40	
Operating humidity range	%	35~85	
Motor size		25 □	
Position repeatability	mm	±0.02	
Idling stroke	mm	0.3 or less	

Note: 1. Idling stroke: Reference value when correcting the error caused by reciprocating motion.

2. The speed and thrust will change base on the length of the wire, load weight and mounting conditions...etc. If the length of the wire over 5m, the speed and thrust will reduce 10% per 5m.

3. If the load weight over the recommended value, the lifetime will shorter.

## Code of order **EDX - 16 - 30 - 03 - 1 - P**

1 2 3 4 5

1	Mark	Motor size □
	16	25

2	Mark	Stroke(mm)
	30	30
	50	50
	75	75
	100	100

3	Mark	Wire length(m)
	01	1
	03	3
	05	5
	10	10

● Standard: 3M

4	Mark	Lead
	1	1
	2	2

5	Mark	Actuator
	P	P-servo

● Standard component Refer to P6-1.89

# EDX series Electric Slide Table

## Model selection-1

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**Seq 1** Confirm the mass transported and velocity → **Seq 2** Confirm the actuation time → **Seq 3** Confirm the allowable torque

### Seq 1 Confirm the mass transported and velocity

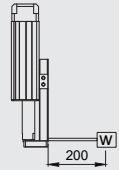
Based on the (velocity–mass transported curve chart) to select the target model by the mass of workpiece and speed.

※EDX16-50 is temporarily selected according to the conditions listed on the right side.

#### Conditions of Use

- Mass of Workpiece: 0.5 (kg)
- Velocity: 100 (mm/s)
- Installation Method: Vertical
- Stroke: 50 (mm)
- Acceleration/Deceleration: 5,000 (mm/s<sup>2</sup>)

#### • Conditions of Workpiece Installation:



### Seq 2 Confirm the mass transported and velocity

Based on the (velocity–mass transported curve chart) to select the target model by the mass of workpiece and speed.

Method 1: Confirm by the curve chart (actuation time)

Method 2: Confirm by the formula (curve chart of velocity–movable mass)

The actuation time can be thereby calculated by the method as follows.

Actuation Time: to obtain T from the equation as below

$$T = T1 + T2 + T3 + T4 (s)$$

- T1: time of acceleration, and T3: the time of acceleration can be acquired from the equation below.

$$T1 = V/a1 (s) \quad T3 = V/a2 (s)$$

- T2: the time of constant velocity can be acquired from the equation below.

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

- T4: time of stability varies due to different motor models, and different positioning widths of step position, where selection should be made referring to conditions as shown as follows as well as the positioning widths of step position.

$$T4 = 0.15 (s)$$

Example)

Provided the values from T1 to T4 are as follows.

$$T1 = V/a1 = 100/5000 = 0.02 (s)$$

$$T3 = V/a2 = 100/5000 = 0.02 (s)$$

$$T2 = \frac{L - 0.5 \cdot V \cdot (T1 + T3)}{V}$$

$$= \frac{50 - 0.5 \cdot 100 \cdot (0.02 + 0.02)}{100}$$

$$= 0.48 (s)$$

$$T4 = 0.15 (s)$$

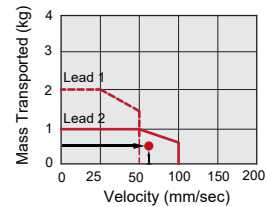
Hence, work time: T is

$$T = T1 + T2 + T3 + T4$$

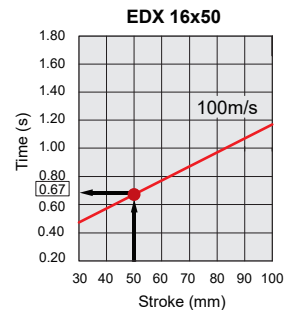
$$= 0.02 + 0.48 + 0.02 + 0.15$$

$$= 0.67 (s)$$

#### EDX 16x50/ Vertical Use



#### Velocity – Mass transported curve chart

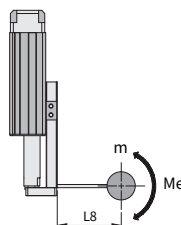


#### Actuation time

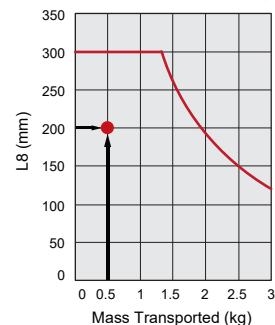
### Seq 3 Confirm the allowable torque(allowable static torque)

Please confirm whether the dynamic torque and static torque applied on operating units are allowable.

According to the outcomes shown as above, EDX16–50 is selected.



#### EDX 16/ Axial Bending



#### Allowable dynamic torque

# EDX series Electric Slide Table

## Model selection-1

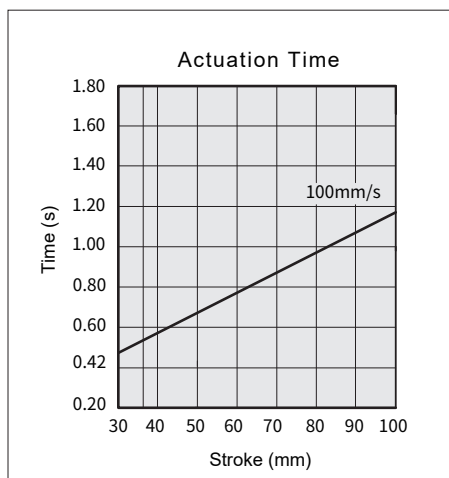
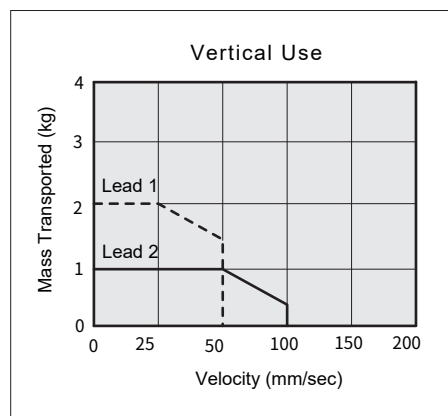
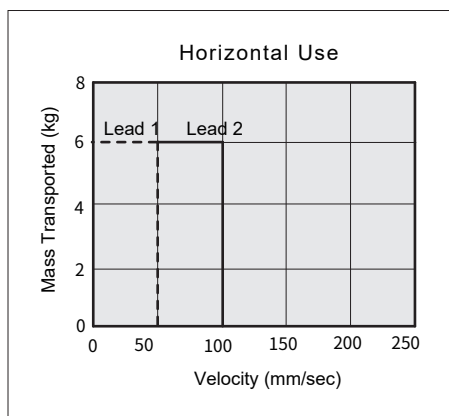
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### Velocity – Mass Transported Curve Chart

Step Motor (with a DC24V encoder)

※The table below shows when the positioning thrust force is at 100%

#### Velocity – Movability Curve Chart



#### Operating Conditions

- Acceleration/Deceleration: 3000mm/s<sup>2</sup>
- Positioning Width: 0.5mm

#### Allowable Static Torque

Model	EDX16
Axial Bending	4.8 (N·m)
Biased	4.8 (N·m)
Reverse	1.8 (N·m)

EDG

EDF

EDM

EDQ

EDX

EQX

EDK

ETB

P-SERVO

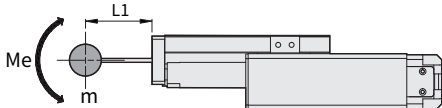
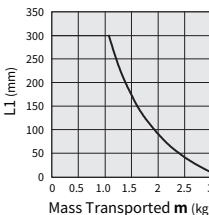
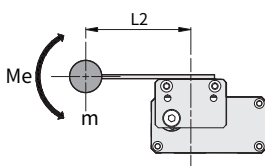
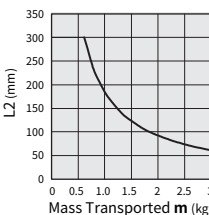
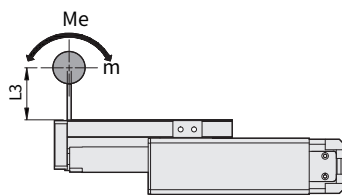
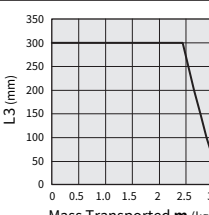
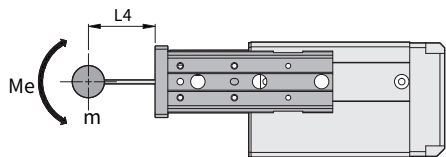
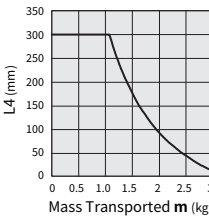
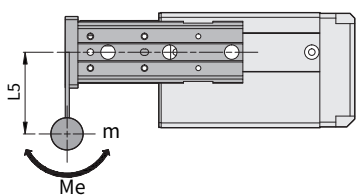
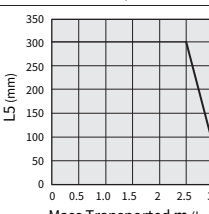
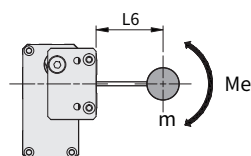
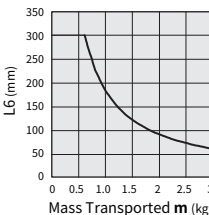
Operation  
manual

# EDX series Electric Slide Table

## Allowable torque

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### Allowable torque

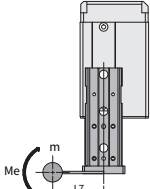
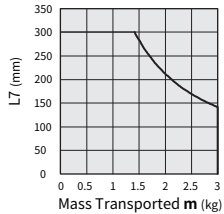
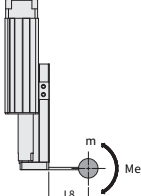
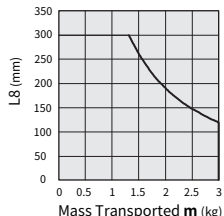
Method	Direction of Load Extension m: Mass Transported (kg) Me: Allowable Dynamic Torque (N · m) L: Extension of the Center of Gravity of Workpiece (mm)		Model
			EDX 16
Horizontal • Top		X	
		Y	
		Z	
Walls		X	
		Y	
		Z	

# EDX series Electric Slide Table

Allowable torque, Calculation of load factor of lead

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## Allowable dynamic torque

Method	Direction of Load Extension m: Mass Transported (kg) Me: Allowable Dynamic Torque (N·m) L: Extension of the Center of Gravity of Workpiece (mm)	Model	
		EDX 16	
Vertical		X	
		Y	

## Calculation of load factor of lead

1. Determine the conditions of use

- Model: EDX
- Size: 16
- Dimension of Installation: Horizontal/ Top/ Horizontal Walls/Vertical

2. Select the corresponding graphs based on model, size and installation method

3. According to the acceleration and mass transported, we can learn the outward extension (mm) from the graphs:  $Lx/Ly/Lz$ .

4. Solve the load factor of each direction.

$$ax = Xc/Lx \quad ay = Yc/Ly \quad az = Zc/Lz$$

5. Confirm the sum of  $ax$ ,  $ay$  and  $az$  is less than or equal to 1.

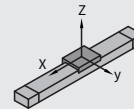
$$ax + ay + az \leq 1$$

If the value exceeds 1, please take the countermeasures such as reducing the acceleration, lowering the mass transported, changing the center of gravity or changing the series.

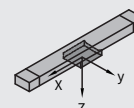
- Acceleration (mm/s<sup>2</sup>): a
- Mass Transported (kg): m
- Center of Gravity of Mass Transported (mm):  $Xc/Yc/Zc$

### Installation Method

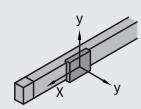
1. Horizontal



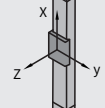
2. Top



3. Horizontal Walls



4. Vertical



## Example

1. Conditions of Use

- Model: EDX
- Spec: 16
- Installation Method: Horizontal
- Acceleration (mm/s<sup>2</sup>): 5000
- Mass Transported (kg): 0.6
- Center of Gravity of Mass Transported (mm):  $Xc=50, Yc=30, Zc=60$

2.  $Lx=220mm, Ly=135mm, Lz=250mm$

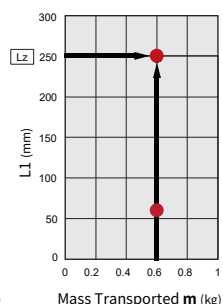
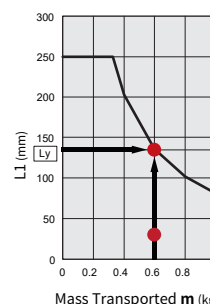
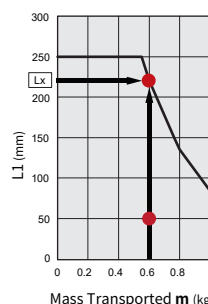
3. The load factors in each direction are shown as follows.

$$ax = 50/220 = 0.23$$

$$ay = 30/135 = 0.22$$

$$az = 60/250 = 0.24$$

4.  $ax + ay + az = 0.69 \leq 1$



EDG

EDF

EDM

EDQ

EDX

EQX

EDK

ETB

P-SERVO

Operation  
manual

# EDX series Electric Slide Table

## Model selection-2

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**Seq 1** Confirm the required thrust force

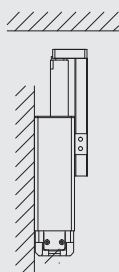
→ **Seq 2** Confirm the setup of thrust force

→ **Seq 3** Confirm the duty ratio

### Example

#### Conditions of Use

- Thrust Force: 90N
- Mass of Workpiece: 1kg
- Velocity: 100mm/s
- Stroke: 100mm
- Installation Method: Vertical and Upward
- Gripping Time+Actuation(A): 1.5sec
- Full Actuation Time(B): 6sec



### Seq 1 Confirm the required thrust force

The overall required thrust force can be calculated hereby

- Thrust Force: 90 (N)
  - Mass of Workpiece: 1 (kg)
- Hence, the overall required thrust force is:  $90 + 10 = 100$  (N)

According to the Spec Table

- Overall Required Thrust Force: 100 (N)
  - Velocity: 100(mm/s). Hence, EDX 16□ is temporarily selected.
- Then, we will calculate the necessary thrust force for thrusting.  
When selecting a vertical and upward installation method, the mass of the slider carrying the components must also be included.

According to the table of slider mass

- EDX 16□ Slider Mass: 0.55 (kg)
- Hence, the required thrust force is:  $100 + 5 = 105$  (N)

### Seq 2 Confirm the setup of thrust force

Referring to the thrust force default-thrust force line graph, the target model must be selected via necessary thrust force to confirm the thrust force default.

- From the right table
- Required Thrust Force: 105 (N)  
Hence, EDX 16x□ is temporarily selected.  
The thrust force setup is at 40 (%)

### Seq 3 Confirm the duty ratio

According to the allowable duty cycle, the allowable duty cycle is confirmed by the thrust force setup.

According to the Allowable Duty Cycle Table

- Thrust Force Setup: 40 (%)
- Hence, the allowable duty cycle is 30 (%).

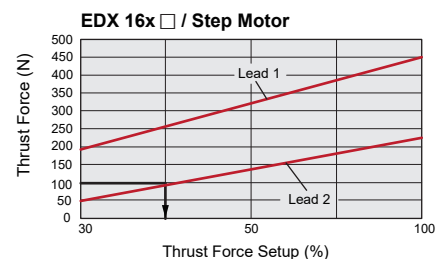
Based on the conditions of use to calculate the duty cycle, where the allowable duty cycle will be acquired depending on the conditions as below.

- Gripping Time+Actuation(A): 1.5sec
  - Total Actuation Time(B): 6sec
- Hence, the duty cycle is  $1.5/6 \times 100 = 25(\%)$ , which is within the allowable range.

According to the outcomes above, EDX 16-100 is to be selected.  
For the selection method of allowable torque, it is as the same as the selection of positioning control.

Model	Stroke (mm)			
	30	50	75	100
EDX 16 Slider	0.27	0.34	0.45	0.55

※ Slider mass should be added into the calculation when installing in vertical and upward direction.

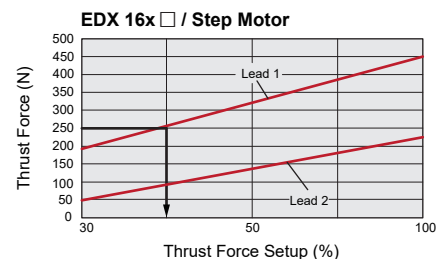
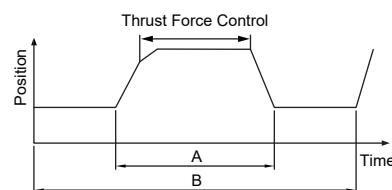


Thrust Force Setup - Thrust Force Line Graph

### Allowable Duty Cycle

Step Motor (with a DC24V encoder)

Thrust Force Setup (%)	Duty Cycle (%)	Continuous Thrust Time (min)
30	—	—
50 below	30 below	5 below
70 below	20 below	3 below



Thrust Force Setup - Thrust Force Line Graph

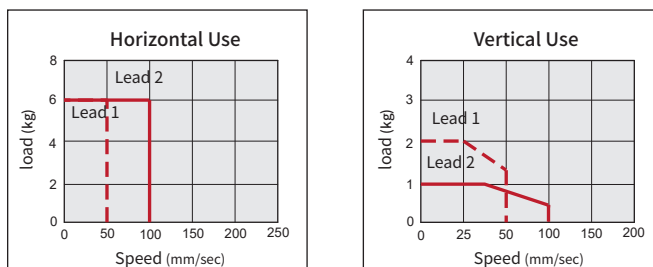
Step Motor (with a DC24V encoder)

# EDX series Electric Slide Table

## Characteristics graph, Mounting type

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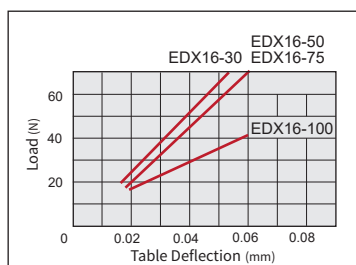
### Load-Speed graph



### Slide Table Deflection (Reference Value)

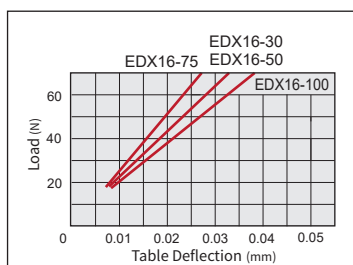
#### Table Deflection by horizontal load

Table Deflection at arrow mark caused by weight of load when Slide Table extends out.



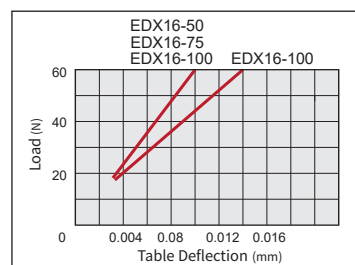
#### Table Deflection by lateral load

Table Deflection at arrow mark caused by weight of load when Slide Table extends out.

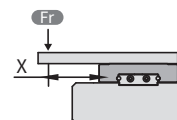
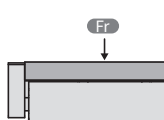
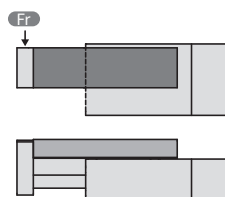
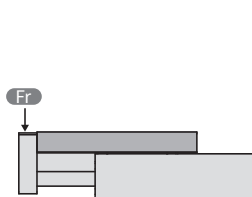


#### Table Deflection by offset load

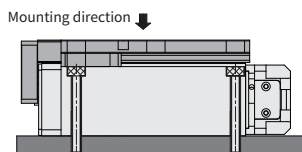
Deflection at arrow mark caused by resulting torque at center of offset load cylinder.



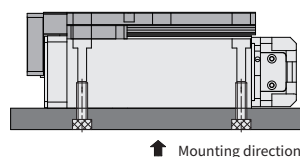
X=40mm



### Body through hole installation



### Body screw hole installation



### Product weight

Item	Model	EDX 16			
		30mm	50mm	75mm	100mm
Weight (kg)		1	1.1	1.2	1.3

EDG

EDF

EDM

EDQ

EDX

EQX

EDK

ETB

P-SERVO

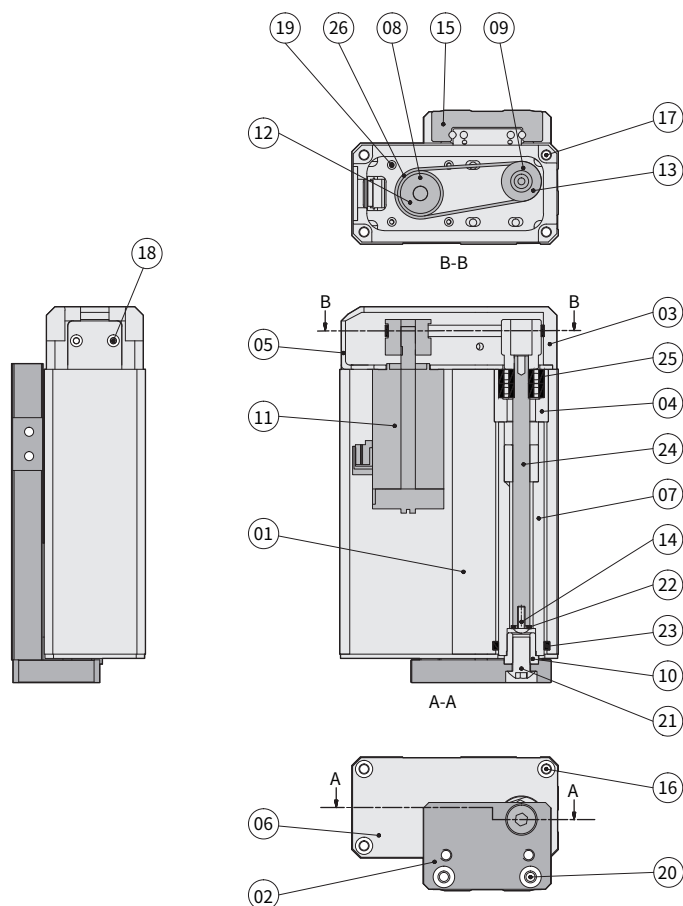
Operation manual

# EDX series Electric Slide Table

## Product features

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### EDX



### Components and material list

No.	Name	Material	No.	Name	Material
01	Body	Aluminum alloy	14	Screw nuts	Alloy steel
02	Front plate	Aluminum alloy	15	Slider with slide base	Stainless
03	Rear cover	Aluminum alloy	16	Front rail fixing screw	Alloy steel
04	Bearing mount ring	Aluminum alloy	17	Rear cover mount screws	Alloy steel
05	Motor fixing plate	Stainless	18	Motor fixing plate fixing screw	Alloy steel
06	Front block	Stainless	19	Motor Fixing Screw	Alloy steel
07	Main shaft	Carbon steel	20	Front slider fixing screw	Alloy steel
08	Motor drive wheel	Aluminum alloy	21	Braces fixing screws	Alloy steel
09	Screw synchronization wheel	Aluminum alloy	22	Screw	POM
10	Bush	Carbon steel	23	Packing	Rubber
11	Closed loop motor	Customized	24	Ball screw	Customized
12	Motor drive wheel set screw	Alloy steel	25	Bearing	Bearing steel
13	Screw synchronization wheel set screw	Alloy steel	26	Timing belt	Customized



## Dimensions

EDX



EDF

EDM

EDQ

EDX

**EQX**

EDK

ETB

## P-SERVO

# Operation manual

6-1.57