ECR

Controller

CONTENTS

Product introduction	Intro Page
● Specifications/How to order/Dimensions/System configuration	**94**
· Parallel I/O (PIO)	**96**
· IO-Link	**100**
· CC-Link	**101**
· EtherCAT	**102**
· Cables	**103**
· Related parts	**104**
⚠ Safety precautions	**118**

Controller

ECR Series

Controller for EBS-M, EBR-M, FLSH, FLCR, FGRC

How to order

ECR-MNNN3B - NP A 02

(A) (B) (C)

(A) Interface specifications	
NP	Parallel I/O (NPN and PNP common)
LK	IO-Link
CL	CC-Link
EC	EtherCAT

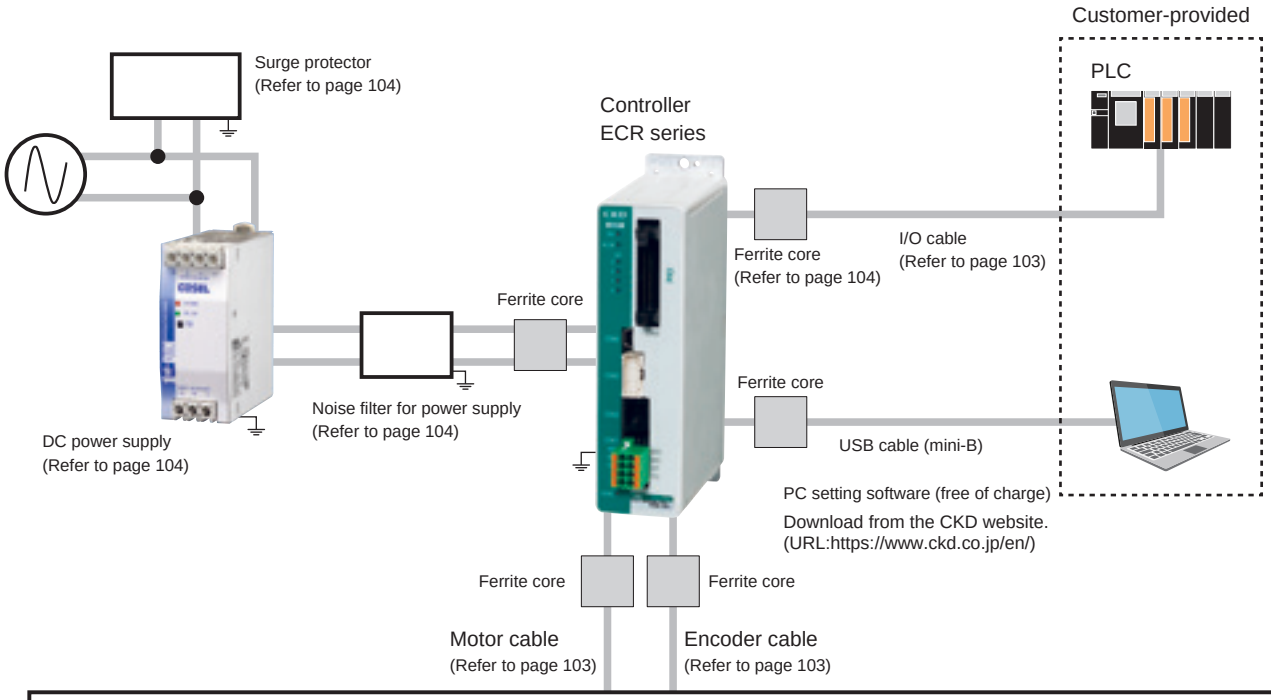
(B) Mounting method	
A	Standard mount
D	DIN rail mount

(C) IO cable length *1	
00	None
02	2 m
03	3 m
05	5 m
10	10 m

*1 Select "None" when selecting interface specifications other than "Parallel I/O".

Product subject to the EAR (EAR99)

System configuration



Connectable actuators

EBS-M Series
(Page 1)

EBR-M Series
(Page 47)

FLSH Series
(Catalog No. CC-1444A)

FLCR Series
(Catalog No. CC-1444A)

FGRC Series
(Catalog No. CC-1444A)

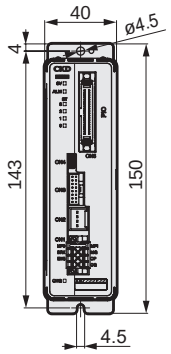
* Refer to the Instruction Manual for details on installing and wiring noise filters, surge protectors, and ferrite cores.

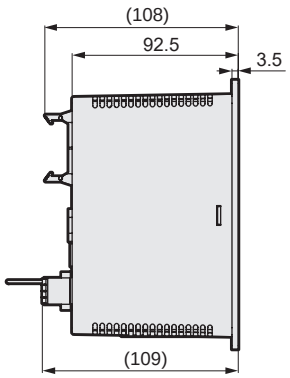
General specifications

Item		Description						
Applicable actuators		EBS-M/EBR-M			FLSH/FLCR/FGRC			
Applicable motor sizes		□35	□42	□56	□20	□25	□25L	□35
Settings tool		PC setting software (S-Tools) Connection cable: USB cable (mini-B)						
External interface	Parallel I/O specification	24 VDC ±10%, input/output max. 16 points, cable length max. 10 m						
	Field network specification	IO-Link, CC-Link, EtherCAT						
Display lamp		Servo ON/OFF LED, alarm status LED Status LED, communication status LED (according to each interface specification)						
Power supply voltage	Control power	24 VDC ±10% or 48 VDC ±10%						
	Power supply	24 VDC ±10% or 48 VDC ±10%						
Current consumption	Control power	0.6 A or less						
	Power supply	2.8 A or less	3.7 A or less	6.1 A or less	1.1 A or less	2.1 A or less	3.2 A or less	3.0 A or less
Motor section max. instantaneous current		4.0 A or less	5.2 A or less	8.6 A or less	1.5 A or less	3.0 A or less	4.5 A or less	4.2 A or less
Brake current consumption		0.4 A or less						
Insulation resistance		10 MΩ and over at 500 VDC						
Withstand voltage		500 VAC for 1 minute						
Operating ambient temperature		0 to 40 °C (no freezing)						
Operating ambient humidity		35 to 80% RH (no condensation)						
Storage ambient temperature		-10 to 50 °C (no freezing)						
Storage ambient humidity		35 to 80% RH (no condensation)						
Working atmosphere		No corrosive gas, explosive gas, or dust						
Degree of protection		IP20						
Weight		Approx. 400 g (standard mount) Approx. 430 g (DIN rail mount)						

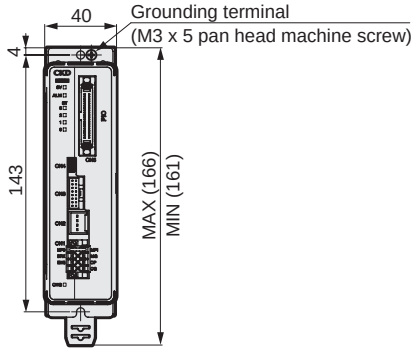
Dimensions

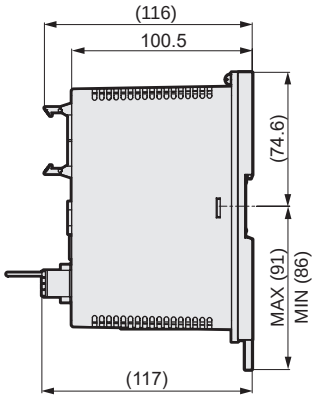
● Standard mount (ECR-MNNN3B-□A□)





● DIN rail mount (ECR-MNNN3B-□D□)



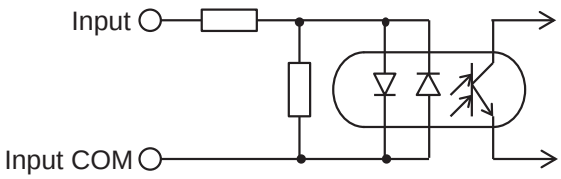


Parallel I/O (PIO) input/output circuit

Input specification

Item	ECR-MNNN3B-NP□□
No. of inputs	16 points
Input voltage	24 VDC ±10%
Input current	3.7 mA/1 point
ON voltage	19 V or higher
OFF current	0.2 mA or less

Input circuit

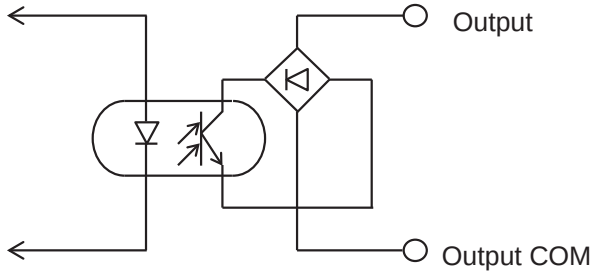


The input is not polarized.
(The input COM can be used with either + or -)

Output specifications

Item	ECR-MNNN3B-NP□□
No. of I/O points	16 points
Load voltage	24 VDC ±10%
Load current	20 mA or less/1 point
Internal voltage drop	3 V or less
Leakage current	0.1 mA or less
Output short-circuit protection circuit	Yes
Connecting load	PLC, etc.

Output circuit



The output is not polarized.
(The output COM can be used with either + or -)

Parallel I/O (PIO) operation mode

Controllers offer nine operation modes.
Use the PC setting software to set the appropriate operation mode. The initial setting is 64-point mode.

Operation mode	Positioning point count	Overview
64-point mode	64 points	· Travel output · Point zone output: 1 point · Zone output: 2 points
128-point mode	128 points	· Travel output · Selectable output: 2 points (point zone, zone 1, zone 2, travel)
256-point mode	256 points	· Selectable output: 2 points (point zone, zone 1, zone 2, travel)
512-point mode	512 points	· Selectable output: 1 point (point zone, zone 1, zone 2, travel)
Teaching 64-point mode	64 points	· JOG (INCH) travel start input · Travel output · Selectable output: 2 points (point zone, zone 1, zone 2, travel)
Simple 7-point mode	7 points	· Travel output · Zone output: 2 points
Solenoid mode Double 2-position type	2 points	· SW output: 2 points · Point zone output: 1 point · Travel output · Zone output: 2 points
Solenoid mode Double 3-position type	2 points	· SW output: 2 points · Point zone output: 1 point · Travel output · Zone output: 2 points
Solenoid mode Single type	2 points	· SW output: 2 points · Point zone output: 1 point · Travel output · Zone output: 2 points

Parallel I/O (PIO) signal name list

Input signal

Abbreviation	Name	Abbreviation	Name
PST	Point travel start	JIM	JOG/INCH (-) travel start
PSB*	Point number selection bit*	JIP	JOG/INCH (+) travel start
OST	Origin return start	INCH	INCH selection
SVON	Servo ON	P*ST	Point number * travel start
ALMRST	Alarm reset	V1ST	Solenoid valve travel instruction 1
STOP	Stop	V2ST	Solenoid valve travel instruction 2
PAUSE	Pause	VST	Solenoid valve travel instruction
WRST	Write start		
TEACH	Teaching selection		

Output signal

Abbreviation	Name	Abbreviation	Name
PEND	Point travel complete	ALM	Alarm
PCB*	Point number confirmation bit *	WARN	Warning
ACB*	Alarm confirmation bit *	READY	Operation preparation complete
PZONE	Point zone	WREND	Write complete
MOVE	Moving	TEACHS	Teaching status
ZONE1	Zone 1	P*END	Point number * travel complete
ZONE2	Zone 2	SW1	Switch 1
OEND	Origin return complete	SW2	Switch 2
SONS	Servo ON state		

Parallel I/O (PIO) operation mode and signal assignment

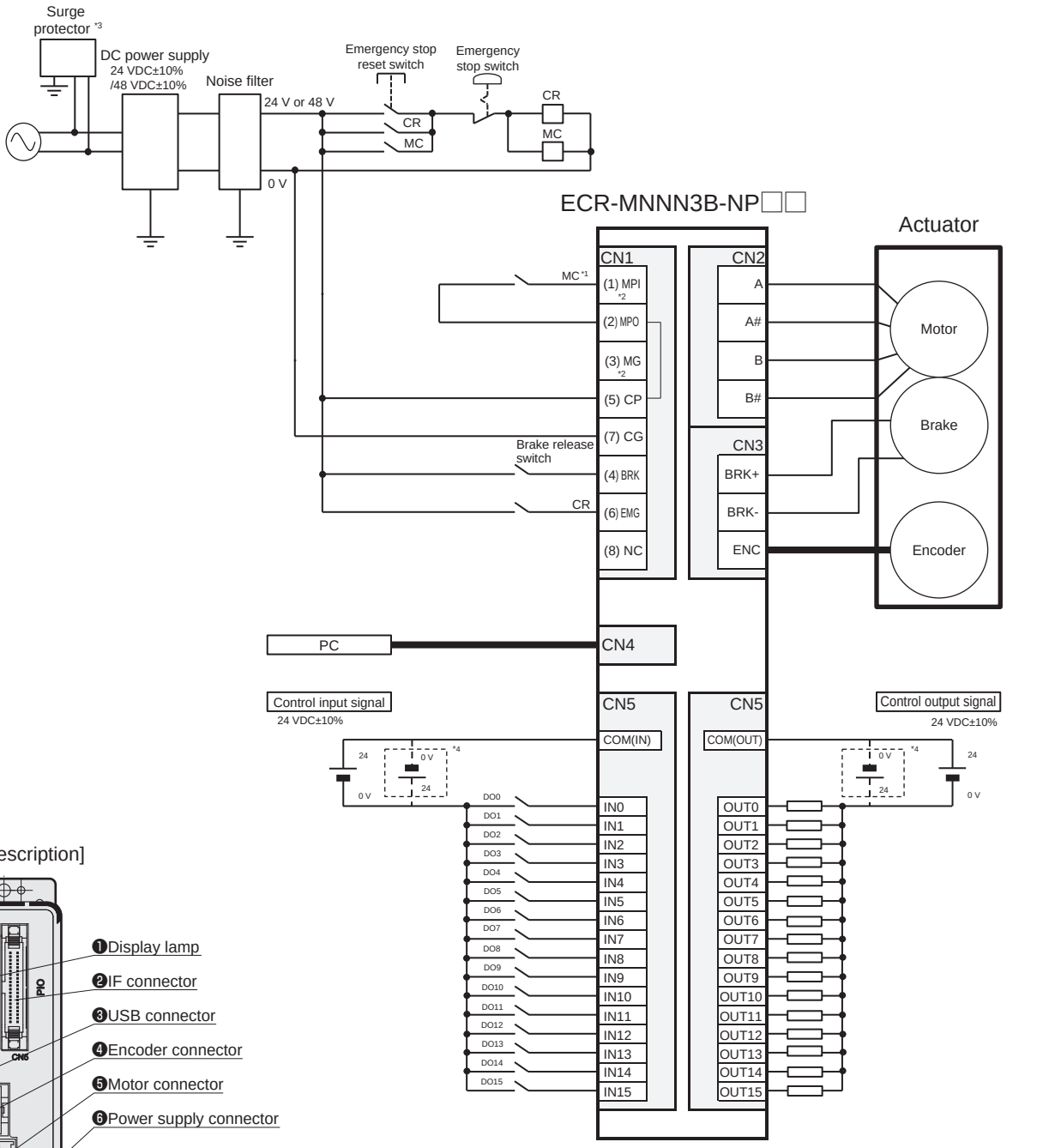
The following figure shows signal assignments in each operation mode.

Operation mode		64 points Mode	128 points Mode	256 points Mode	512 points Mode	Teaching 64-point mode	Simple 7-point mode	Solenoid mode Double 2-position type	Solenoid mode Double 3-position type	Solenoid mode Single type
Positioning point count		64	128	256	512	64	7	2	2	2
Input	IN0	PSB0	PSB0	PSB0	PSB0	PSB0	P1ST	V1ST	V1ST	-
	IN1	PSB1	PSB1	PSB1	PSB1	PSB1	P2ST	V2ST	V2ST	VST
	IN2	PSB2	PSB2	PSB2	PSB2	PSB2	P3ST	-	-	-
	IN3	PSB3	PSB3	PSB3	PSB3	PSB3	P4ST	-	-	-
	IN4	PSB4	PSB4	PSB4	PSB4	PSB4	P5ST	-	-	-
	IN5	PSB5	PSB5	PSB5	PSB5	PSB5	P6ST	-	-	-
	IN6	-	PSB6	PSB6	PSB6	TEACH	P7ST	-	-	-
	IN7	-	-	PSB7	PSB7	JIM	-	-	-	-
	IN8	-	-	-	PSB8	JIP	-	-	-	-
	IN9	-	-	-	-	INCH	-	-	-	-
	IN10	PST	PST	PST	PST	PST/ WRST	-	-	-	-
	IN11	OST	OST	OST	OST	OST	OST	OST	OST	OST
	IN12	SVON	SVON	SVON	SVON	SVON	SVON	SVON	SVON	SVON
	IN13	ALMRST	ALMRST	ALMRST	ALMRST	ALMRST	ALMRST	ALMRST	ALMRST	ALMRST
	IN14	STOP#	STOP#	STOP#	STOP#	STOP#	STOP#	-	-	-
	IN15	PAUSE#	PAUSE#	PAUSE#	PAUSE#	PAUSE#	PAUSE#	-	-	-
Output	OUT0	PCB0/ ACB0	PCB0/ ACB0	PCB0/ ACB0	PCB0/ ACB0	PCB0/ ACB0	P1END	P1END	P1END	P1END
	OUT1	PCB1/ ACB1	PCB1/ ACB1	PCB1/ ACB1	PCB1/ ACB1	PCB1/ ACB1	P2END	P2END	P2END	P2END
	OUT2	PCB2/ ACB2	PCB2/ ACB2	PCB2/ ACB2	PCB2/ ACB2	PCB2/ ACB2	P3END	-	-	-
	OUT3	PCB3/ ACB3	PCB3/ ACB3	PCB3/ ACB3	PCB3/ ACB3	PCB3/ ACB3	P4END	-	-	-
	OUT4	PCB4	PCB4	PCB4	PCB4	PCB4	P5END	SW1	SW1	SW1
	OUT5	PCB5	PCB5	PCB5	PCB5	PCB5	P6END	SW2	SW2	SW2
	OUT6	PZONE	PCB6	PCB6	PCB6	TEACHS	P7END	-	-	-
	OUT7	MOVE	MOVE	PCB7	PCB7	MOVE	MOVE	MOVE	MOVE	MOVE
	OUT8	ZONE1	PZONE/ ZONE1/ ZONE2/ MOVE	PZONE/ ZONE1/ ZONE2/ MOVE	PCB8	PZONE/ ZONE1/ ZONE2/ MOVE	ZONE1	ZONE1	ZONE1	ZONE1
	OUT9	ZONE2	PZONE/ ZONE1/ ZONE2/ MOVE	PZONE/ ZONE1/ ZONE2/ MOVE	PZONE/ ZONE1/ ZONE2/ MOVE	PZONE/ ZONE1/ ZONE2/ MOVE	ZONE2	ZONE2	ZONE2	ZONE2
	OUT10	PEND	PEND	PEND	PEND	PEND/ WREND	PZONE	PZONE	PZONE	PZONE
	OUT11	OEND	OEND	OEND	OEND	OEND	OEND	OEND	OEND	OEND
	OUT12	SONS	SONS	SONS	SONS	SONS	SONS	SONS	SONS	SONS
	OUT13	ALM#	ALM#	ALM#	ALM#	ALM#	ALM#	ALM#	ALM#	ALM#
	OUT14	WARN#	WARN#	WARN#	WARN#	WARN#	WARN#	WARN#	WARN#	WARN#
	OUT15	READY	READY	READY	READY	READY	READY	READY	READY	READY

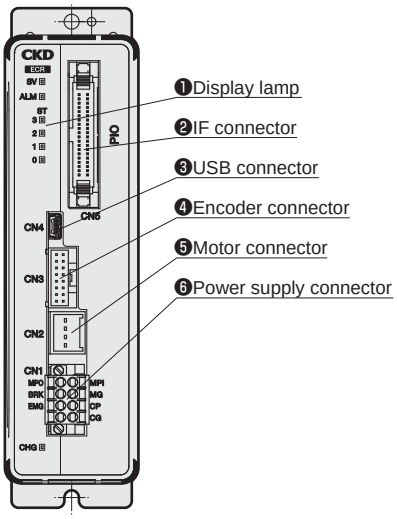
* The pound sign (#) indicates a negative logic signal.

Parallel I/O connection diagram (ECR-MNNN3B-NP**)

[PIO]



[Panel description]



*1 For safety category support, connect the contact of an electromagnetic switch or other device between the MPI and MPO terminals when motor drive power must be shut OFF.
(Connected with jumper wires at shipment.)
*2 The MPI and MG terminals can be used to isolate the motor power supply and control power supply.
*3 A surge protector is required to comply with the CE marking.
*4 This can be used even if the polarity is reversed.

● Accessories

Part name	Manufacturer model	Manufacturer
Power supply connector	DFMC1, 5/4-STF-3, 5	PHOENIX CONTACT

Description of field network operation modes

Operation mode	Overview
PIO mode (PIO)	Point operation can be used and signal assignment of inputs and outputs can be changed in the operation mode (PIO) in the same manner as with the parallel I/O specification. However, you cannot select a direct-value operation that sets the operating conditions for operation directly from the PLC. Reading and writing of parameters does not work and the monitoring function cannot be used. Refer to the table below for details.
Simple direct value mode (SDP)	Switching the direct travel selection signal enables a target position to be arbitrarily be set by the PLC or 512 point operation. The selected direct travel operation method can then be used. Reading and writing of parameters does not work and the monitoring function can be used. Refer to the table below for details.
Full direct value mode (FDP)	Switching the direct travel selection signal enables operating conditions to be arbitrarily be set by the PLC or 512 point operation. The selected direct travel operation method can then be used. Reading and writing of parameters does not work and the monitoring function can be used. Refer to the table below for details.

Operation mode		PIO	SDP	FDP
Parameter read/write		Not available	Available	Available
Direct value travel selection*1		Selection not possible	1	1
Positioning point count		512	Unlimited	Unlimited
Direct value travel item*2	Target position	-	OK	OK
	Positioning width	-	-	OK
	Speed	-	-	OK
	Acceleration	-	-	OK
	Deceleration	-	-	OK
	Pressing rate	-	-	OK
	Pressing distance	-	-	OK
	Pressing speed	-	-	OK
	Position specification method	-	-	OK
	Operation mode	-	-	OK
	Stop method	-	-	OK
	Acceleration/ deceleration method	-	-	OK
Monitor item*3	Position	-	OK	OK
	Speed	-	△	▲
	Current	-	△	▲
	Alarm	-	△	▲

*1: When the direct value travel selection is 0, it operates with the value set by the point data. This enables up to 512 positioning points.
*2: OK indicates items operated with the value set by the PLC. - indicates operation with the value set by the point data.
*3: OK indicates an item that can be monitored on all networks at all times. - indicates items that cannot be monitored.
△ indicates an item that can be selected from △ and monitored 1 at a time with IO-Link or CC-Link, but simultaneously for EtherCAT.
▲ indicates and item that can be selected from ▲ and monitored 1 at a time for IO-Link, but simultaneously for CC-Link or EtherCAT.

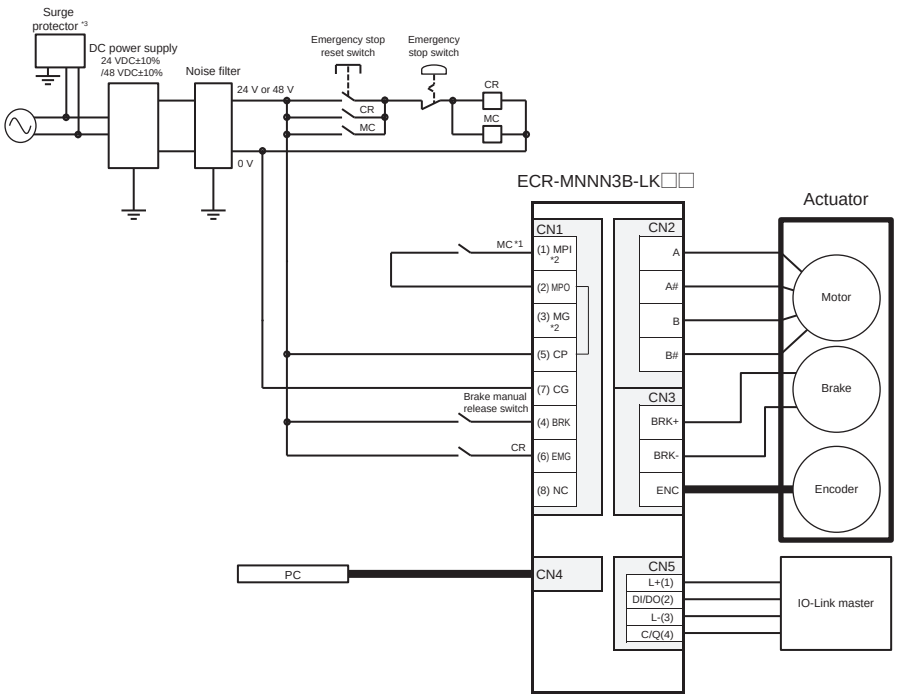
IO-Link specifications and connection diagram (ECR-MNNN3B-LK**)

[Communication specifications]

Item	Specifications
Communication protocol Version	V1.1
Transmission bit rate	COM3 (230.4kbps)
Port	Class A
Process data length (Input) PD (in) data length	PIO mode: 2 bytes
	Simple direct value mode: 9 bytes
	Full direct value mode: 9 bytes
Process data length (Output) PD (out) data length	PIO mode: 2 bytes
	Simple direct value mode: 7 bytes
	Full direct value mode: 22 bytes
Minimum cycle Time	PIO mode: 1 ms
	Simple direct value mode: 2 ms
	Full direct value mode: 2.5 ms
Monitor function	Position, speed, current, alarm

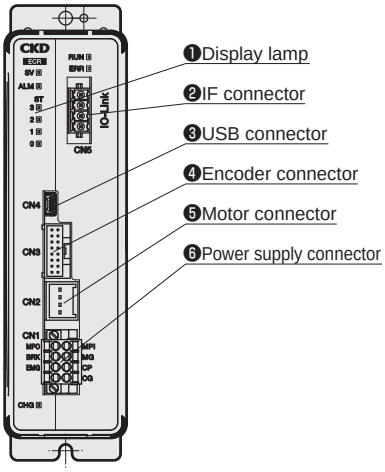
* Items that can be monitored change depending on the mode. Refer to page 99 for details.

[IO-Link]



*1 For safety category support, connect the contact of an electromagnetic switch or other device between the MPI and MPO terminals when motor drive power must be shut OFF. (Connected with jumper wires at shipment.)
*2 The MPI and MG terminals can be used to isolate the motor power supply and control power supply.
*3 A surge protector is required to comply with the CE marking.

[Panel description]



Cyclic data from master

PD (out)	bit	Full direct value mode Signal name
0	7	Pause#
	6	Stop#
	5	Alarm reset
	4	Servo ON
	3	Origin return start
	2	Point travel start
	1	-
	0	Point number selection bit 8
1	7 to 0	Point number selection bit 7 to 0
2	7	-
	6	-
	5 to 4	Rotation direction
	3 to 1	Monitor number
	0	Direct value travel selection
3 to 6	7 to 0	Position
7 to 8	7 to 0	Positioning width
9 to 10	7 to 0	Speed
11	7 to 0	Acceleration
12	7 to 0	Deceleration
13	7 to 0	Pressing rate
14	7 to 0	Pressing speed
15 to 18	7 to 0	Pressing distance
19 to 20	7 to 0	Gain magnification
21	7	Position specification method
	6 to 5	Operation mode
	4 to 3	Acceleration/deceleration method
	2 to 0	Stop method

Cyclic data from controller

PD (in)	bit	Full direct value mode Signal name
0	7	Operation preparation complete
	6	Warning#
	5	Alarm#
	4	Servo ON state
	3	Origin return complete
	2	Point travel complete
	1	-
	0	Point number confirmation bit 8
1	7 to 0	Point number confirmation bit 7 to 0
2	7 to 5	-
	4	Zone 2
	3	Zone 1
	2	Moving
	1	Point zone
	0	Direct travel status
3 to 6	7 to 0	Position (monitor value)
7 to 8	7 to 0	Monitor value

* Refer to the Instruction Manual for details of other operation modes.
* The pound sign (#) indicates a negative logic signal.

● Accessories

Part name	Manufacturer model	Manufacturer
Power supply connector	DFMC1, 5/4-STF-3, 5	PHOENIX CONTACT
IO-Link connector	FMC1, 5/4-ST-3, 5-RF	PHOENIX CONTACT

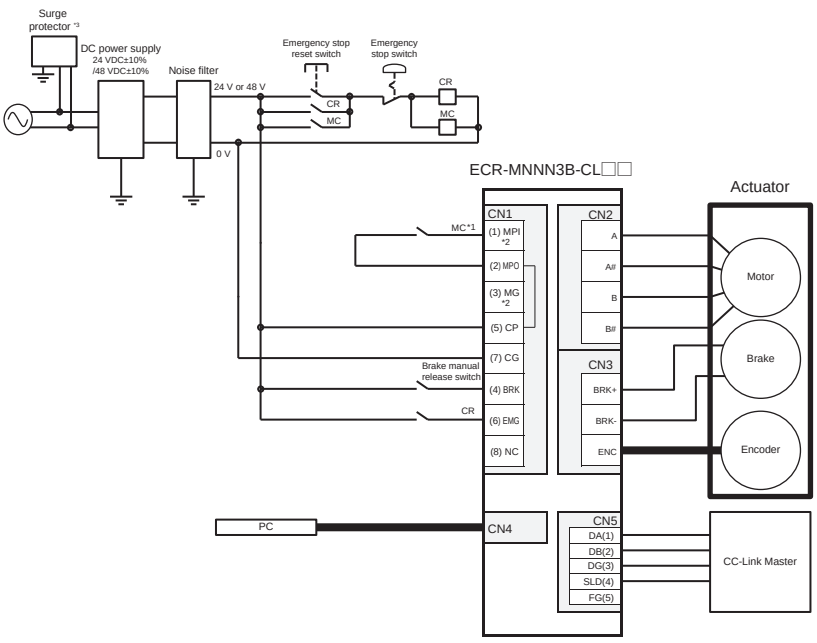
CC-Link specifications and connection diagram (ECR-MNNN3B-CL**)

[Communication specifications]

Item	Specifications
CC-Link Version	Ver. 1.10
Station	Remote device station
Remote station No.	1 to 64 (set by parameter setting)
Operation mode Number of occupied stations	PIO mode (1 station occupied)
	Simple direct value mode (2 stations occupied)
	Full direct value mode (4 stations occupied)
Remote input No. of I/O points	PIO mode: 32 points each
	Simple direct value mode: 64 points each
	Full direct value mode: 128 points each
Remote Register input/ output	PIO mode: 4 words each
	Simple direct value mode: 8 words each
	Full direct value mode: 16 words each
Communication speed	10M/5M/2.5M/625k/156kbps (Selected by parameter setting)
Connection cable	CC-Link Ver. 1.10. compliant cable (3 core twisted pair cable with shield)
Number of connected units	42 max. when only remote device stations are connected
Monitor function	Position, speed, current, alarm

* Items that can be monitored change depending on the mode.
Refer to page 99 for details.

[CC-Link]



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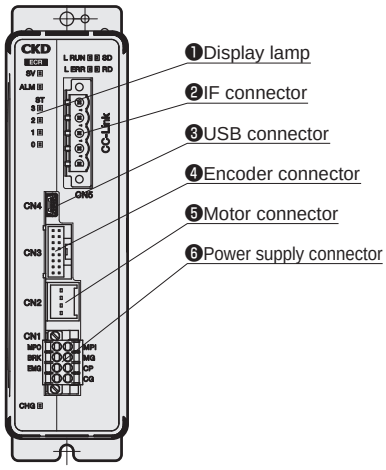
[Panel description]



Cyclic data from master

Device No.	Full direct value mode Signal name
RYn0 to RYnF	PIO input signal (Conforms to parallel I/O signal assignment)
RY (n+1) 0 to RY (n+1) 3	-
RY (n+1) 4	Data request
RY (n+1) 5	Data R/W selection
RY (n+1) 6 to RY (n+1) B	-
RY (n+1) C	Monitor request
RY (n+1) D	-
RY (n+1) E	
RY (n+1) F	Direct value travel selection
RY (n+2) 0 to RY (n+7) 9	-
RY (n+7) A	Error reset request flag
RY (n+7) B to RY (n+7) F	-

* Refer to the Instruction Manual for details of other operation modes.

Cyclic data from controller

Device No.	Full direct value mode Signal name
RXn0 to RXnF	PIO output signal (Conforms to parallel I/O signal assignment)
RX (n+1) 0 to RX (n+1) 3	Data response
RX (n+1) 4	Data complete
RX (n+1) 5	Data write status
RX (n+1) 6	-
RX (n+1) 7	
RX (n+1) 8 to RX (n+1) B	Monitor response
RX (n+1) C	Monitor complete
RX (n+1) D	-
RX (n+1) E	
RX (n+1) F	Direct value travel status
RX (n+2) 0	Point zone
RX (n+2) 1	Moving
RX (n+2) 2	Zone 1
RX (n+2) 3	Zone 2
RX (n+2) 4 to RX (n+7) 9	-
RX (n+7) A	Error status flag
RX (n+7) B	Remote ready flag
RX (n+7) C to RX (n+7) F	-

● Accessories

Part name	Manufacturer model	Manufacturer
Power supply connector	DFMC1, 5/4-STF-3, 5	PHOENIX CONTACT
CC-Link connector	MSTB2, 5/5-STF-5, 08ABGYAU	PHOENIX CONTACT

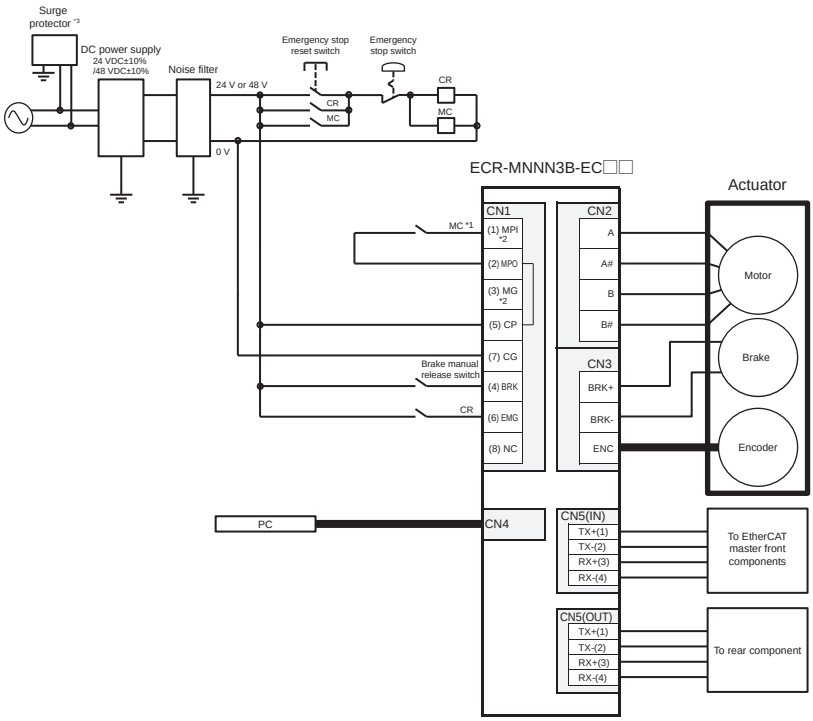
EtherCAT specifications and connection diagram (ECR-MNNN3B-EC**)

[Communication specifications]

Item	Specifications
Communication speed	100Mbps (fast Ethernet, full duplex)
Process data	Variable PDO mapping
Max. PDO data length	RxPDO: 64 bytes/TxPDO: 64 bytes
Station alias	0 to 65535 (set by parameters)
Connection cable	EtherCAT compliant cable (CAT5e or higher twisted pair cable (double shield with aluminum tape and braid) is recommended.)
Node address	Automatic indexing the master
Monitor function	Position, speed, current, alarm

* Items that can be monitored change depending on the mode. Refer to page 99 for details.

[EtherCAT]



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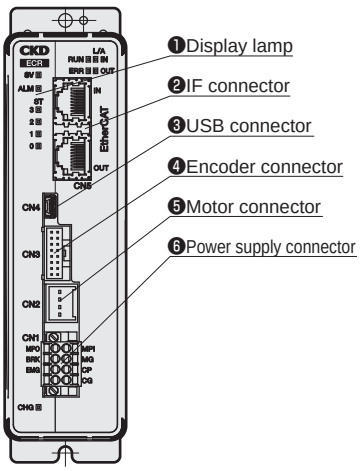
*3 A surge protector is required to comply with the CE marking.

[Panel description]



Process data from master

Index	Sub Index	bit	Full direct value mode Signal name
0x2001	0x01	0 to 15	PIO input signal (Conforms to parallel I/O signal assignment)
		16 to 31	-
	0x02	0 to 3	-
		4	Data request
		5	Data R/W selection
		6 to 11	-
		12	Monitor request
		13	-
		14	-
		15	Direct value travel selection
		16 to 31	-

* Refer to the Instruction Manual for details of other operation modes.

Process data from controller

Index	Sub Index	bit	Full direct value mode Signal name
0x2005	0x01	0 to 15	PIO output signal (Conforms to parallel I/O signal assignment)
		16 to 31	-
	0x02	0 to 3	Data response
		4	Data complete
		5	Data write status
		6	-
		7	-
		8 to 11	Monitor response
		12	Monitor complete
		13	-
		14	-
		15	Direct value travel status
		16	Point zone
		17	Moving
		18	Zone 1
		19	Zone 2
		20 to 31	-

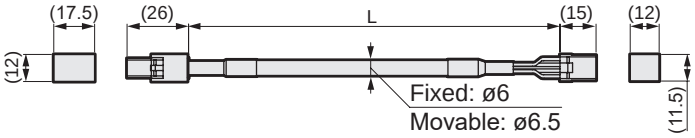
● Accessories

Part name	Manufacturer model	Manufacturer
Power supply connector	DFMC1, 5/4-STF-3, 5	PHOENIX CONTACT

Relay cable

Motor cable (fixed/movable)

* Can be selected with actuator model



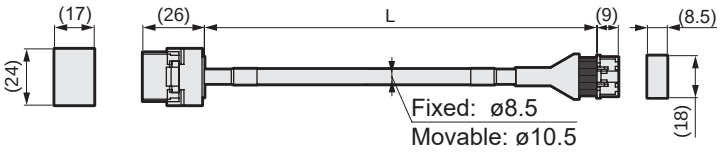
EA-CBLM1 - S 01

Ⓐ Cable type	
S	Fixed cable
R	Movable cable

Ⓑ Cable length	
01	1 m
03	3 m
05	5 m
10	10 m

Encoder cable (fixed/movable)

* Can be selected with actuator model



EA-CBLE1 - S 01

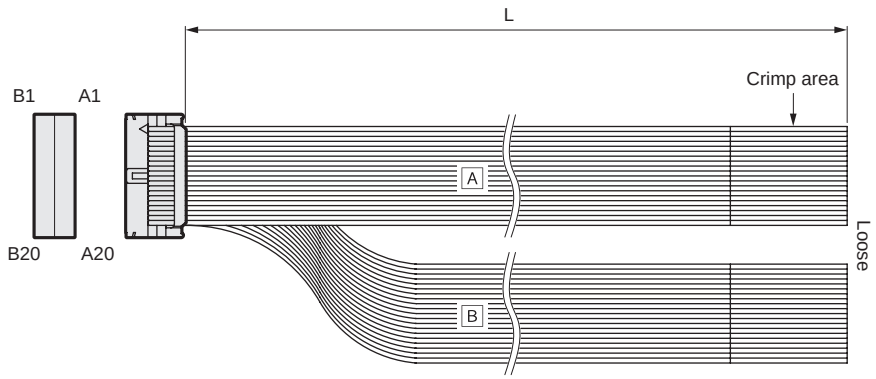
Ⓐ Cable type	
S	Fixed cable
R	Movable cable

Ⓑ Cable length	
01	1 m
03	3 m
05	5 m
10	10 m

I/O cable

I/O cable

* Parallel I/O specification controller model can be selected



EA-CBLNP1 - 02

Ⓐ Cable length	
02	2 m
03	3 m
05	5 m
10	10 m

Related parts model No. table

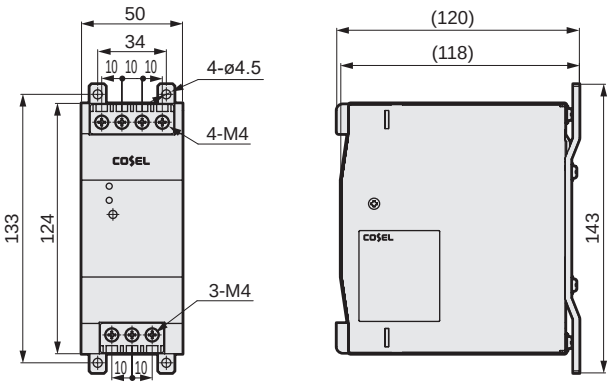
● DC power supply

Item \ Model No.			EA-PWR-KHNA240F-24-N2 (screw mounted) EA-PWR-KHNA240F-24 (DIN rail mounted)	EA-PWR-KHNA480F-48-N2 (screw mounted) EA-PWR-KHNA480F-48 (DIN rail mounted)
Manufacturer			COSEL Co., Ltd.	
Manufacturer Model No.	Mounting screw		KHNA240F-24-N2	KHNA480F-48-N2
	DIN rail mount		KHNA240F-24	KHNA480F-48
Input voltage			85 to 264 VAC 1ø or 88 to 370 VDC	85 to 264 VAC 1ø or 88 to 350 VDC
Output	Power		240 W	480 W
	Voltage/current		24 V 10 A	48 V 10 A
	Variable voltage range		22.5 to 28.5 V	45.0 to 55.2 V
Included functions	Overcurrent protection		Operating at 101% min of peak current	
	Overvoltage protection		30.0 to 36.0 V	57.6 to 67.2 V
	Remote control		Available	
	Remote sensing		-	
	Others		DC_OK display, ALARM display	
Operating temperature/humidity			-25 to +70 °C, 20 to 90% RH (no condensation), startup possible at -40 °C *	
Applicable standards	Safety standards	AC input	AC input: Certified UL60950-1, C-UL (CSA60950-1), EN60950-1	
			UL508, ANSI / ISA12.12.01, and ATEX; Electrical Appliances and Material Safety Act compliant *	
		DC input	Certified UL60950-1, C-UL (CSA60950-1), EN60950-1	
	Noise terminal voltage		Compliant with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	Harmonic current		Compliant with IEC61000-3-2 (class A) *	
Structure	Dimensions (W x H x D)		50×124×117 mm	70×124×117mm
	Weight		900 g max	1,200 g max
	Cooling method		Natural air cooling	

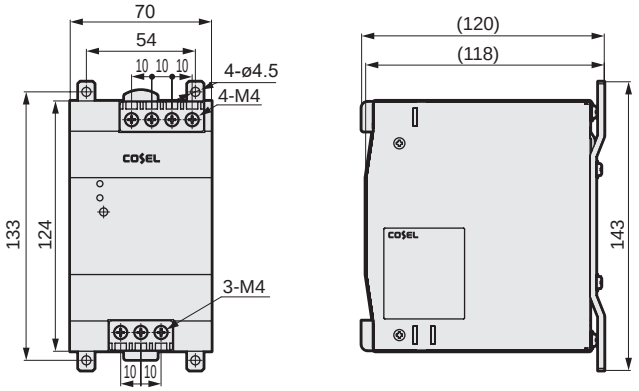
* Refer to the manufacturer's website for details.
* CE and ROHS certification has been obtained under the manufacturer's model number.

Part names and dimensions

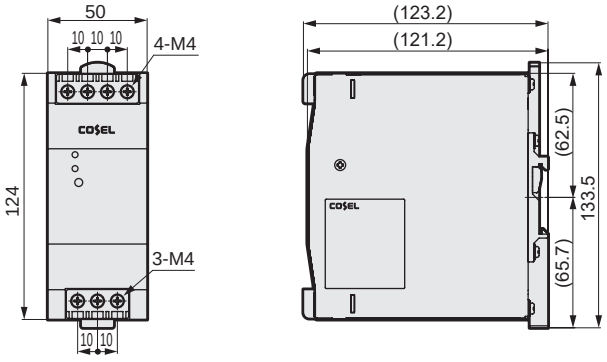
● EA-PWR-KHNA240F-24-N2 (24 V screw mounted)



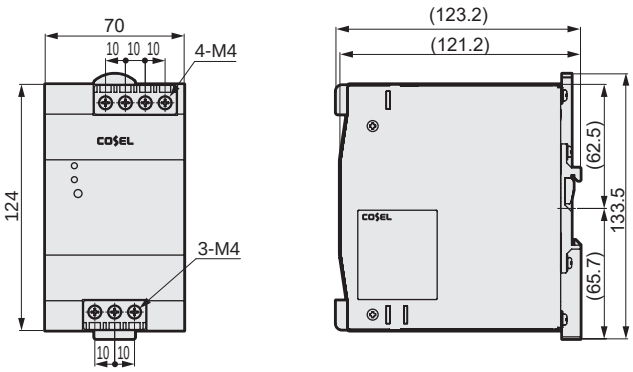
● EA-PWR-KHNA480F-48-N2 (48 V screw mounted)



● EA-PWR-KHNA240F-24 (24 V DIN rail mounted)



● EA-PWR-KHNA480F-48 (48 V DIN rail mounted)



● Other parts

Part name	Model No.
Noise filter for power supply (single phase, 15 A)	AX-NSF-NF2015A-OD
Ferrite core set (7 pieces/set)	EA-NSF-FC01-SET

* Refer to the instruction manual for the ferrite core to be used.