

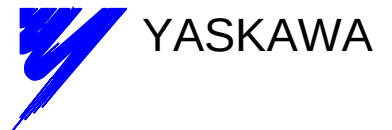
DATE: Feb.22 2008

ESTIMATA No.

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CUSTOMER

USER



SEMISTAR-M Series
NXC100 Specifications

Type: **ERCR-NS01- B004**

SER

NOTE	COPIES		ENG. Technology Development Section 1 Semiconductor Robot Plant Semiconductor Robotics Division
	CUSTOMER		
2 P1,2 revised P5-9,11-15 replacement July 17 '10 S.Kobuchi /T. Nakao	USER		DR. Feb.22 '08 S.Kobuchi
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1. Outline

1.1 Purpose

This document provides delivering specifications and manufacturing scope for robot controller.
The robot controller is designated NXC100.

1.2 System configuration

NXC100 receives the control command from the host controller via RS-232C /or ETHERNET to control the Manipulator, Track and Pre-aligner.

(1) Configuration

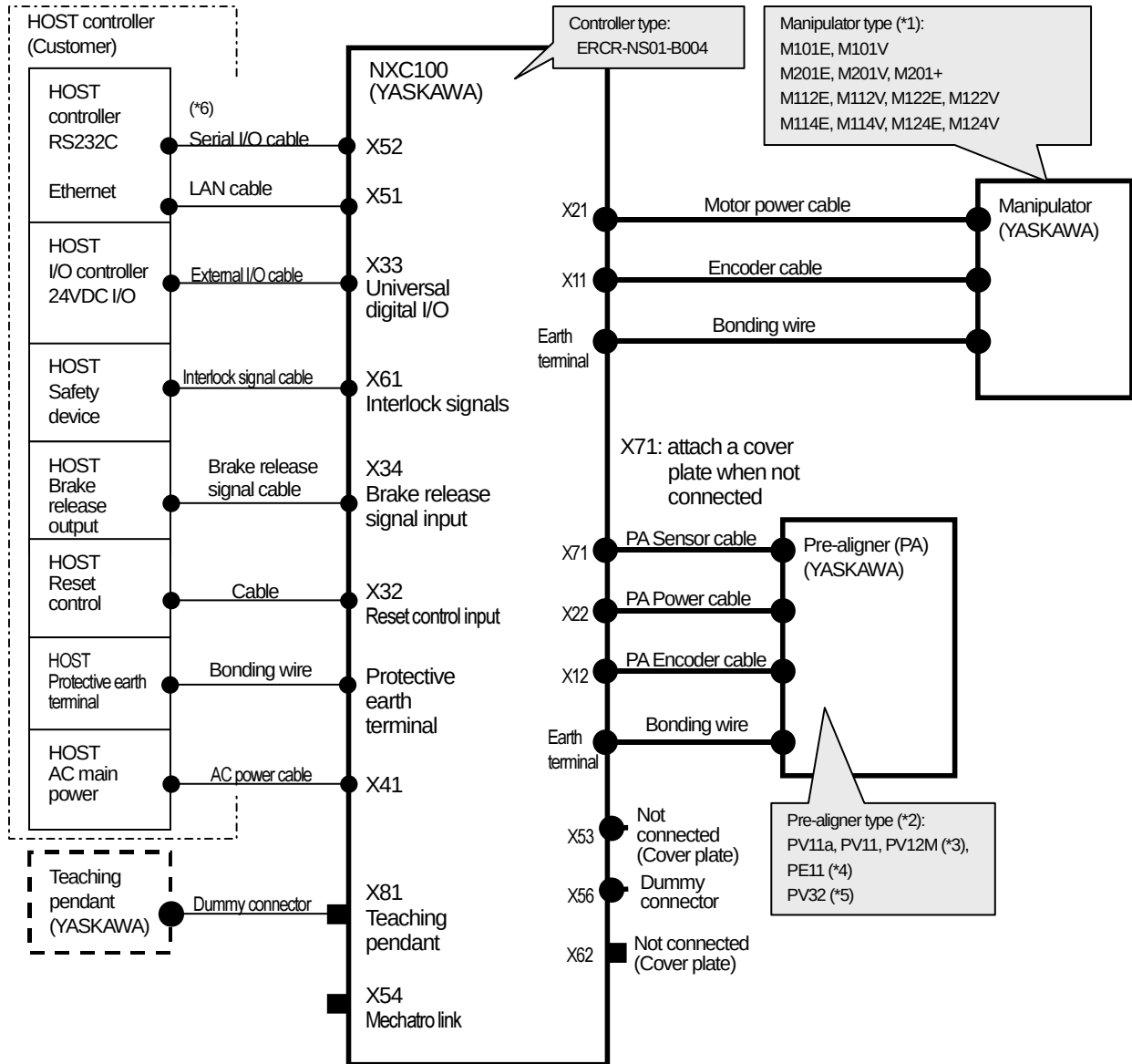
There are three types of NXC100 hardware configurations depending on the specification of pre-aligner.
Specify the configuration when placing order.

Hardware Configuration	Pre-aligner Specification/Type
NXC100 Specification A	No pre-aligner PV11a: 200 mm, 1 axis, suction type / XU-ACP120-A13 PV11: 300 mm, 1 axis, suction type / XU-ACP130-A13 PV12M: 200/300 mm switching, 1axis, suction type / XU-ACP130-B11
NXC100 Specification B	PE11: edge grip type / XU-ACP330-C10
NXC100 Specification C	PV32: 3 axes, suction type / XU-ACP330-A22

The NXC100 software configuration varies by the specifications of controlled manipulator/ track/ pre-aligner, types of end effectors, configuration of various functions.

The NXC100 is provided in Yaskawa's standard software configuration if there is no particular designation from user.

(2) System configuration when manipulator is individually operated (without track)



*1 No expansion box is required when using manipulator without track. Attach a cover plate to the X62 connector.

*2 When not using pre-aligner, use the standard configuration controller NXCR100 Specification A. Attach a cover plate to the X71 connector.

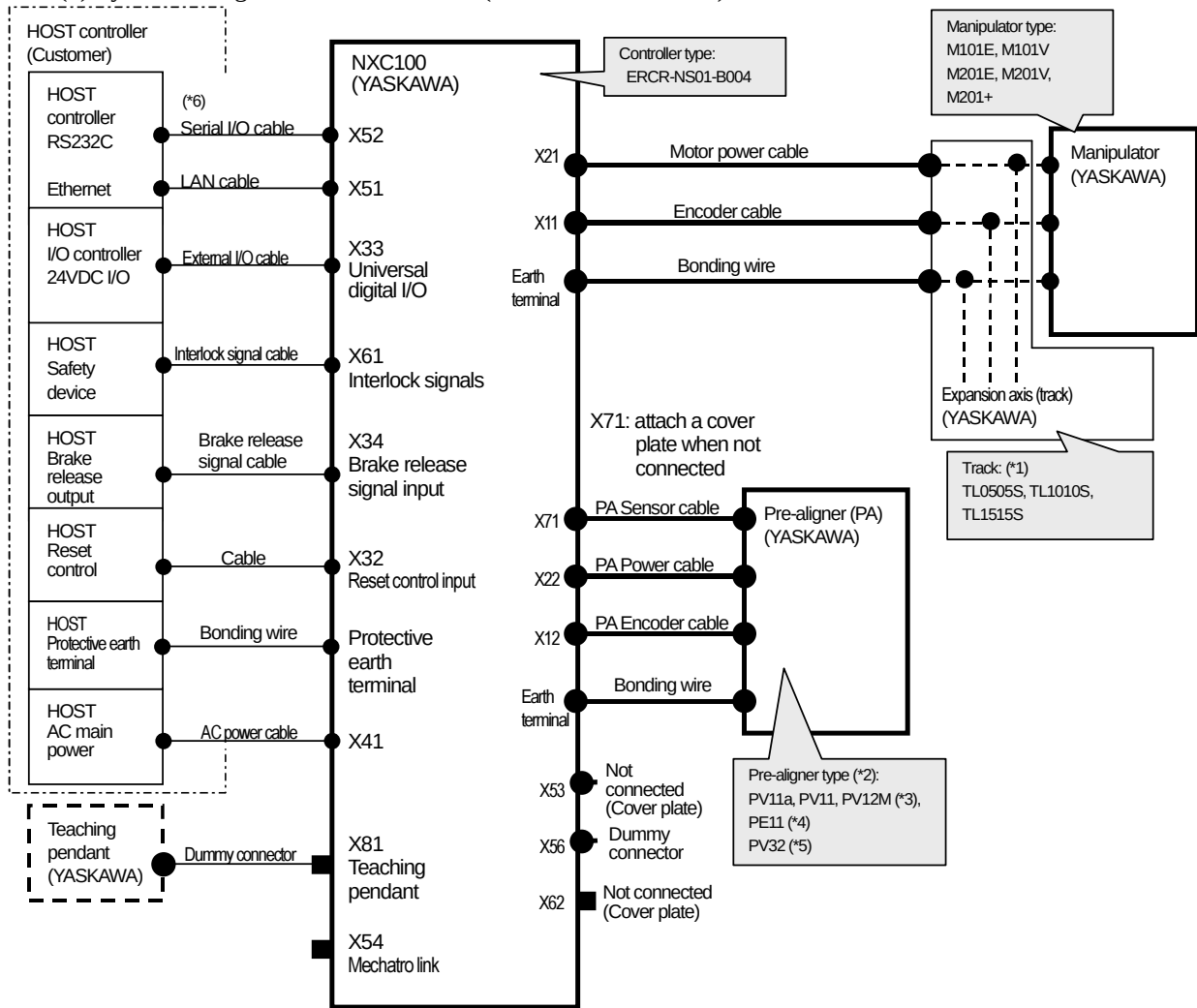
*3 When using the single-axis pre-aligner (PV11a, PV11, or PV12M), use the standard configuration controller NXCR100 Specification A. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*4 When using the edge-grip pre-aligner (PE11), use the controller configured for PE11, NXCR100 Specification B. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*5 When using the 3-axes pre-aligner (PV32), use the controller configured for PV32, NXCR100 Specification C. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*6 Specify the communication method when placing order.

(3) System configuration for the EFEM (With TLxxxxS series)



*1 No expansion box is required when using the TLxxxxS series track. Attach a cover plate on the X62 connector.

*2 When not using pre-aligner, use the standard configuration controller NXC100 Specification A. Attach a cover plate to the X71 connector.

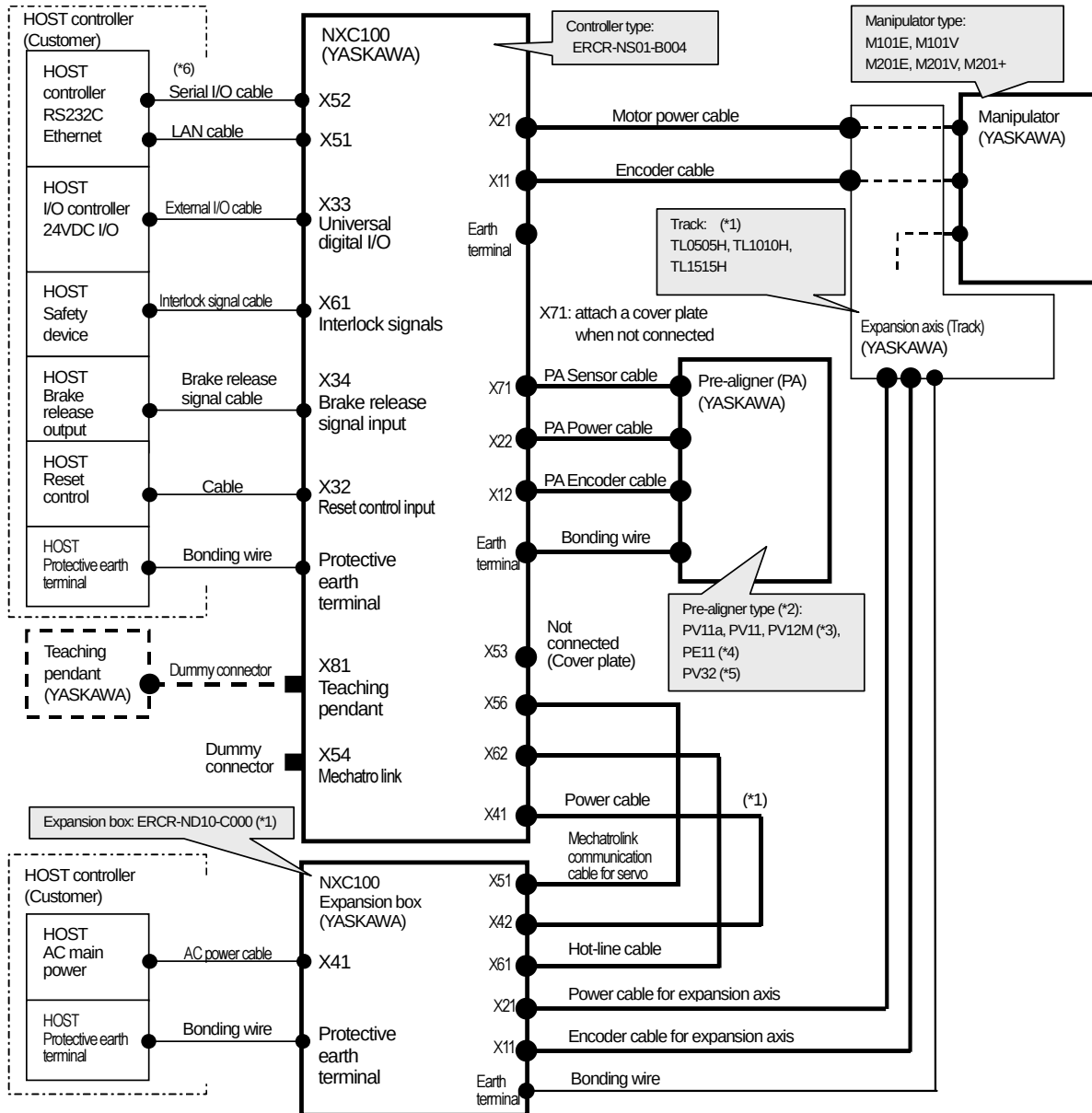
*3 When using the single-axis pre-aligner (PV11a, PV11, or PV12M), use the standard configuration controller NXC100 Specification A. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*4 When using the edge-grip pre-aligner (PE11), use the controller configured for PE11, NXC100 Specification B. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*5 When using the 3-axes pre-aligner (PV32), use the controller configured for PV32, NXC100 Specification C. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*6 Specify the communication method when placing order.

(4) System configuration for the EFEM (With TLxxxxH series)



*1 Expansion box is required when using the TLxxxxH series track, refer to the specifications for the expansion box. Remove the cover plate attached to the X62 connector, then connect the hot-line cable. Remove the dummy connector on the X56 connector, then connect the mechatrolink communication cable for servo. The controller power is supplied via the expansion box.

*2 When not using pre-aligner, use the standard configuration controller NXC100 Specification A. Attach a cover plate to the X71 connector.

*3 When using the single-axis pre-aligner (PV11a, PV11, or PV12M), use the standard configuration controller NXC100 Specification A. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*4 When using the edge-grip pre-aligner (PE11), use the controller configured for PE11, NXC100 Specification B. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*5 When using the 3-axes pre-aligner (PV32), use the controller configured for PV32, NXC100 Specification C. Remove the cover plate attached to the X71 connector, then connect the pre-aligner sensor cable.

*6 Specify the communication method when placing order.

1.3 Manufacturing Scope

YASKAWA manufacturing scope is shown in the following.

(1) NXC100 (Type: ERCR-NS01-B004)	1
(2) Expansion Box	1
(3) Manipulator	1
(4) External motor power cable for manipulator	1
(5) External encoder cable for manipulator	1
(6) Track	1
(7) External motor power cable for track	1
(8) External encoder cable for track	1
(9) Pre-aligner	1
(10) External motor power cable for pre-aligner	1
(11) External encoder cable for pre-aligner	1
(12) Pre-Aligner sensor cable	1
(13) Teaching pendant (optional: JZRCR-NPP02-01-E1)	1
* From (2) to (13), these vary according to the order.	
* (2): refer to the expansion box specifications	
* (3)(4)(5): refer to the manipulator specifications.	
* (6)(7)(8): refer to the track specifications	
* (9)(10)(11)(12): refer to the pre-aligner specifications.	
 ➤ Controller accessories	
(1) X32 Reset Connector	1
(2) X34 Brake Release Connector	1
(3) X54 Mechatrolink terminator	1
(4) X56 Mechatrolink terminator	1
(5) Power fuse for spare	2
(6) I/O fuses for spare	2
(7) Wiring tool for WAGO connector (X32, X34)	2
(8) Dust cover for X31	1
These parts are with the controller.	
(9) X81 Teachingpendant dummy connector	1
(10) Connector cover for X71 (with a screw)	1
(11) Connector cover for X61 (with a screw)	1
 ➤ The customer must prepare the following cables;	
• Connecting cable for Serial I/O (X52)	1
or	
Connecting cable for LAN (X51)	1
• Connecting cable for External I/O (X33)	1
• Connecting cable for Safety signal (X61)	1
• Connecting cable for Reset signal (X32)	1
• Connecting cable for AC Power (X41)	1
• Bonding wire (Earth terminal)	2

Those are not provided by YASKAWA.

1.4 Specifications

Table1 NXC100 Specifications

Item		Specifications
Applicable Manipulator Model		XU-RC series M101E, M101V: Single Arm / XU-RC350S-C03 M201E, M201V: Dual Arm / XU-RC350D-C03 M201+: Dual Arm / XU-RC350D-J03 M112E, M112V: Single Yaw / XU-RC400M-C03 M122E, M122V: Dual Yaw / XU-RC400M-D03 M114E, M114V: Single Yaw / XU-RC820M-A03 M124E, M124V: Dual Yaw / XU-RC820M-B03
Applicable Track Model		XU-ACT series TL0505S: 2W Liner Motor Track / XU-ACT051L-C10 TL0505H: 2W Liner Motor Track / XU-ACT051L-D10 (*1) TL1010S: 3W Liner Motor Track / XU-ACT101L-C10 TL1010H: 3W Liner Motor Track / XU-ACT101L-D10 (*1) TL1515S: 4W Liner Motor Track / XU-ACT152L-D10 TL1515H: 4W Liner Motor Track / XU-ACT152L-C10 (*1)
Applicable Pre-aligner Model		XU-ACP series (*2) PV11a: 1 axis ,200 mm, suction type / XU-ACP120-A13 (*3) PV11: 1 axis ,300 mm, suction type / XU-ACP130-A13 (*3) PV12M: 1axis, 200/300mm / XU-ACP130-B11 (*3) PE11: Edge grip type 300mm / XU-ACP330-C10 (*4) PV32: 3axes, 200/300mm / XU-ACP330-A22 (*5)
Applicable expansion box		For TLxxxxH series / ERCR-ND10-C000 (*1)
Basic Specifications	Input Power Supply	Single-Phase 100 - 110VAC (50/60Hz) Rated current: 2A Full load current: 9 A (excluding inrush current) Single-Phase 200 - 220VAC (50/60Hz) Rated current: 1A Full load current: 7 A (excluding inrush current) Power fluctuation +/- 10%, Frequency fluctuation +/- 2Hz Power consumption: 400VA *Since the voltage is switched by the internal setting of the NXC100 controller, the input power voltage is set at 100 V or 200 V before shipment. Specify the power supply voltage when placing order.
		<u>Tolerance for voltage interruption</u> -In case of no track is used: 20 msec - In case of TLxxxxS series track is used: 3 msec (100 V input power); 20 msec (200 V input power) - In case of TLxxxxH series track is used: 20 msec *Limitation of maximum velocity differs by presence of wafers. Without wafers: 1500 mm/sec.; with wafers: 1300 mm/sec.
	Grounding	Ground resistance 100Ω or less

Table1 NXC100 Specifications

Item			Specifications
Basic Specifications	Environmental Conditions	Operating/Storage Temperature	0°C~+40°C (*6)/-10°C ~+60°C
		Operating/Storage Humidity	90%RH Max (non-condensing)
		Vibration Resistance /Shock Resistance	1G/5G (*7)
		Altitude	1000m or below
		Ambient	Free from explosive, inflammable, and corrosive gases Free from dirt or dust Pollution degree 1 (IEC664-1)
	Structure		Self -stand vertically or horizontally mounted type Forced cooling (Air inlet on the front panel and air outlet on the rear panel)
	External dimensions (WxHxD)		W: 425xH: 133xD: 300 (385) [mm] Volume: 18.4 liters (Excluding protruded sections) <i>Refer to “4. Outline drawing”</i>
	Approximate Mass		14kg
	Case Surface		Nickel plated
Control Section	Main Operation processing		667MHz
	Main Memory		128Mbyte
	Flash Disk		Compact Flash 128Mbyte
	Communication (for host or maintenance) (*9)		RS-232C (One channel)
			10Base-T / 100Base-TX (One channel)
	Servo Operation processing		300MHz
Host Input / Output Signals	Input	Photo-insulation external input for Host DC24V, 5mA max	12 inputs (concurrent Digital-In)
		Robot safety signal Contact inputs	Safety Plug (SAFF) Force Input (FORCE) Full Speed Test (FST) Safe Speed Mode Selection (SS-P) External Servo ON (EXSVON) External Hold (EXHOLD) External Emergency Stop (EXESP) External Dead-Man Switch (EXDSW) Servo On Enable (ONEN)
		CPU reset for host contact input	1 input
	Output	Photo-insulation output for Host DC24V, 40mA max	14 outputs (concurrent Digital-Out)
		Robot safety signal Contact output	External Mode Select Switch (EX-SEL SW)
	Exclusive use Input/Output	Brake release input	1 input (DC24V, 1Amax)
		Analog sensor output	2 outputs (Manipulator vacuum sensor output)
	<i>Refer to “NXC100 INSTRUCTION MANUAL ” for the functions.</i>		

Table1 NXC100 Specifications

Item		Specifications
AC Servo Driver	Number of control axis	8 axis
	Motor total capacity	650W (load factor 35%)
	Applicable Motor	Σ II , Σ III Series AC Servo Motor Manufactured by YASKAWA
	Amplifier capacity	Refer to “Table 4 Applicable Amplifier Specifications”. (*8)
	Expansion box interface	Mechatrolink communication connector for servo (X56) Hot-line signal connector for servo (X62)
Display		Pilot lamp for power supply input (White), 7-Segment LED, 4 digits (Green) CPU backup battery condition indicator (Red)
Power Supply	Control Power	+5V, +24V supplied by built-in switching regulator
	Current protection	Double phase Protected by fuses
Safety and Compliance	SEMI standards	Conforms to SEMI S2-0706 and S8-0705.
		Functional design in accordance with SEMI F47-0200. (*10)
	NRTL Listed	Design in accordance with UL61010-1
	EMC Directive	Design in accordance with EMC Directive - EMS (Electromagnetic Susceptibility) EN 61000-6-2 - EMI (Electromagnetic Interference) EN 61000-6-4
	Machinery Directive	Self declaration Machinery Directive 2006/42/EC
	American national standard	Design in accordance with ANSI/RIA 10218-1-2007, Robots for industrial Environment - Safety Requirements Part 1 - Robot

(*1) In case of the TLxxxxH series track, NXC100 requires the expansion box.

(*2) If the system does not use the pre-aligner, use NXC100 configured as specification A.

(*3) In case of the PV11, PV11a, PV12M-pre-aligner, use NXC100 configured as Specification A.

(*4) In case of the PE11-pre-aligner, use the controller configured for PE11, NXC100 Specification B.

(*5) In case of the PV32-pre-aligner, use the controller configured for PV32, NXC100 Specification C.

(*6) Use the NXC100 within the specified temperature range. If the NXC100 is enclosed in a box, the temperature inside of the box must not exceed the specified range.

(*7) Use the NXC100 in the installation method mentioned in the instruction manual.

(*8) For manipulator, track and pre-aligner axis configuration, refer to “Table 2 Applicable Amplifier Specifications”.

(*9) Specify the communication method when placing order.

(*10) In case of no track, the specification of the voltage interruption is 20msec.

In case of the TLxxxxS series track,

100Vac-input: The specification of the voltage interruption is 3msec.

200Vac-input: The specification of the voltage interruption is 20msec.

In case of the TLxxxxH series track, the speed specification of the track is different with the existence of the wafer.

With wafer: 1300mm/sec, No wafer: 1500mm/sec

(*11) The model which specifications were changed to at the request from the process tool supplier may not conform to these standards.

Table 2 Applicable Amplifier Specifications

Applicable Unit			Amplifier Capacity		Standard Axis									Expansion Axis
					1st axis (100/200 W)	2nd axis (200 W)	3rd axis (100W)	4th axis (50 W)	5th axis (50 W)	6th axis (50 W)	7th axis (50 W)	8th axis (50 W)	9th axis (50 W)	ERCR-ND10 -C000 (400 W)
Motor Driver	NXC100 controller	Spec A			✓	✓	✓	✓	✓	✓				
		Spec B			✓	✓	✓	✓	✓	✓				
		Spec C			✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Expansion Box ERCR-ND10-C000													✓
Unit Motor	Manipulator	M101E, M101V				✓	✓	✓						
		M201E , M201V, M201+				✓	✓	✓	✓					
		M112E, M112V M114E, M114V			✓	✓	✓	✓						
		M122E , M122V M124E , M124V			✓	✓	✓	✓	✓					
	Track	TL0505S, TL1010S, TL1515S			✓									
		TL0505H, TL1010H, TL1515H												✓
	Pre-aligner	PV11a, PV11								✓				
		PV12M, PE11								✓				
		PV32								✓	✓	✓		

Table 3 Teaching Pendant Specifications

Item		Specifications
Type		JZRRCR-NPP02-01-E1
General	Dimension	W133XH255XD35 <i>Refer to "4. Outline drawing"</i>
	Approximate Mass	0.6kg
	Ambient temperature *1	0 to 40°C (operating), -20 to 60°C (storage)
	Ambient Humidity	30 to 85%RH (non-condensing)
Display	Display	95.96X31.96 mm Monochromatic LCD with Back light
	Number of indication dots	192X64
Operation panel	Key Switch	Matrix arrangement of 5X9 pieces
	Emergency Stop	Red mushroom type φ24.9 (EN acceptable) Push Lock / Turn Reset
	Mode Selector	HOST, TEACH 2-position select switch
	Servo on ready	Illuminated Push Button Switch Indicator: Green
	Dead-man Switch	3-position switch, conforming to ANSI/RIA R15.06-1999
Communication	Serial I/F	RS-422
Others	Hand strap	The material where particles are not generated is used

(*1) Use the teaching pendant within the specified temperature range. If the teaching pendant is enclosed in a box, the temperature inside of the box must not exceed the specified range.

2. Input / Output Interface

2.1 LED Indicator, Operation Switch, etc

(1) 7-segments LED Indicator

Indicates the NXC100's internal status in 4 digits. (Green)

Mainly used to indicate an error code.

	0	1	2	3	4	5	6	7	8	9
Display	0	1	2	3	4	5	6	7	8	9
	A	B	C	D	E	F				
Display	A	b	c	d	E	F				

(2) Input Power ON/OFF Switch

Device code: SW1

Turns ON/OFF the input power supply.

(3) Fuse

Device code F1, F2, F1 to F4

F1, F2: Main fuse for power supply protection

Location: Side of Power ON/OFF Switch

314010P,250V, 10A, 5mm diameter×20mm in length, with inertial delay

Manufactured by Littelfuse Ltd.

F1, F2: Fuse for Robot IO protection

F3, F4: Fuse for Host IO protection

Location: Inside the Fuse box

2173.15MXP,250V, 3.15A, 5mm diameter×20mm in length, with snap decision

Manufactured by Littelfuse Ltd.

Fuse for Brake protection

Location: Inside the Fuse box

SDP50, 5A, with inertial delay

Manufactured by Dito Communication Apparatus Co., Ltd

(4) LED Indicator

Device code: SOURCE

LED Indicator (SOURCE) indicates the ON/ off condition of the NXC100 power supply.

Device code: BAT

LED indicator (BAT) indicates with detecting the decline of the memory data backup battery voltage.

(5) Battery

Battery is for CPU memory backup.

Location: Inside the Fuse box

LITHIUM battery, ER6VC3, 3.6V, 2000mAh

Manufactured by Toshiba Battery Co., Ltd.

2.2 Connector for the HOST controller

Refer to “*NXC100 INSTRUCTION MANUAL* ” for the pin assignment and the functions.

NXC100 Front Side

- (1) X51 ETHERNET (Maintenance PC Connection)
NXC100 Side Connector: RJ45 (Socket)
Cable Side Connector: RJ45 (Plug)
- (2) X52 RS232C (Host Communication)
NXC100 Side Connector: DSUB 9 Pin (Male)
Cable Side Connector: DSUB 9 Pin (Female)
- (3) X81 Teaching Pendant (Teaching Pendant Signal Input Use)
NXC100 Side Connector: SRCN2A25-24S (JAE)
Cable Side Connector: SRCN6A25-24P (JAE)
Dummy Connector: HE0400945 (Included with NXC100)

NXC100 Back Side

- (4) X41 INPUT AC Power
NXC100 Side Connector: CE05-2A18-10PD-D (DDK)
Cable Side Connector: CE05-6A18-10SD-D-BSS
- (5) X33 I/O (General Purpose Digital Input/Output Use)
NXC100 Side Connector: 10268-52A2JL (3M)
Cable Side Connector: 10168-6000EL (3M)
Cable Side Shell: 10368-3210-000-0 (3M)
- (6) X61 SAFETY (Safety Signal Input/Output Use)
NXC100 Side Connector: 10250-52A2JL (3M)
Cable Side Connector: 10150-6000EL (3M)
Cable Side Shell 10350-3210-000-0(3M)
- (7) X32 RESET (Reset Signal Input/Output Use)
NXC100 Side Connector: 231-104/026-000 (WAGO)
Cable Side Connector: 231-604-019-000 (WAGO) (Included with NXC100)
- (8) X34 BRAKE (Brake Release Signal Input Use)
* Optional function.
NXC100 Side Connector: 231-602/019-000 (WAGO)
Cable Side Connector: 231-102/026-000 (WAGO) (Included with NXC100)

2.3 Interlock Circuit

NXC100 has safety signals on X61 connector. NXC100 has hard-wired interlock circuit. The interlock circuit gives feedback of the operating status to firmware with alarm circuit. When the interlock is activated, all the servomotors decelerate, stops and then is powered off.

This safety circuit designed to meet “EN ISO 10218-1:2006, Chapter 5.4 Safety – related control system performance (hardware / software)”

Refer to “*NXC100 INSTRUCTION MANUAL*”.

3. Warranty

The product is warranted as follows;

(1) Scope

Controller: ERCR-NS01-B004

(2) Validity

- The period of warranty shall be valid for one year after delivering the product to the end user or, eighteen months after shipment from the YASKAWA plant, whichever is shorter.
- When YASKAWA and/or our specific company repairs the product, the scope of the warranty is the repair part only, and the period of warranty is six months from the receiving inspection date.

(3) Contents

Should any failure caused by imperfect design or manufacturing occur within the period of warranty, YASKAWA shall assume responsibilities for the defective product to be replaced or repaired without charge. In this case, YASKAWA will dispatch technical engineers, if requested, to your company (or to the end user).

This warranty is subject only to the products manufactured by YASKAWA; any damage in secondary production generated during malfunction or suspension of your (or end user's) products or equipment shall not be covered.

Other services, such as training, retrofit and/or addition of optional function, preventive maintenance etc. will be charged.

(4) Exemption

Even in the period of warranty, failures occurring in any of the following cases shall not be covered.

- a) Replenishment/replacement of consumable/expendable supplies.
- b) Failure or defect caused by force majeure, such as natural disaster or fire disaster etc.
- c) Failure or defect caused by users handling and/or improper maintenance.
- d) Failure or defect caused by modification or transportation of products by user.
- e) Indemnity for indirect loss, such as failures, defects, shutdown.
- f) Any property damage caused by reason that is not attributable to YASKAWA.

4. Outline drawing

(1) NXC100 outline drawing

Number of outline drawing: HE0302353

(2) Teaching pendant outline drawing

Number of outline drawing: HE0400944