NACHI

NACHI EUROPE GmbH

OUR SYNERGY
YOUR PERFORMANCE

EZ-SERIES

MINIMUM SPACE MAXIMUM DYNAMICS

CELEBRATE THE POLE POSITION

FIRST IN THE WORLD

Unique kinematics
With its overhead head unit,
the Scara EZ03 from NACHI minimizes
the need for space at pick-and-place

New Swing in the Automation of Assembly – The EZ series

NACHI's innovative robot EZ03 opens up a new dimension in productivity. With its design, NACHI turns the SCARA-concept upside down. Operators benefit from minimum footprint along with highest dynamics.

Applications:

- Pick-and-place
- Load & unload from/to a narrow entrance

Main Advantages:

- Compact design for minimum space requirement
- Inside placed valves
- Intelligent wiring
- Hollow wrist

FIRST IN THE WORLD

Unique kinematics
With its overhead head unit, the Scara EZ03 from NACHI minimizes the need for space at pick-and-place

"NACHI –
Always a Step Ahead"

Slim Sprinter:

The inverted mounted base unit of NACHI's EZ03 robot minimizes the floor space required in pick-and-place applications.

Unique mechanism is employed in the robot body

Z-AXIS MOVING STRUCTURE

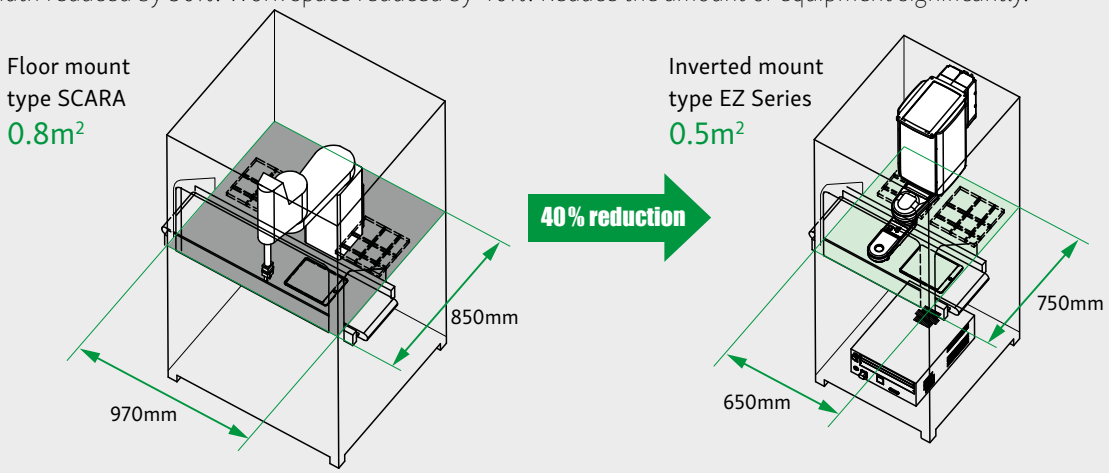
Z-axis structure (along which whole arm moves) makes its arm compact.

SLIM HORIZONTAL ARM

Slim, light weight and high speed operation is possible due to no servomotor in the robot arm.

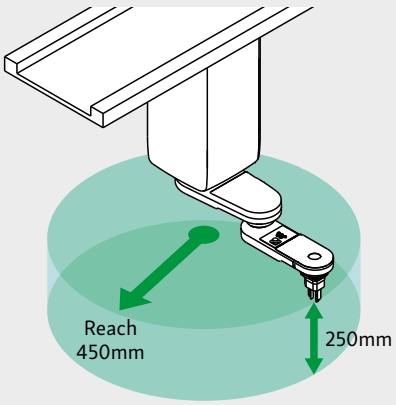
CUT BACK ON EQUIPMENT (EXAMPLE OF TABLET ASSEMBLY LINE)

Line width reduced by 30%. Work space reduced by 40%. Reduce the amount of equipment significantly.



WIDE OPERATING ENVELOPE

The small horizontal arm permits a wide operation envelope and compact layout.

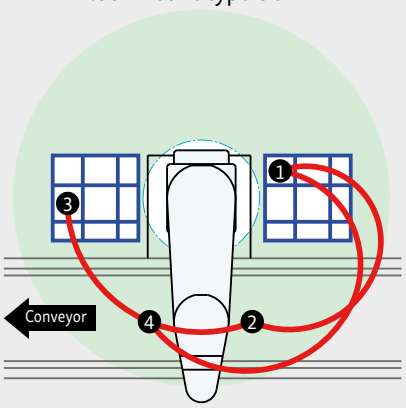


360° operating envelope. Eliminates center dead zone inaccessible by conventional SCARA robots.

HIGH SPEED WITH SHORTEST PATH (EXAMPLE OF TABLET ASSEMBLY LINE)

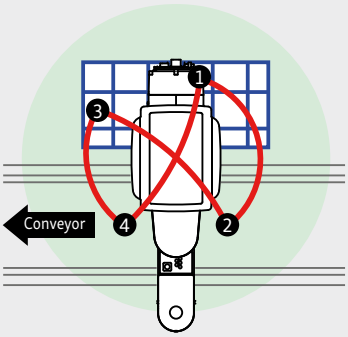
Potentially reduce cycle time by up to 30% (compared to a floor mount type SCARA).

Floor mount type SCARA



Operation distance is 3,400mm
Cycle time is 2.3sec.

Inverted mount type EZ Series



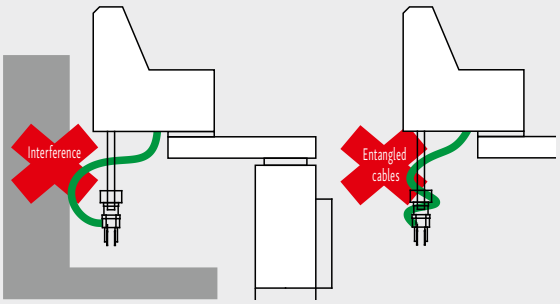
Operation distance is 2,000mm
Cycle time is 1.6sec.

SMART CABLE ROUTING

With the smart cable routing feature, risk of cable interference with peripheral devices is reduced and the operational reliability is significantly improved.

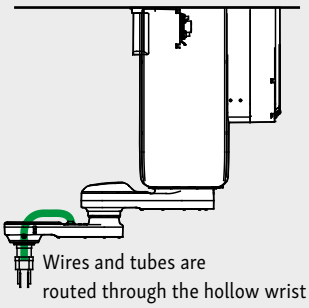
Floor mount type SCARA

Wires and tubes are routed outside



Inverted mount type EZ Series

Wires and tubes are routed through the hollow wrist



Wires and tubes are routed through the hollow wrist

VARIOUS LINEUP

User can select a combination of following types and Z-axis strokes; Inverted mount/ Floor mount and 250mm/150mm strokes.

Inverted mount type
Z-axis 250mm
EZ03V4-4525

Inverted mount type
Z-axis 150mm
EZ03V4-4515

Floor mount type
Z-axis 250mm
EZ03F4-5525

Floor mount type
Z-axis 150mm
EZ03F4-5515

COMPACT CONTROLLER

OPTIONAL

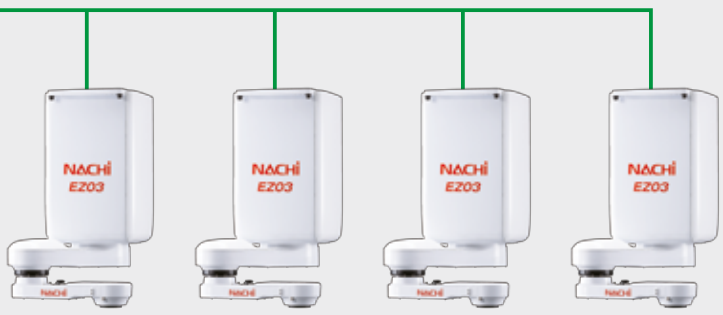
Just 369mm wide Multi-Controller CFDL can be placed within the support structure.

- It can control up to 4 robot unit.
- Emergency stop and operation switches are provided for each 4 unit independently. (They can work in synchronous manner too.)

Controller for 1 or 2 arms
CFDL1-0000
CFDL2-0000

Teach pendant

Controller
CFDL4-0000
(Controller for 3 or 4 arms)



Standard Specifications

Roboter type EZ□□□□-02-□□□□

BASIC SPECIFICATIONS

Mark 1	Mark 2	Mark 3	Notes
03	V	4	3kg payload, inverted mount, 4 axis
	F	4	3kg payload, floor mount, 4 axis
02	V	6	2kg payload, inverted mount, 6 axis
	F	6	2kg payload, floor mount, 6 axis

ARM VARIATION

Mark 1	Max. reach	Mark 2	Mark 3	Notes
45	450mm	15	150mm	Inverted mount
		25	250mm	
55	550mm	15	150mm	Floor mount
		25	250mm	

ROBOT SPECIFICATIONS

Item			Specifications							
Robot model			EZ03V4 -02-4515	EZ03V4 -02-4525	EZ03F4 -02-5515	EZ03F4 -02-5525	EZ02V6 -02-4515	EZ02V6 -02-4525	EZ02F6 -02-5515	EZ02F6 -02-5525
Structure			Horizontal articulated							
Number of axis			4				6			
Max. reach			450mm		550mm		450mm		550mm	
Installation*1			Inverted mount		Floor mount		Inverted mount		Floor mount	
Drive system			AC servo system							
Max. operating envelope	J1	Vertical	150mm	250mm	150mm	250mm	150mm	250mm	150mm	250mm
	J2		±170°							
	J3		±180°		±145°		±180°		±145°	
	J4		±360°				±190°			
	J5		-				±110°			
	J6		-				±360°			
Max. speed*2	J1	Vertical	1200mm/s	1400mm/s	1200mm/s	1400mm/s	1000mm/s	1200mm/s	1000mm/s	1200mm/s
	J2		450°/s							
	J3		720°/s							
	J4		2400°/s				1200°/s			
	J5		-				720°/s			
	J6		-				720°/s			
Payload (max)			2kg (3kg)				1kg (2kg)			
Allowable moment of inertia for wrist*3	J4		0.05kg·m² (0.005kg·m² rated)				0.03kg·m² (0.013kg·m² rated)			
	J5		-				0.03kg·m² (0.013kg·m² rated)			
	J6		-				0.01kg·m² (0.001kg·m² rated)			
Position repeatability*4			±0.014mm				±0.02mm			
Air piping			ϕ6×2							
Application wirings			10 wires							
Installation conditions			Ambient temperature: 0 to 45° C*5 Ambient humidity: 20 to 85% RH (without condensation) Allowable vibration of installation surface: Not more than 0.5 G (4.9m/s²)							
Environmental conditions*6			IP20 * Explosion-proof version is not available.							
Noise level			70dB							
Robot mass			42kg		43kg		44kg		45kg	

1 [rad] = 180/π[°], 1 [N•m] = 1/9.8 [kgf•m]

*1: The maximum speed in the chart is a maximum value. The maximum value may change depending on work programs and load conditions of the wrist.

*2: The allowable moment of inertia of a wrist changes with the load conditions of a wrist.

*3: JIS B 8432 compliant.

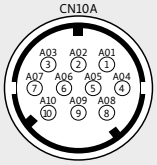
*4: Using at 1000m or lower sea level. Ambient temperature has limitations when allowable altitude is exceeded.

*5: Fluids that cause the deterioration of sealants, such as gasoline-based cutting fluids, chlorine, alkali, acids, and organic solvents, cannot be used.

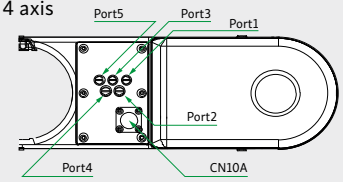
*6: A-weighted equivalent sound level measured according to JIS Z 8737-1 (ISO 11201). (While operating at maximum speed with rated load)

APPLICATION CONNECTOR

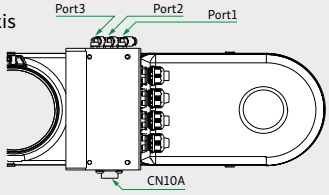
	6	5	4	3	2	1
D	G	A20	A19	A18	A17	A16
C		A15	A14	A13	A12	A11
B	A22	A10	A09	A08	A07	A06
A	A21	A05	A04	A03	A02	A01



4 axis

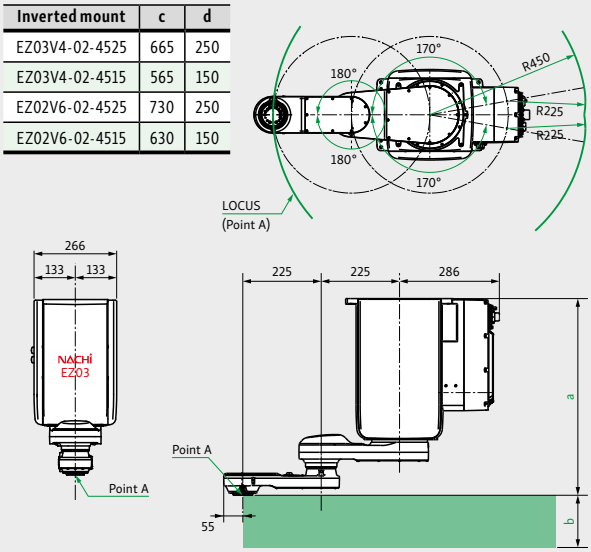


6 axis

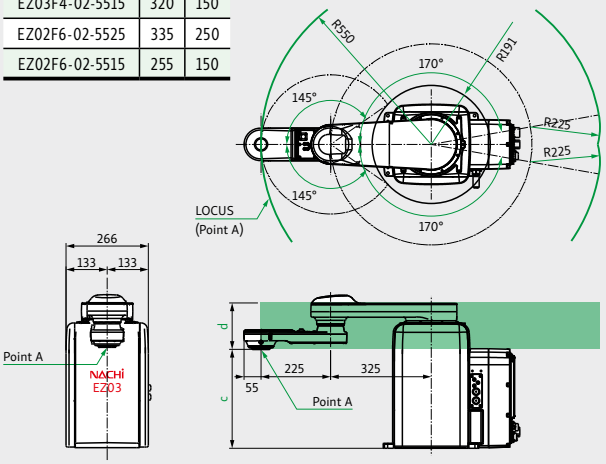


ROBOT DIMENSIONS AND OPERATING ENVELOPE

Inverted mount	c	d
EZ03V4-02-4525	665	250
EZ03V4-02-4515	565	150
EZ02V6-02-4525	730	250
EZ02V6-02-4515	630	150



Floor mount	c	d
EZ03F4-02-5525	420	250
EZ03F4-02-5515	320	150
EZ02F6-02-5525	335	250
EZ02F6-02-5515	255	150



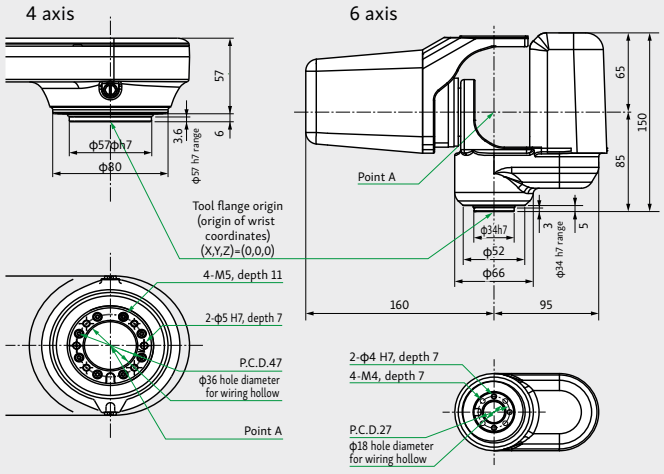
BASIC SPECIFICATIONS OF CONTROLLER

Item	Specifications		
Model	CFDL1-0000	CFDL2-0000	CFDL4-0000
Maximum controllable units	1 unit	2 units	4 units
Maximum controllable axis	6 axis/unit		
Compatible motor	AC servo motor		
Compatible encoder	17-bit absolute encoder		
Safety performance	PLd Category-3, *ISO10218 compliant		
Teach pendant	Option		
Operating switches	Emergency stop, mode switching		
Relay unit	8		
W/H	2, 5, 10, 15, 20m		
External dimensions	369 (W) × 490 (D) × 187 (H)		369 (W) × 510 (D) × 263 (H)
Protection rating	IP20		
Power supply	Single phase/3Φ 200-230 VAC		
Ambient temperature	0 to 40°C (50/60 Hz)		
Ambient humidity	20 to 85% (without condensation)		

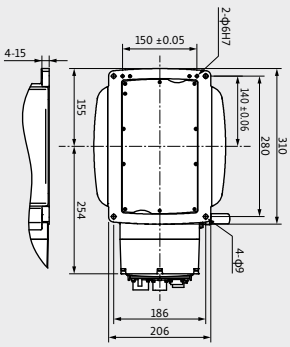
CONTROLLER OPTIONS

Item	Specifications		
Model	CFDL1-0000	CFDL2-0000	CFDL4-0000
External memory	USB memory		
Network	Ethernet		
PCI option	2 slots	1 slot	
Fieldbus	DeviceNet, PROFIBUS, EtherCAT, CC-Link, and others EtherCAT and CC-Link are only compatible as a slave		
Digital I/O	Maximum 64/64		
Software PLC	Yes		
Built-in visual sensor	Option		
Brake release	Brake release mode		
Mechanism conversion	No		
Overseas compliance	UL, CE, KCs		
Welder I/F	None (not compliant with RWC, MEDAR, etc.)		

ROBOT DIMENSIONS AND OPERATING ENVELOPE

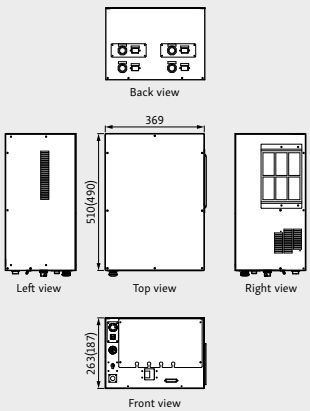


INSTALLATION

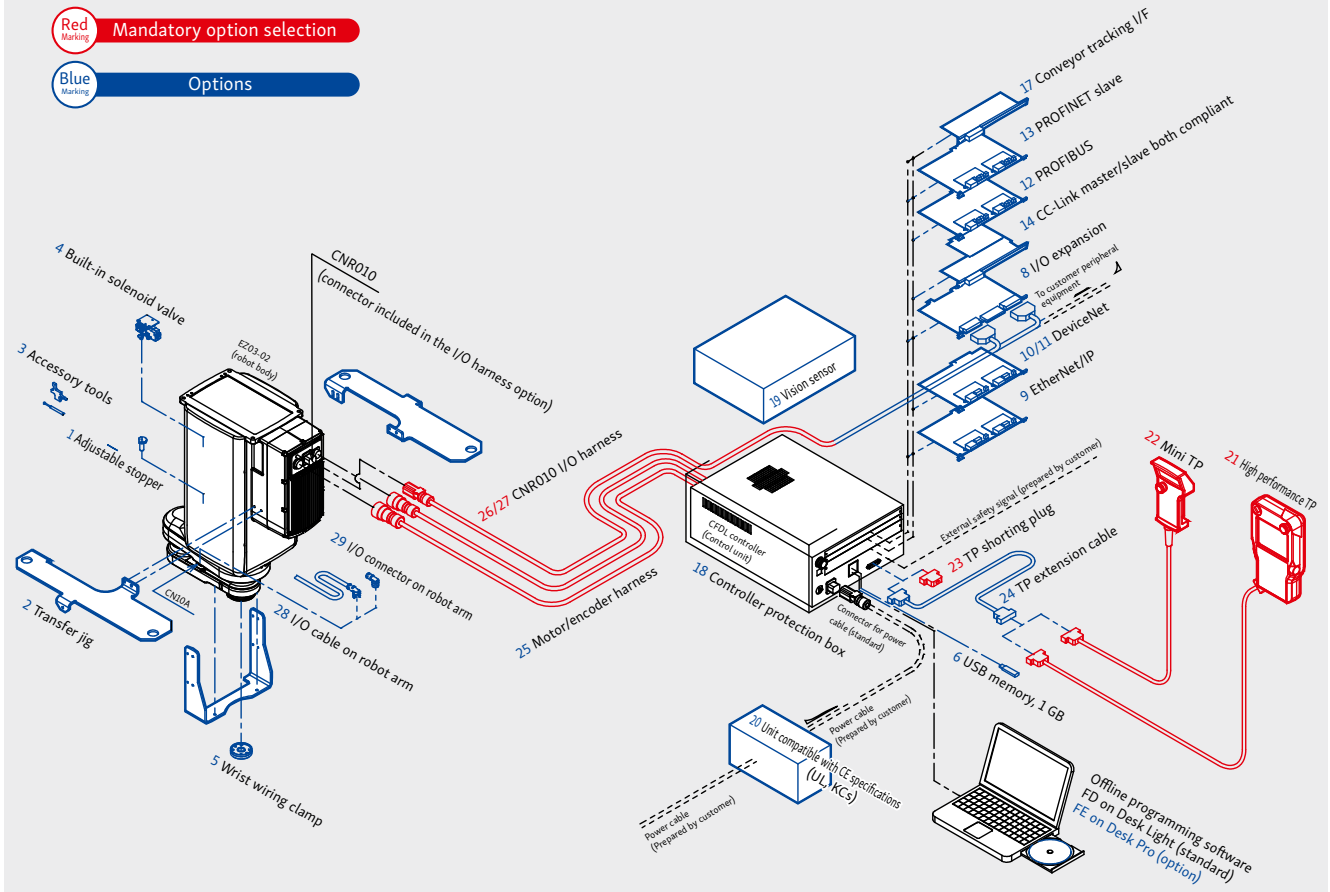


Both inverted and floor mount

CONTROLLER DIMENSIONS



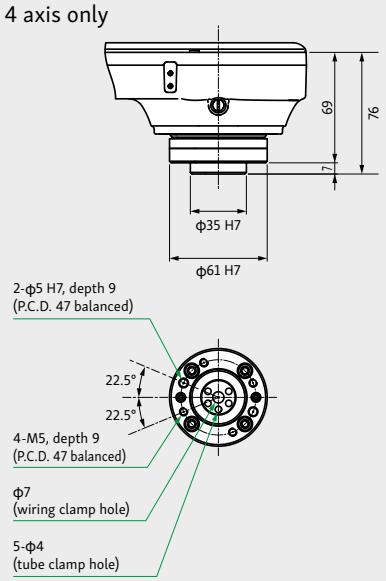
Figures in parentheses indicate the CFDL1-0000, CFDL2-0000



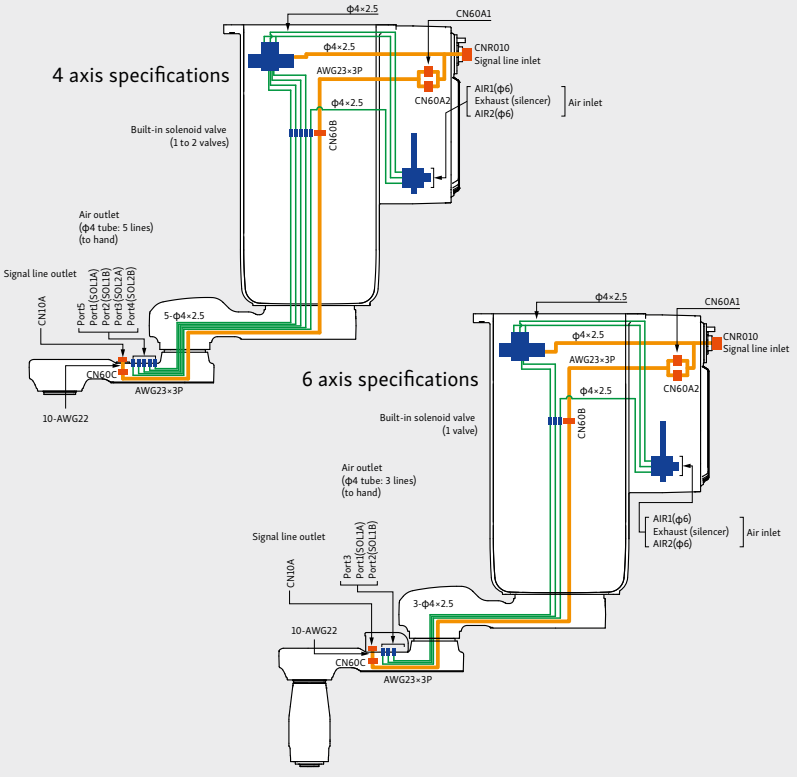
- Options are installed by customer according to their installation instruction manual.
- TP is an acronym for teach pendant.

WRIST DIMENSIONS (OPTION 5)

4 axis only



WIRING AND PIPING INSIDE MACHINE BODY



OPTIONS

No.	Product name	Specifications	Parts No.	Notes
①	Adjustable stopper	For number 2 axis	OP-S5-032	
②	Transfer jig	For both crane transport and inverted mount jig	OP-S2-049	
③	Accessory tools	For 4 axis, zeroing pin and block	OP-T2-099	For 1 to 4 axis
		For 6 axis, zeroing pin and block	OP-T2-094	For 1 to 6 axis
④	Built-in solenoid valve	1 valve (4 and 6 axis specifications)	OP-H4-009	Pressure range 0.1 to 0.5 MPa
		2 valves (4 axis specifications)	OP-H5-011	Coil voltage rating 24 VDC
⑤	Wrist wiring clamp	Wire/tube clamp for hollow in number 4 axis	OP-W3-018	Air (ϕ4, 5 lines), signal lines (4-axis only)
⑥	USB memory	1 GB	FD11-OP93-A	
⑦	Compact I/O board	8 point/8 point (relay output)		Equipped on sequence board
⑧	I/O expansion	I/O 32 point/32 point (NPN 1 board expansion)	CFD-OP125-A	Occupies 1 slot
		I/O 64 point/64 point (NPN 2 board expansion)	CFD-OP125-B	Occupies 2 slots
		I/O 32 point/32 point (PNP 1 board expansion)	CFD-OP151-A	Occupies 1 slot
		I/O 64 point/64 point (PNP 2 board expansion)	CFD-OP151-B	Occupies 2 slots
⑨	EtherNet/IP	Master 1CH	CFD-OP130-A	Occupies 1 slot
		Slave 1CH	CFD-OP130-B	
		Master 1CH + Slave 1CH	CFD-OP130-C	
		Slave 2CH	CFD-OP130-D	
		Master 2CH	CFD-OP130-E	
⑩	DeviceNet	Master 1CH	CFD-OP131-A	Occupies 1 slot
		Slave 1CH	CFD-OP131-B	
		Master 1CH + Slave 1CH	CFD-OP131-C	
		Slave 2CH	CFD-OP131-D	
		Master 2CH	CFD-OP131-E	
⑪	DeviceNet (quick connect)	Master 1CH	CFD-OP129-A	Occupies 1 slot
		Slave 1CH	CFD-OP129-B	
		Master 1CH + Slave 1CH	CFD-OP129-C	
		Slave 2CH	CFD-OP129-D	
		Master 2CH	CFD-OP129-E	
⑫	PROFIBUS	Master 1CH	CFD-OP132-A	Occupies 1 slot
		Slave 1CH	CFD-OP132-B	
		Master 1CH + Slave 1CH	CFD-OP132-C	
		Slave 2CH	CFD-OP132-D	
		Master 2CH	CFD-OP132-E	
⑬	PROFINET	Slave 1CH	CFD-OP136-B	Occupies 1 slot
		Slave 2CH	CFD-OP136-D	
⑭	CC-Link	Both master and slave supported 1CH	CFD-OP98-B	Occupies 1 slot
⑮	FL-net	1CH	CFD-OP101-B	Occupies 1 slot
⑯	Analog output	Analog output 4CH	CFD-OP46-B	Occupies 1 slot
⑰	Conveyor tracking I/F	RS422 Differential input encoder counter	CFD-OP47-A	Occupies 1 slot
⑱	Controller protection box	1 to 2 units (CFDL1, CFDL2)	CFD-OP133-A	IP54 protection class compliant (dust-proof and drip-proof box)
		4 units (CFDL4)	CFDL-OP133-A	
⑲	Vision sensor	Vision sensor unit for CFD (separate installation), cross laser	CFD-OP139-A	
		Vision sensor unit for CFD (separate installation), monocular/stereo camera	CFD-OP139-B	
		Vision sensor unit for CFD (separate installation), 2 LED	CFD-OP139-C	
		Vision sensor unit for CFD (separate installation), 3D	CFD-OP139-D	
⑳	UL specifications	UL standard compliant	CFDL-UL-A	
	CE specifications	CE marking compliant	CFDL-CE-A	
	KCs specifications	Korean KCs compliant	CFDL-KCS-A	
㉑	High performance TP	Cable length 4m	CFDTP-10-04M	Select one from 21, 22, or 23.
㉒	Mini TP	Cable length 4m	MINITP-10-04M	
㉓	TP shorting plug	To disconnect teach pendant	CFD-OP153-A	

OPTIONS				
㉔	TP extension cable	5m	CFDTP-RC05M	User can choose either one connector on both ends.
		10m	CFDTP-RC10M	
㉕	Motor/encoder harness	2m	E000E-J1-02-B	It is necessary to select one of them.
		5m	E000E-J1-05-B	
		10m	E000E-J1-10-B	
		15m	E000E-J1-15-B	
		20m	E000E-J1-20-B	
㉖	CNR010 I/O harness (loose wires for controller connections on robot side)	2.5m	IOCABLE-10-02M	I/O cable between robot and controller. Controller side is open-ended. User needs to connect wires to match appropriate signals.
		5.5m	IOCABLE-10-05M	
		10.5m	IOCABLE-10-10M	
		15.5m	IOCABLE-10-15M	
		20.5m	IOCABLE-10-20M	
		25.5m	IOCABLE-10-25M	
㉗	CNR010 I/O harness Relay output supported (both terminals connected to controller on robot side)	2.5m	IOCABLE-40B-02M	I/O cable between the robot and sequence I/O board (NPN type) in the controller.
		5.5m	IOCABLE-40B-05M	
		10.5m	IOCABLE-40B-10M	
		15.5m	IOCABLE-40B-15M	
		20.5m	IOCABLE-40B-20M	
		25.5m	IOCABLE-40B-25M	
㉘	I/O cable on robot arm	1.5m	IOCABLE-20-01M	
㉙	I/O connector on robot arm	Connector only, connectors are soldered type	IOCABLE-20-00	
㉚	32-contact I/O harness (connected to controller connector, customer side is loose wires) I/O expansion, 1 board specifications	2.5m	IOCABLE-30-1-02M	Customer recommended to complete wiring on application side. Can be used with CFD-OP125-A or CFD-OP151-A.
		5.5m	IOCABLE-30-1-05M	
		10.5m	IOCABLE-30-1-10M	
		15.5m	IOCABLE-30-1-15M	
		20.5m	IOCABLE-30-1-20M	
		25.5m	IOCABLE-30-1-25M	
㉛	64-contact I/O harness (connected to controller connector, customer side is loose wires) I/O expansion, 2 board specifications	2.5m	IOCABLE-30-2-02M	Customer recommended to complete wiring on application side. Can be used with CFD-OP125-B or CFD-OP151-B.
		5.5m	IOCABLE-30-2-05M	
		10.5m	IOCABLE-30-2-10M	
		15.5m	IOCABLE-30-2-15M	
		20.5m	IOCABLE-30-2-20M	
		25.5m	IOCABLE-30-2-25M	
㉜	Power voltage converter	CFDL1-0000, CFDL2-0000	CFD-OP154-A	Portable transformer for 100 VAC
		CFDL4-0000	CFDL-OP154-A	

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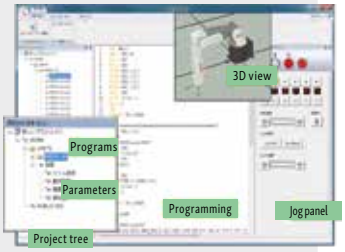
PROGRAMMING TOOL – PC-BASED TEACHING TOOL – STANDARD

Software for robot setting, programming and debugging.



- User can manage setting and program files based on the project
- Exclusive editor for robot language
- User can easily manage and input signal, position and parameter
- User can control the robot without teach pendant

VISIONSENSOR NV-PRO — OPTIONAL

- Customizable teach pendant screen menu
- Works as a system operation console which can control peripheral devices

OFFLINE SIMULATION TOOL – FD ON DESK LIGHT – STANDARD

Best simulator for a feasibility study.

- Offline programming
- Operation and layout study
- Cycle time simulation
- PLC program editing
- Operation instruction

SUPPORT FOR VARIOUS FIELDBUS — OPTIONAL

- DeviceNet (master, slave)
- EtherNet/IP (master, slave)
- EtherCAT (slave)
- CC-Link (master, slave)
- PROFIBUS (master, slave)
- PROFINET (slave)

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EtherCAT is trademarks of Beckhoff Automation GmbH.

CC-Link is a trademark of CC-Link association.
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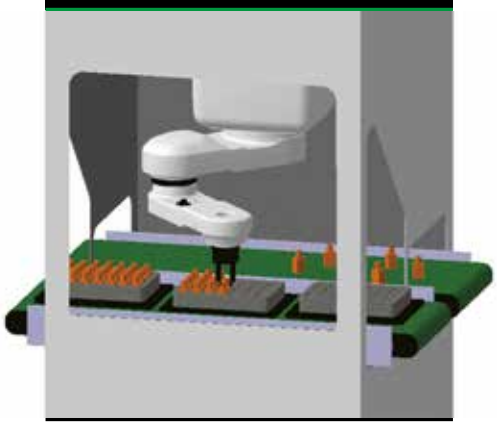
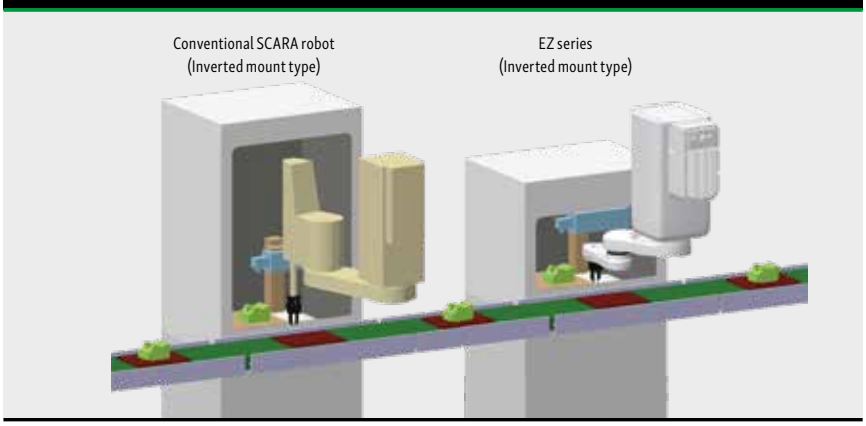
Application Examples

PICK-AND-PLACE



LOAD & UNLOAD FROM / TO A NARROW ENTRANCE



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