SCARA Robots

i4-650H/750H/850H

High performance robot for assembly, material handling, and precision machining.

- Built-in EtherCAT and PROFINET Fieldbus communications.
- At-a-glance robot status with highly visible, multi-colored LED light ring and LCD display.
- Reach Options of 650 mm, 750 mm, 850 mm with 210 mm or 410 mm z-axis stroke.
- IP65, Electrostatic Discharge (ESD) protection, Cleanroom, and Food Grade models available.

Ordering Information

RS4-20 □ □ □ □□

1 2 3 4 5

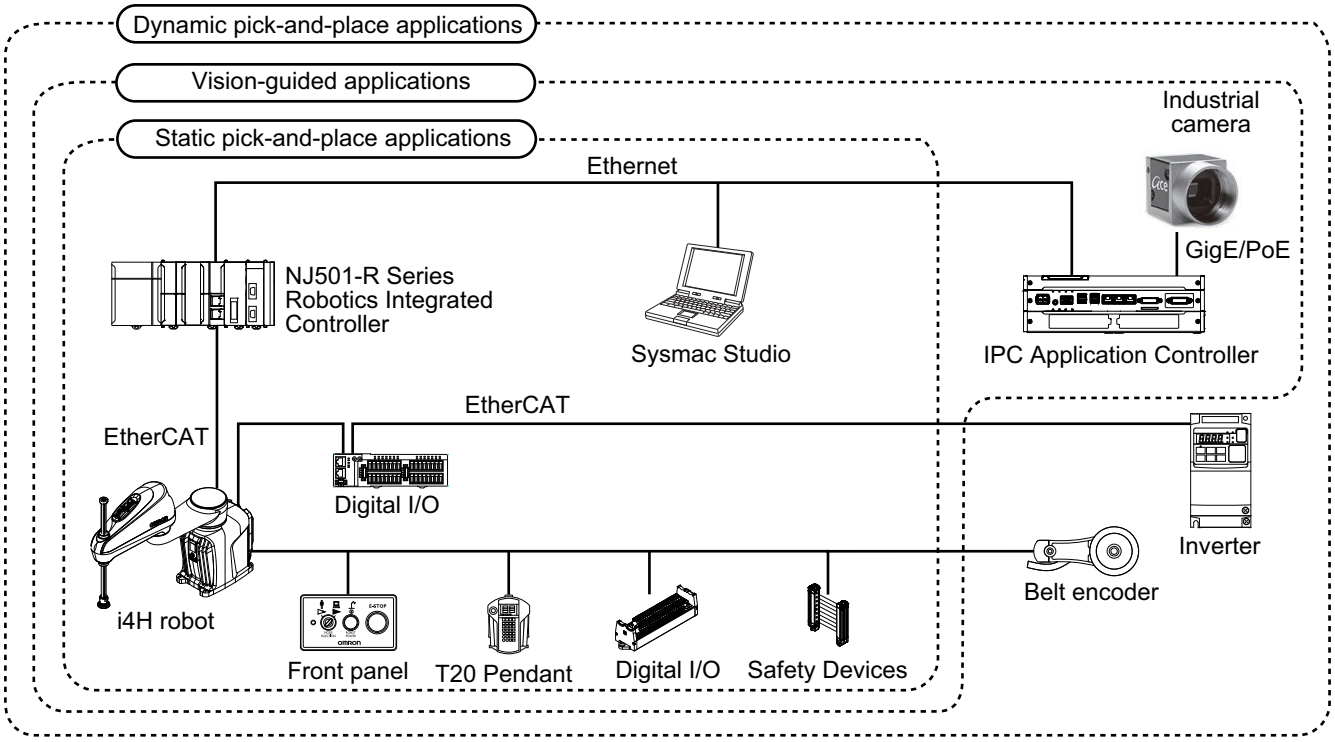
Item	Description	Details	Designation
1	Robot Type	SCARA	RS4-20
2	Control Type	Standard Control	5
		Integrated Control*1	6
3	Reach	650 mm	6
		750 mm	7
		850 mm	8
4	Mount Configuration	Standard	5
		Inverted	7
5	Options	• IP20 with Standard Lubrication • 210 mm Z-axis Quill Stroke Length	02
		• IP20 with Standard Lubrication • 410 mm Z-axis Quill Stroke Length	04
		• IP20 with Standard Lubrication • Cleanroom Rated • Electrostatic Discharge Protection • 210 mm Z-axis Quill Stroke Length	12
		• IP20 with Standard Lubrication • Cleanroom Rated • Electrostatic Discharge Protection • 410 mm Z-axis Quill Stroke Length	14
		• IP65 with Food Grade Lubrication • 210 mm Z-axis Quill Stroke Length	42
		• IP65 with Food Grade Lubrication • 410 mm Z-axis Quill Stroke Length	44
		• IP20 with Food Grade Lubrication • 210 mm Z-axis Quill Stroke Length	53
		• IP20 with Food Grade Lubrication • 410 mm Z-axis Quill Stroke Length	55

*1 Some first-generation models do not support TIO and integrated pneumatic valve control. Contact your local OMRON representative for more information.

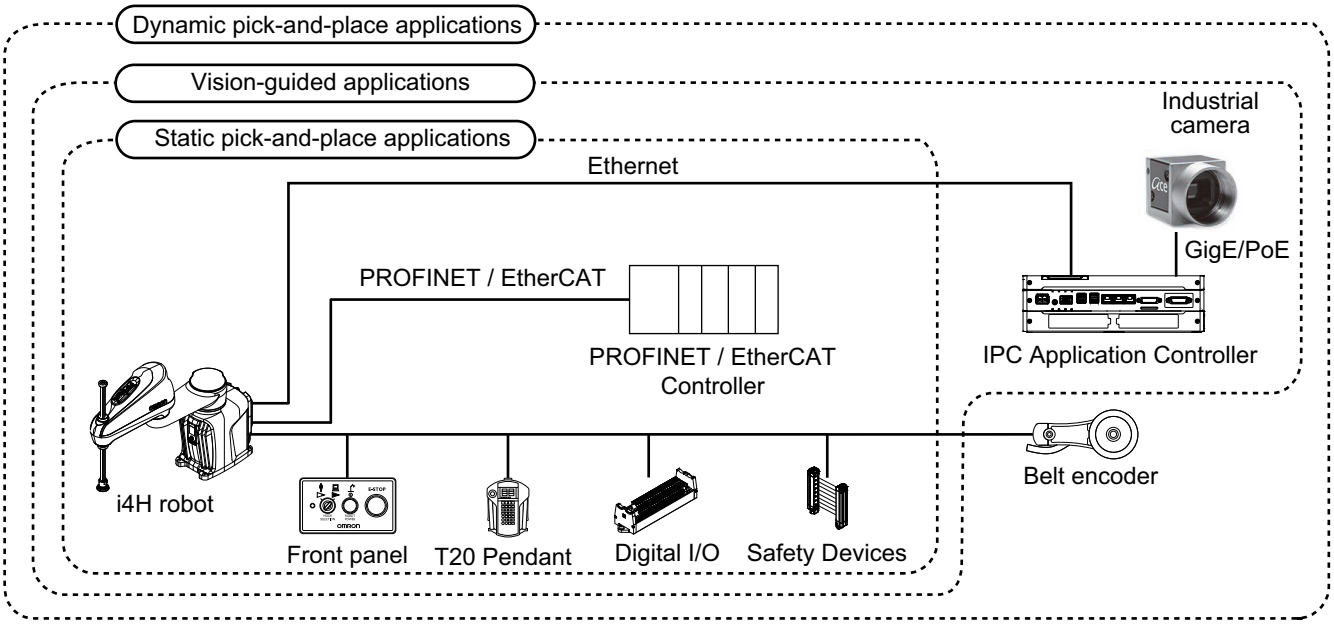
System Configuration

Typical system configurations are shown below. Other equipment and connections are possible.

Integrated Control



Standard Control



Specifications

Product		i4-650H		i4-750H		i4-850H	
Quill Length		210 mm	410 mm	210 mm	410 mm	210 mm	410 mm
Number of Axes		4					
Reach		650 mm		750 mm		850 mm	
Maximum Payload[*1]		15 kg					
Repeatability at 100% speed	XY	±0.015 mm					
	Joint 3	±0.01 mm					
	Joint 4	±0.005°					
Joint Range	Joint 1	±152°					
	Joint 2	±140°					
	Joint 3	210 mm (Standard Quill), 410 mm (Long Quill)					
	Joint 4	±150,000 rotations (Standard Control), ±1 rotation (Integrated Control)					
Inertia Moment (Max.)	Joint 4	0.5 kg-m^2					
Torque Limits	Joint 4	8.0 N-m continuous, 22.8 N-m peak[*2]					
Maximum Push Force - Downward, No Load[*3]	Joint 3	588 N					
Joint Speeds	Joint 1	450 deg/s					
	Joint 2	720 deg/s					
	Joint 3	1583 mm/s					
	Joint 4	2400 deg/s					
Cycle Times[*4,*5]	Burst[*6]	0.41 s		0.39 s		0.39 s	
	Sustained	0.45 s		0.46 s		0.50 s	
	Blended Burst[*5]	0.32 s		0.31 s		0.31 s	
Electrical Requirements	DC	24 VDC ±10%, 8 A max.					
	AC	200 to 240 VAC, 50/60 Hz, Single Phase, 12.0 A max.					
Protection	IP20 Model	NEMA Type 1					
	IP20 Food Grade Model	NEMA Type 1, uses food grade lubrication NSF H1 (ISO 21469 certified)					
	IP20 Electrostatic Discharge Protection, Cleanroom Model	NEMA Type 1, ISO 4 / Class 10					
	IP65 Model	NEMA Type 4, uses food grade lubrication NSF H1 (ISO 21469 certified)					
Mounting		Table, Inverted, Wall					
Environment Requirements	Ambient Temperature	0° to 40°C					
	Humidity Range	5% to 90% non-condensing					
Weight	IP20 Models	50.4 kg	50.8 kg	50.9 kg	51.3 kg	51.6 kg	52.0 kg
	IP65 / Cleanroom Models	52.9 kg	53.3 kg	53.4 kg	53.8 kg	54.1 kg	54.5 kg
On-board I/O	Inputs	12 Sinking / Sourcing (XIO), 5 Sinking (TIO), 0 to 30 VDC					
	Outputs	12 Sourcing, 24 VDC ±10%, 0.7 A per output 1.5 A max. @ 25ºC for all circuits					
Tool Network Connection (Ethernet / EtherCAT)		1 (4 pin, M12 female)					
PROFINET		PROFINET v2.4, class B (vendor specific I/O device profile)					
EtherCAT SubDevice		FreeRun and DC (Distributed Clock) with Sync0					
Electrical Pass-through Ports		2 (19 pin, M23 male)					
Pneumatic Ports		8 (6 mm, push-type fittings) max. pressure 0.55 MPa					
Vacuum Ports (Cleanroom Models)		2 (10 mm push-type fittings) 0.14 m^3/minute min., 81 mm water vacuum					
Belt Encoder		2 line driver inputs (A, B, and Z)					
RS-232C Serial Communication Ports		1 (troubleshooting information only)					
Programming Software		Sysmac Studio / ACE Version 4[*7]					
IPC Application Manager		Robot Vision Manager, PackManager					
Controller		NJ501-R Series (Integrated Control robots only)					
Standards		EN ISO 12100, EN ISO 13849-1, EN ISO 10218-1, UL 1740, EN 60204-1, EN 61000-6-2, EN 61000-6-4, CAN/CSA Z434, KN 61000 6-2, KN 61000 6-4, (ESD models only) ANSI/ESD S20.20.2021, IEC 61430-5-1.2016					

*1 Payload includes any object(s) attached to a robot link or tool flange, including end-effectors, tooling, valves, grippers, and objects being handled by the robot.

*2 Values can be achieved in a 20° C ambient operating temperature. Values may decrease in higher ambient temperatures. The peak torque can be applied for up to 200 ms with a duty cycle of 10%.

*3 At a duty cycle of 3 seconds pushing and then 2 seconds not pushing.

*4 Cycle times may increase by up to 15% when operating in ambient temperatures above 20° C.

*5 Cycle time is defined as a continuous path with straight-line motion in which the robot tool moves up 25 mm, laterally 305 mm, down 25 mm,

and then back along the same path (not achievable over all paths in the robot working envelope). Values listed are with no joint 4 rotation, at 20°C ambient with a 2.0 kg payload. Blended Burst cycle uses the same criteria with arc motion.
*6 Burst cycle times may increase by up to 15% when bellows are present.
*7 Use Sysmac Studio for Integrated Control robots. Use ACE Version 4 for Standard Control robots.

Version Information

The details in this document apply to products operating with the following hardware and software versions.
- Integrated Control Robot Controller Version: Revision A
- Standard Control Robot Controller Version: Revision C
- Integrated Control Robot Firmware Version: 5.0C
- Standard Control Robot Firmware Version: 6.102C
- ACE Software Version: 4.8.3
- PROFINET functionality requires a minimum firmware version of 6.06C and an ACE software version of 4.7.3
- EtherCAT functionality requires a minimum firmware version of 6.102C and an ACE software version of 4.8.3

Items Included with the Robot

Front Panel	Remote mounted device for robot mode, power, indication, and emergency stop. Includes an interconnecting extension cable.
XSYSTEM Cable	1.8 m cable providing 3 connectors for XMCP, XFP, XUSR signals and 1 RJ-45 connector.
XMCP Connector Jumper	Jumper for XMCP connector on XSYSTEM cable.
XFP Connector Jumper	Jumper for XFP connector on XSYSTEM cable.
XUSR Connector Jumper	Jumper for XUSR connector on XSYSTEM cable.
DC Control Power Connector	Control power connector and pins.
AC High Power Connector	High power connector, pins, and retaining clip.
USB Dongle	USB Memory Stick (includes manuals, ACE software, robot firmware, and other documentation).
Printed Documentation	Safety Guide, Declarations of Incorporation, Declaration of Conformance to KC Standards.
Labels	CE, LED color status, UKCA, French labels.
Cable Seal Kit	Ingress protection for the connections and components on the Primary Interface Panel (IP65 rated robots only).

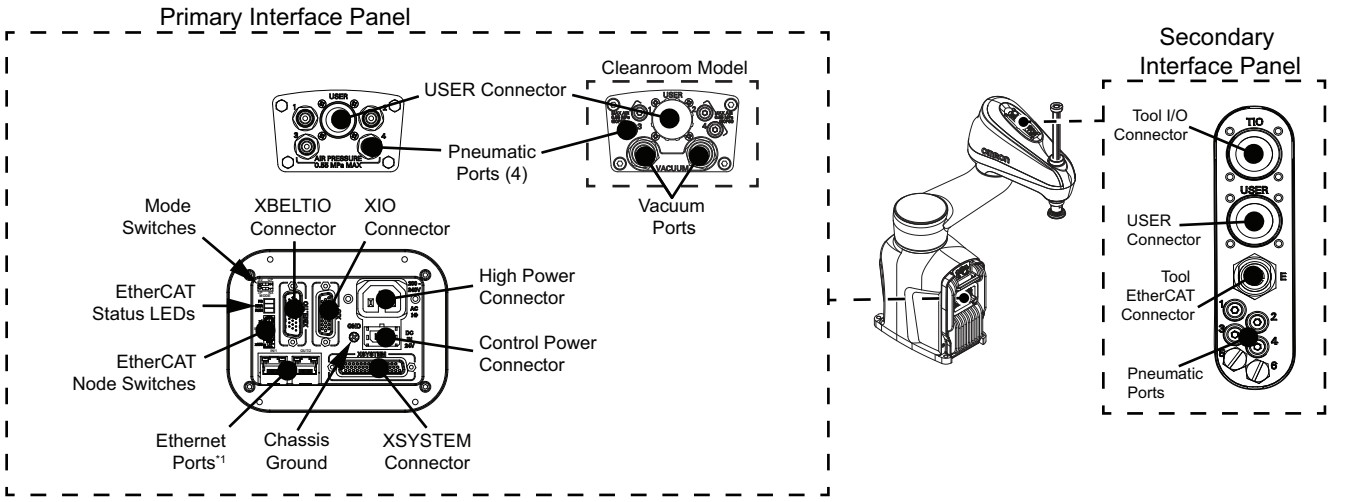
Options and Additional Items

Item	Description	Details	Ordering Code
XSYSTEM Cable with Jumpers	Provides connections and jumpers for a Front Panel, Teach Pendant, and other user-supplied devices.	1.8 m cable length.	13323-100*1
Cable Seal Kit	Cable Seal for all cable connections at the Primary Interface Panel.	All components for replacing or installing a cable seal included.	08765-000*2
Cable Seal Kit (Inverted Mount)			08765-200*2
High Power Connector	Used to supply 200 to 240 VAC power for the internal servo amplifiers.	Includes connector, pins, and retaining clip.	22822-100*1
Control Power Connector	Used to supply 24 VDC control power.	Includes connector and pins.	22822-200*1
Control Power Kit	Provides 24 VDC Control Power to the robot	Includes 24 VDC power supply (S8VK-G24024) and 5.0 m DC cable with pre-installed connector to robot.	23912-000
XBELTIO Cable	Provides connections to Belt Encoder, EXPIO, and RS-232 signals.	0.6 m cable length.	13463-000
XIO Breakout Cable	Provides a flying leads connection to digital I/O at the XIO connector on the robot.	5.0 m cable length.	04465-000
XIO Termination Block and Cable	Provides terminal block digital I/O connections at the XIO connector on the robot.	Includes a terminal block with a 1.8 m cable.	90356-40100
IO Blox Kit	Provides additional I/O (8 inputs and 8 outputs).	Includes an IO Blox unit with a 0.3 m cable.	90356-30200
IO Blox Expansion Kit	Provides IO Blox unit expansion.	Includes an IO Blox unit with a 0.3 m cable.	90356-30100

Item	Description	Details	Ordering Code
IO Blox Connection Cable	Connects two IO Blox units.	3.0 m cable length.	04679-030
		0.3 m cable length.	04679-003
	Connects an IO Blox unit and a robot.	3.0 m cable length.	04677-030
		0.3 m cable length.	04677-003
Encoder Kit	Includes all equipment to add an encoder to a robot.	Includes encoder, mounting bracket, and 5 m cable.	09742-001
TIO Connector Cable	Provides connections to Tool I/O signals.	1.8 m cable length.	19140-100
USER Connector Cable	Provides flying leads for USER ports on the Primary and Secondary Interface Panels.	1.8 m cable length.	18823-100
Encoder Extension Cable	Replaces or extends the Encoder Kit cable.	5.0 m cable length.	09446-050
Pneumatic Valve Kit	Provides three robot-controlled pneumatic valves.	All components included.	19165-000
Belt Encoder Y-adapter Cable	Provides two M12 connectors for the Belt Encoder signals/connector on the XSYSTEM cable.	3.0 m cable length.	09443-000
Front Panel Kit	Remote mounted device for robot mode, power, indication, and emergency stop.	Includes a Front Panel with a 3.0 m cable.	92546-10358*1
eCobra Mount Adapter	Adapts i4H robot mounting holes to the eCobra mounting hole pattern.		21636-000
eCobra Tool Flange	eCobra tool flange compatible with the i4H robot.		19106-100
Tool Flange (ISO)	Replacement i4H tool flange.		19106-000F
Camera Mounting Bracket	Used to mount a camera to the outer link.		18908-000
Camera Mounting Adapter	Provides Basler and Sentech camera mounting for the Camera Mounting Bracket.		22295-000
T20 Pendant Kit	Provides all required equipment for the T20 Pendant.	Includes the T20 Pendant, 3 m adapter cable, and an M23 jumper plug.	10046-010
IPC Application Controller	Used to execute PackManager and Robot Vision Manager applications.		AC1-152000
Wall Mount Bracket	Enables mounting the robot to a vertical surface.	Not compatible with IP65-rated robots.	20089-000
NJ501-R Series Robotics Integrated Controller	Machine controller with sequence, motion, and robotics functionality.	Refer to Cat. No. P140 for more information.	NJ501-R□□□
Sysmac Studio	Settings and creation of programs to control a robot with the Robot Integrated CPU Unit and IPC Application Controller.	A license for the Standard Edition (SYSMAC-SE201L) is required.	SYSMAC-SE200D-64
3D Simulation	Perform 3D simulation including robots and peripheral devices.		SYSMAC-SA401L-64
PackManager	Enables full functionality of the PackManager software.		20409-000
Robot Vision Manager	Enables the Robot Vision Manager functionality and inspection tools library.		20410-000
PackManager + Robot Vision Manager	Enables functionality of both PackManager and Robot Vision Manager		20433-000
Bellows Installation Kit	Two bellows and associated hardware for protecting the quill.	210 mm quill length.	19464-003F*3
Bellows Installation Kit		410 mm quill length.	19464-004F*3
Replacement Bellows	Upper and lower replacement bellows.	210 mm quill length.	19464-103F
		410 mm quill length.	19464-104F
Encoder Backup Battery Pack	Pack contains two 3.6 V batteries.		19238-000F*1

*1 Equipment supplied with all robots.
*2 Additional equipment supplied with IP65 rated robots.
*3 Additional equipment supplied with IP65 and Cleanroom / ESD rated robots.

Interface Panels

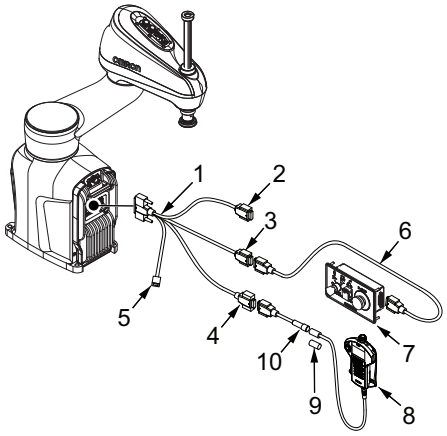


*1 Ethernet Ports can be configured for EtherCAT or PROFINET fieldbus communications.

Cables and Connections

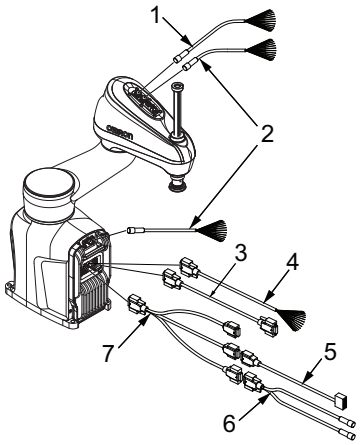
Refer to Options and Additional Items for more information.

Standard Cables and Connections



Item	Description	Function	Ordering Code
1	XSYSTEM Cable	Main interface cable	13322-100
2	XUSR Connector	User-supplied safety devices	
3	XFP Connector	Front Panel connections	
4	XMCP Connector	T20 Pendant	
5	Ethernet Connector	Service mode connection	
6	Front Panel Extension Cable		92546-10358
7	Front Panel	High-power, mode, and E-stop	
8	T20 Pendant		10046-010
9	T20 Pendant Jumper Plug	Used when T20 Pendant is not connected	
10	T20 Pendant Adapter Cable		

Optional Cables and Connections



Item	Description	Function	Ordering Code
1	TIO Cable	On-board I/O to devices on outer link / tool flange	19140-100
2	USER Connector Cables	Pass-through electrical signals	18823-100
3	XIO Termination Block Cable	Connection to I/O termination block	03695-000
4	XIO Breakout Cable	I/O flying leads	04465-000
5	EXPIO to IO Blox Cable	IO Blox connections	04677-030
6	Belt Encoder Y-adapter Cable	Direct encoder connections	09443-000
7	XBELTIO Adapter Cable	Encoder, force, and RS-232 signal interface cable	13463-000

Mounting Options

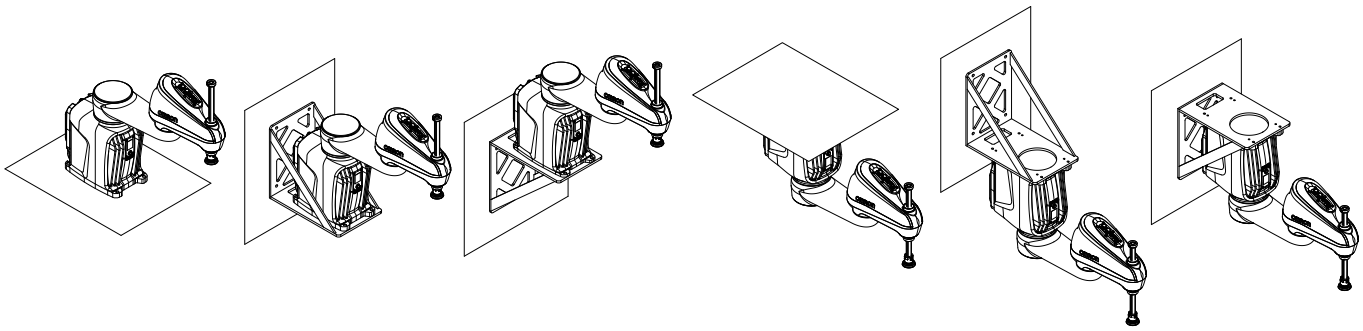
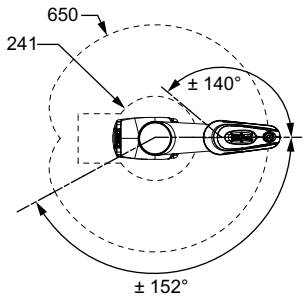


Table Mount **Wall Mount** **Inverted Mount** **Inverted Wall Mount**

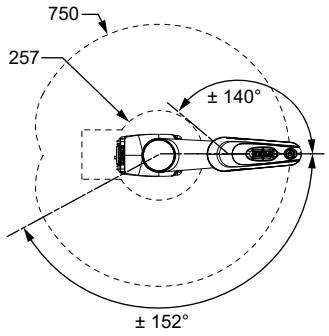
Arm Reach Dimensions

(Unit: mm)

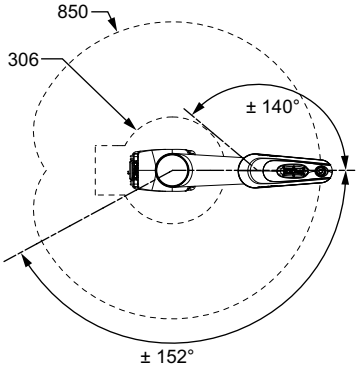
i4-650H



i4-750H



i4-850H

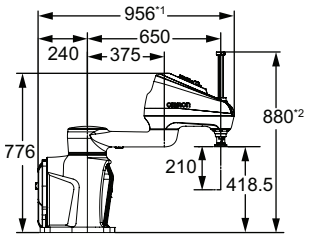


Note: Reach restrictions behind the robot may vary based on robot configuration and type.

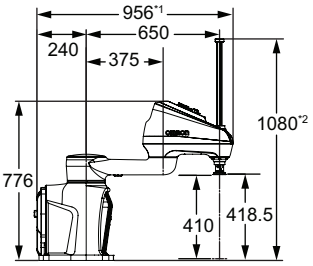
Robot Dimensions

(Unit: mm)

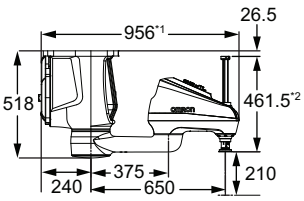
i4-650H



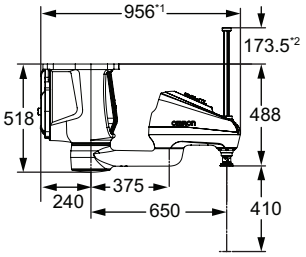
i4-650H Long Quill



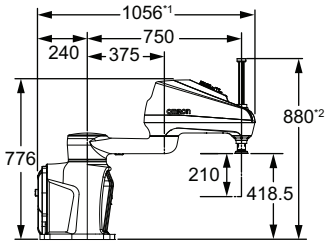
i4-650H Inverted



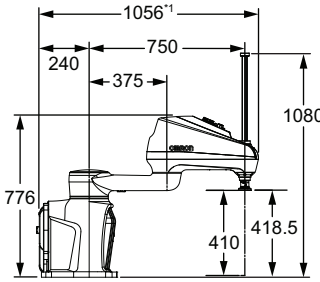
i4-650H Inverted, Long Quill



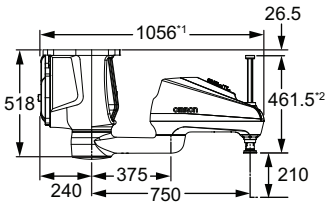
i4-750H



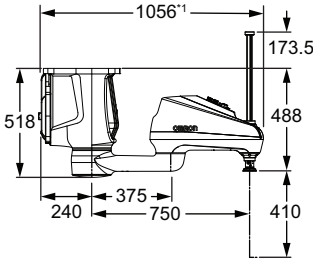
i4-750H Long Quill



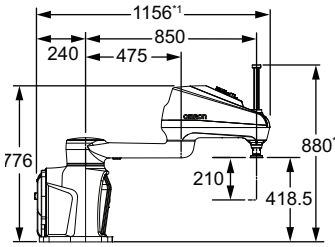
i4-750H Inverted



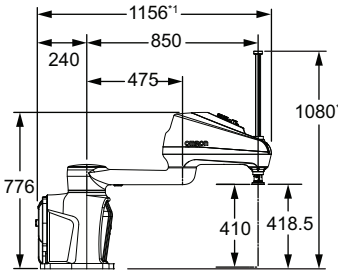
i4-750H Inverted, Long Quill



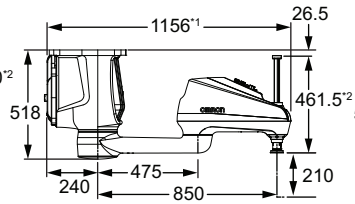
i4-850H



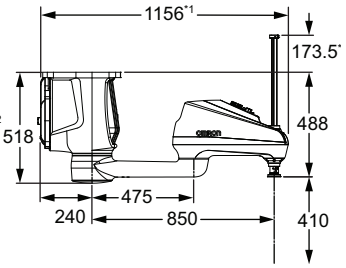
i4-850H Long Quill



i4-850H Inverted



i4-850H Inverted, Long Quill



*1 For any model with a cable seal, this distance increases by 150 mm.

*2 For any model with bellows, this distance increases by 47 mm.

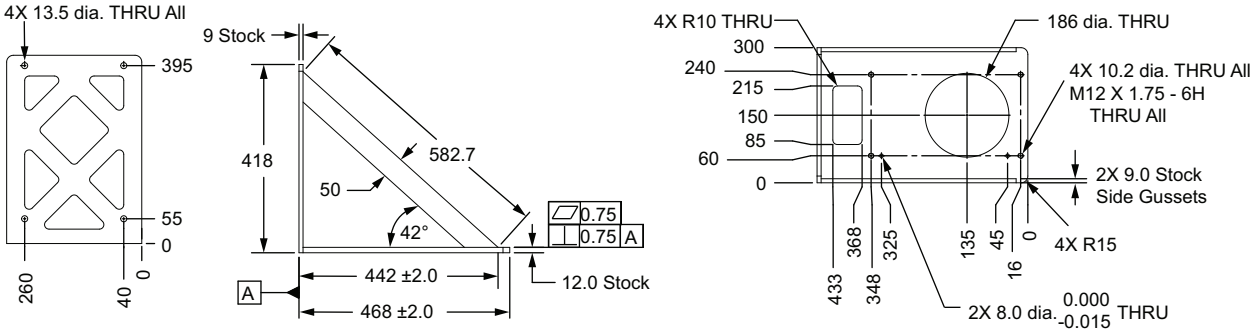
Note: The base of the robot is 240 mm wide.

Note: The z-axis quill has a hollow shaft design and can be utilized for routing cables and pneumatic lines to an end-effector. The inner diameter of this hollow shaft is 18 mm.

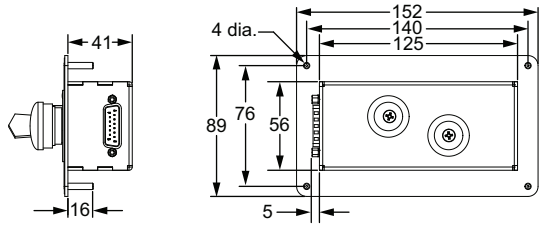
Other Dimensions

(Unit: mm)

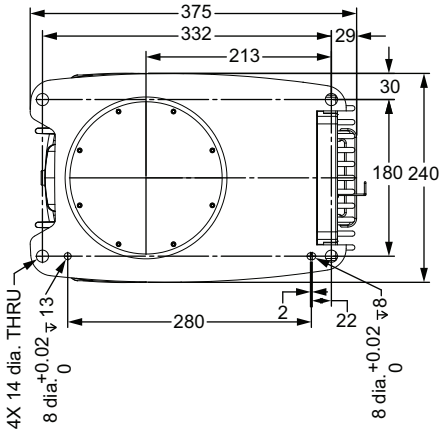
Wall Mount Bracket



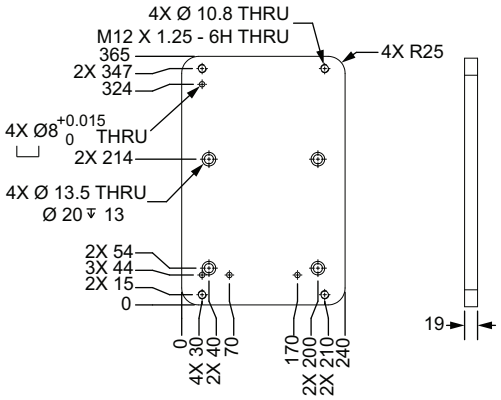
Front Panel



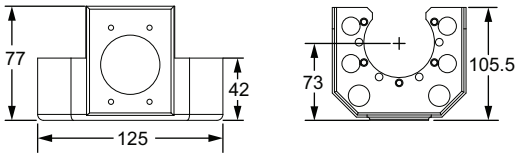
Robot Base



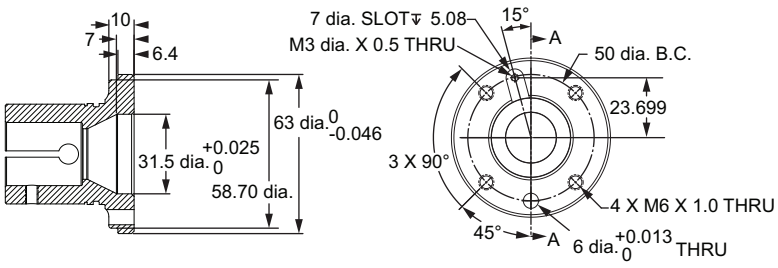
eCobra Mount Adapter



Camera Mounting Bracket

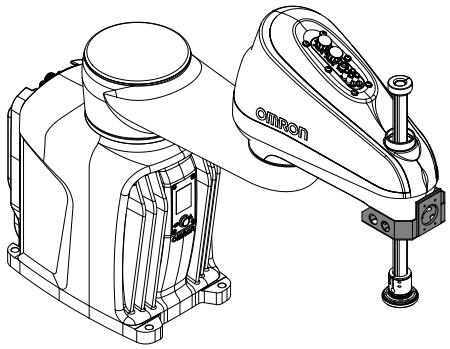


Tool Flange (ISO)

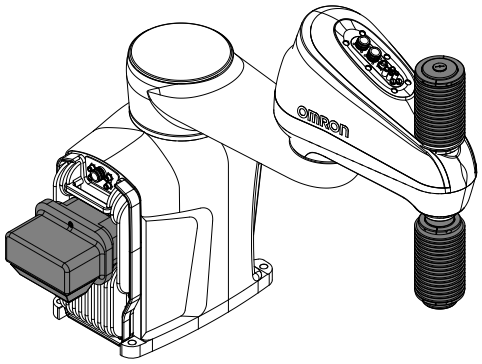


Other Information

Camera Bracket



Cable Seal and Bellows



Related Manuals

Catalog Number	Manual Title
I590	Robot Safety Guide
I601	T20 Pendant User's Manual
I660	i4H Robots User's Manual
I661	i4H Robots with EtherCAT User's Manual
I632	IPC Application Controller User's Manual
I633	Automated Control Environment (ACE) Version 4 User's Manual
I671	V+ User's Manual
I672	V+ Keyword Reference Manual
M130	Industrial Robot Fieldbus Configuration User's Guide
O037	NJ-series Robot Integrated CPU Unit User's Manual
O049	Machine Automation Controller NJ-series Robot Integrated System Startup Guide
W504	Sysmac Studio Version 1 Operation Manual
W595	Sysmac Studio Robot Integrated System Building Function with Robot Integrated CPU Unit Operation Manual
W618	Sysmac Studio 3D Simulation Function Operation Manual
W621	Sysmac Studio Robot Integrated System Building Function with IPC Application Controller Operation Manual

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