orcahand v2.1 touch

with PaXini fingertip tactile sensing





TACTILE SENSORS

Hall-effect 3-axis force, 363 taxels per hand

DIMENSIONS (H × W × D)

330 × 93 × 105 mm overall
Base footprint 93 × 96 mm
Finger ≈97 mm, palm to tip
Palm 92.3 W × 74.0 H mm

SKIN

Silicone palm and finger skin

MOTION

17 active DoF including
16 tendon-driven finger DoF
1 belt-driven wrist DoF
Rated for 80,000 cycles, then new sensor cables

ACTUATORS

17 servos
Assisted auto-tensioning

STRUCTURE

Aluminum spool holders
PLA structure
Steel and PTFE guide the tendon.



ROBOT ARM MOUNTING

Aluminum ISO 9409-1 plate
Ø63 mm flange
Ø50 mm bolt circle
4 × Ø6.5 mm for M6

POWER + CONNECTION

12 V, 5 A adapter included
Two 12 V fans
USB-C serial

WEIGHT

~1.25 kg

CONTROL AND ROBOT LEARNING

Control package	Open-source full control stack in Python at github.com/orcahand/orca_core
User interface	Browser app for setup and calibration at github.com/orcahand/orca_ui
Models	URDF and MJCF at github.com/orcahand/orcahand_description STEP files per part at github.com/orcahand/orcahand_hardware
Simulation	MuJoCo learning environment at github.com/orcahand/orca_sim
Teleoperation	Open-source stack and retargeter at github.com/orcahand/orca_teleop. Webcam, Manus gloves and Apple Vision Pro supported. Meta Quest and Rokoko gloves coming soon.
Robot learning	LeRobot dataset recording and in-sim policy runs at github.com/orcahand/orca_teleop

SHIPPING AND ACCESSORIES

Shipped with	12 V, 5 A adapter, USB-C cable, spare parts, ISO 9409-1 Franka mounting plate. Other connector plates upon request.
Standard spare parts	3 spare sensor cables, 5 spool systems, and parts to rebuild one finger (1.5 m tendon, pins, bearings), as well as magnets and screws.
Optional Max Kit	In addition to the standard spares, you get spare sensor cables for two entire sensor cable swaps. Your hand comes in a hard-shell travel case with 16 extra spool systems and tendon for respooling an entire second hand.
Shipping	DAP or DDP. Shipped worldwide with DHL Express, or DHL Economy where available (Europe).

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RANGE OF MOTION

Joint	Min (°)	Max (°)	Span (°)
Wrist	-65	+35	100
Thumb CMC	-45	+33	78
Thumb abduction	-18	+55	73
Thumb MCP	-25	+100	125
Thumb DIP	-15	+107	122
Index abduction	-30	+25	55
Middle and ring abduction	-27	+27	54
Pinky abduction	-30	+30	60
MCP, index / middle / ring / pinky	-25	+100	125
PIP, index / middle / ring / pinky	-15	+107	122

Degrees from the neutral position. Identical for left and right hands. As configured in orca_core and in the URDF at github.com/orcahand/orcahand_description.

TACTILE SENSING

Sensor modules	5 Hall-effect 3-axis force modules, one per fingertip
Taxels per hand	363
Output per taxel	3-axis force (Fx, Fy, Fz)
Force range	Normal Fz 0-25 N, tangential Fxy ±10 N
Minimum detectable force	0.1 N
Spatial resolution	1 mm
Measurement accuracy	1% FS
Output frequency	50 Hz
Durability	Anti-magnetic design, service life >10 million cycles
Warranty	1 year on the touch sensors

ACTUATORS

	Dynamixel finger	Dynamixel wrist	Feetech finger	Feetech wrist
Model	XC330-T288	XC430-T240BB	HL-2915	HL-3930
Stall torque	0.92 Nm @ 11.1 V	1.9 Nm @ 12 V	1.39 Nm @ 12 V	3.43 Nm @ 12 V
No-load speed	65 RPM @ 11.1 V	70 RPM @ 12 V	110 RPM @ 12 V	45 RPM @ 12 V
Resolution	4,096 steps (0.088°)	4,096 steps (0.088°)	4,096 steps (0.088°)	4,096 steps (0.088°)
Weight	23 g	65 g	27.8 g	70.5 g
Dimensions	20 × 34 × 26 mm	28.5 × 46.5 × 34 mm	34 × 20 × 23 mm	45.2 × 24.7 × 35 mm
Voltage	6.5-12 V	6.5-14.8 V	9-14 V	9-12.6 V
Gear ratio	288.35 : 1	245.22 : 1	320 : 1	345 : 1
Protocol	Dynamixel 2.0 (TTL), up to 4 Mbps	Dynamixel 2.0 (TTL), up to 4.5 Mbps	Half-duplex serial (TTL), up to 1 Mbps	Half-duplex serial (TTL), up to 1 Mbps

Order codes: v2.1-touch-dx-l / v2.1-touch-dx-r / v2.1-touch-ft-l / v2.1-touch-ft-r.
DX: Dynamixel, FT: Feetech. L: left, R: right. Both motor options run the same orca_core software.