

Robotic Hands UNITREE G1 Dex3-1 L+R with tactile sensor

Gamintojas: **UNITREE** · Modelis: **DEX3WT-214T** · EAN: **5905156112063** · Prekės kodas: **760429**



16 220,90 €

Kaina su PVM

Be PVM: **13 405,70 €**

Sandėlyje



Prekė internetu

Nuskenaukite kodą arba apsilankykite www.shopro.lt

Aprašymas

UNITREE G1 Dex3-1 Robotic Hands (left + right) with a touch sensor

The UNITREE G1 Dex3-1 set includes a left and right three-fingered robotic hand designed to work with the UNITREE G1 humanoid robot. Each hand offers 7 degrees of freedom, utilizes 7 miniature brushless joints with force control, and is equipped with 33 pressure sensors distributed across the palm, fingers, and fingertips. Hybrid force- and position-based control allows for precise control of movement and contact with an object, and the positioning repeatability of the fingertip is ± 2 mm. With 1,000 Hz communication, a USB 2.0 interface, and a wide range of feedback data, the Dex3-1 enables both complex manipulations and the collection of detailed data regarding hand movement and contact with objects.

7 degrees of freedom for precise movement

Each Dex3-1 hand has three movable fingers—the thumb has 3 degrees of freedom, the index finger has 2, and the middle finger has another 2. The range of motion of each joint allows for complex grip configurations—for the thumb, it ranges from -60° to 60° , from -35° to 60° , and from 0° to 100° , while the joints of the index and middle fingers operate within ranges of 0° to 90° and 0° to 100° , respectively. This design allows the fingers to be repositioned in multiple planes and their arrangement to be adapted to the task at hand. The positioning repeatability of the fingertip at ± 2 mm further supports tasks requiring consistent movement replication.

33 pressure sensors and sensitive contact measurement

The Dex3-1 version with touch sensors enables simultaneous detection of hand-to-object contact at multiple points. Each hand contains 9 sensor arrays comprising a total of 33 pressure sensors, resulting in 66 measurement elements when the left and right hands are combined. There are three 2×2 arrays on the palm, another three 2×2 arrays on the fingers, and three 3×1 arrays on the fingertips. The pressure detection range is from 10 g to 2,500 g, while the maximum load the sensor can withstand without damage is 20 kg. The sensors also transmit data on their temperature, and the 1,000 Hz communication frequency allows for the rapid acquisition of information needed for contact analysis and control.

Hybrid Force Control and Advanced Joints

The UNITREE Dex3-1 uses hybrid force and position control, so control is not limited solely to setting specific finger positions. The design of each hand includes 6 miniature, directly driven brushless force-control joints and 1 joint using a geared drive. The F-1515-108 and F-1515-214 models are used, enabling control of torque, angle, angular velocity, stiffness, and damping. For the F-1515-108, the rated maximum torque is 0.76 Nm, with an actual torque of 0.49 Nm in the direction of rotation and 1.37 Nm in the opposite direction. For the F-1515-214, these values are 1.498 Nm, 0.86 Nm, and 3.1 Nm, respectively.

Extensive real-time feedback data

The system provides a wide range of information regarding the current status of the mechanics and sensors. Perceptual data includes the joint's mode, position, velocity, torque, and temperature, as well as voltage, current, force, sensor temperatures, and IMU data. The control feedback also includes the joint's stiffness and damping coefficients. This allows for precise observation of the hand's behavior while performing a task and enables the simultaneous use of multiple parameters during motion planning and control.

1000 Hz Communication and USB 2.0

The hand's communication interface uses USB 2.0, and the communication frequency is 1000 Hz. A full data packet is 1,234 bytes on the transmit side and 1,270 bytes on the receive side. The joint control frequency is also 1,000 Hz, and High Speed Unibus is used for joint communication. These parameters provide access to a large amount of information about the hand's status and enable frequent updates to control parameters during the execution of complex motion sequences.

Design tailored to the UNITREE G1 robot

A single hand weighs 710 g, and its dimensions when extended are 175 × 88 × 77 mm. Dex3-1 can work in conjunction with the UNITREE G1 humanoid robot and enables the performance of a variety of complex manipulation tasks. The mechanism's compact dimensions are combined with an advanced motion system, pressure sensors, and a feedback system, making both actuation and measurement functions available in a single design.

General

Manufacturer	UNITREE
Model	DEX3WT-214T
Compatibility	UNITREE G1

Gripper Specifications

Weight	710 g
Dimensions	175 × 88 × 77 mm (when extended)
Degrees of Freedom	Thumb ×3 Index finger ×2 Middle finger ×2
Drive Mechanism	6 direct-drive motors 1 gear-driven motor

Joint Range of Motion	Thumb joint 0: -60° to 60° Thumb joint 1: -35° to 60° Thumb joint 2: 0° to 100° Index finger joint 0: 0° to 90° Index finger joint 1: 0° to 100° Middle finger joint 0: 0° to 90° Middle finger joint 1: 0° to 100°
Finger Tip Positioning Repeatability	±2 mm
Operating Voltage	12-58 V
Standby Current	0.2 A at 58 V
Maximum Current	10 A
Communication Interface	USB 2.0
Operating temperature range	From -20°C to 60°C
Load conditions (palm facing down, room temperature, gripping a hard round object with a diameter of 5 cm)	Maximum weight: 500 g Maximum power: 400 W for 3 s
Load conditions (palm facing left, room temperature, gripping a hard round object with a diameter of 5 cm)	Maximum weight: 500 g Maximum power: 400 W for 3 s

Sensor parameters

Number of sensor arrays	9 (33 pressure sensors in total)
Sensor array resolution	2 × 2 (palm area) × 3 2 × 2 (finger pad) × 3 3 × 1 (single fingertip) × 3
Detection range	10-2,500 g
Maximum load without damage	20 kg

Software features

Communication frequency	1000 Hz
Number of bytes in a full data packet	Transmitter: 1234 bytes Receiver: 1270 bytes
Measurement feedback data	Joint mode Joint position Joint speed Joint torque Joint temperature Voltage and current Sensor pressure value Sensor temperature IMU data

Control feedback	Joint mode Joint position Joint speed Joint torque Joint stiffness coefficient Joint damping coefficient
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Parameters of the miniature brushless force-controlled joint

Model	F-1515-108 Miniature Brushless Force-Controlled Joint F-1515-214 Miniature Brushless Force-Controlled Joint
Weight	45 g
Dimensions	34.8 × 23.1 × 23.3 mm
Gear Ratio	F-1515-108: 1:108 F-1515-214: 1:214
Maximum Torque (theoretical value)	F-1515-108: 0.76 Nm F-1515-214: 1.498 Nm
Maximum Torque (actual value, torque in the direction of rotation)	F-1515-108: 0.49 Nm F-1515-214: 0.86 Nm
Maximum torque (actual value, torque opposite to the direction of rotation)	F-1515-108: 1.37 Nm F-1515-214: 3.1 Nm
Maximum rotational speed	F-1515-108: 23 rad/s F-1515-214: 11 rad/s
Maximum line current	4.76 A
Control communication frequency	1000 Hz
Communication method	High Speed Unibus
Encoder	Absolute rotor position encoder
Operating temperature range	From -20°C to 60°C
IP rating	/
Operating voltage	12-24 V
Motor feedback	Torque Angle Angular velocity Temperature
Motor control commands	Torque Angle Angular velocity Stiffness Damping

GPSR Link: https://psr-assets.innpro.pl/robots/sg_robots__accessories.pdf, PPWR: <https://ppwr.innpro.pl/en/unitree>, Gross weight: 2240, Net weight: 2240, Box length: 30,00, Box width: 23,50, Box height: 25,00

Techninė specifikacija

Specifications

Sandėlio grupė	Robots/Części i Akcesoria/Seria G1 [+2][+1]
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Matmenys ir svoris

Matmenys (I × P × A)	30,00cm × 23,00cm × 25,00cm
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Svoris	2,24kg
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