Alt-Bionics

Robotics Hand – Technical Datasheet

Release Version 1.3
December 2025

Product Name: Surge

Key Features:

- Lift Capacity up to 18 kg / 40 lbs. (Per Hand)
- 400 ms (180° / sec) Closing Speed
- 6 Powered Degrees of Freedom (DoF)
- Fully Modular Fingers
- Manus Glove Compatibility
- 48V DC Input (28 – 58V Range)
- RS485 Communication
- < 1mm Finger Position Repeatability
- No Cost SDK: ROS - C++ - python

Product Summary:

Surge is a 6-DoF robotic hand designed for humanoid and robotic arm platforms, combining human-inspired dexterity with robust engineering to give robots reliable, practical interaction in real-world environments.

SDK Compatibility Ecosystem:

realman

MANUS™

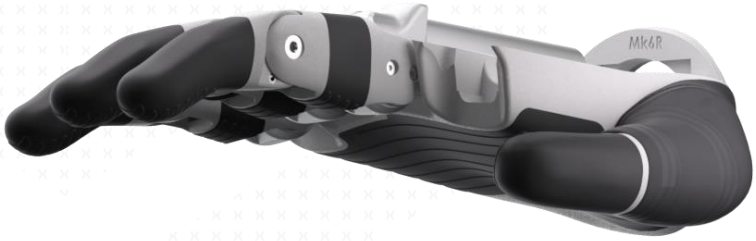
Meta Quest

KINOVA

FRANKA

Alt-Bionics

Modular Finger Overview



Modularity Benefits:

- Enhanced Overall Hand Durability
- Motor Health Tracking
- Preventative Maintenance Alerts
- 5-Minute Repair Time
- Future-proof design

Benefits Summary:

Our modular design enables **fast, tool-minimal repairs in under five minutes**, reducing downtime and maintenance costs. Swappable finger modules allow for quick replacements without full-hand disassembly, ensuring continuous operation and extended lifespan. This design enhances efficiency, durability, and long-term reliability, so **your robots spend more time working and less time in repair**.

Replacement fingers can be ordered separately and overnight shipped anywhere in the U.S.

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Surge

Mechanical Specifications

Height	7.4” (18.78cm)
Width	3.6” (9.14cm)
Palm Thickness (Widest)	1.5” (3.81cm)
Weight	1.19 lbs. (540g)
Max Grip Force (4 Fingers)	8 lbf. (35.5N)
Minimum Closing Time	0.4 seconds (400ms)
Single Finger Carrying Strength (Distal)	5 lbs. / finger (2.6kg) – Max
Single Finger Carrying Strength (Proximal)	15 lbs. / finger (6.8kg) – Max
Palm Carrying Strength	80 lbs. – *Dependent on humanoid or multiaxis wrist*
Thumb Carrying Strength	15 lbs. (6.8kg) – Max
Single Finger Max Lateral Strength (at Distal)	15 lbs. (6.8kg) – Max
Finger Range of Motion	90°
Thumb Range of Motion	95° Flexion | 85° Rotation
Actuator Type	Gear-driven (Non-Overhauling)

Electrical Specifications

Nominal Input Voltage	48 VDC
Input Voltage Range	28 – 58 VDC
Nominal Input Power	25W
Peak Input Current	1 A
Electrical Protection	Reverse input, overvoltage, and overcurrent protection
Communication Interface Types	RS485
Write Parameters	Individual finger joint angles & Move to preset grip

AT Commands (Current)

Prefix	Command	Postfix	Variable	EOL	Description	Example	Result	Response
AT	+SJA	=	<ANGLE>,<JOINT NUMBER>	\n\r	SET an angle for joint N	AT+SJA=45,I\n\r	Sets Index to 45°. (See table of Finger codes	OK\n\r
AT	+SPP	=	<POSE NUMBER>	\n\r	SET predefined pose	AT+SPP=0\n\r	Sets hand to pose 0 (See table of grips)	OK\n\r
AT	+SCG	=	<VALUE>,<JOINT NUMBER>	\n\r	SET user defined PID gains	AT+SCG=1,P\n\r	Enables the use of use defined PID gains on the Pinky	OK\n\r
AT	+SCP	=	<VALUE>,<JOINT NUMBER>	\n\r	SET P gain	AT+SCP=10,P\n\r	Sets Pinky P Gain value to 10 (AT+SCG=1\n\r must be sent once first)	OK\n\r
AT	+SCI	=	<VALUE>,<JOINT NUMBER>	\n\r	SET I gain	AT+SCI=10,P\n\r	Sets Pinky I Gain value to 10 (AT+SCG=1\n\r must be sent once first)	OK\n\r
AT	+SCD	=	<VALUE>,<JOINT NUMBER>	\n\r	SET D gain	AT+SCD=10,P\n\r	Sets Pinky D Gain value to 10 (AT+SCG=1\n\r must be sent once first)	OK\n\r
AT	+SCT	=	<VALUE>,<JOINT NUMBER>	\n\r	SET current threshold	AT+SCT=50,M\n\r	Set Middle current threshold to 50% of max current	OK\n\r
AT	+SCE	=	<VALUE.	\n\r	SET clear error	AT+SCE=1\n\r	Clear motor error and release a stuck joint	OK\n\r
AT	+SEF	=	<VALUE>	\n\r	SET Command feedback, when set to 0 no response is given to commands. When set to 1, "OK" or "ERROR" response is given	AT+SEF=1\n\r	default is 0	OK\n\r

AT Commands (Current) - Continued

Prefix	Command	Postfix	Variable	EOL	Description	Example	Result	Response
AT	+SMC	=	<VALUE>	\n\r	SET control using manus gloves	AT+SMC=1\n\r	Enables hand control using the Manus Glove	OK\n\r
AT	+SSM	=	<VALUE>,<JOINT NUMBER>	\n\r	SET stop command to motor	AT+SCT=1,M\n\r	Stops the middle finger from moving. Use "A" for Joint number to stop ALL joints. Must set to 0 to move again	OK\n\r
AT	+GJA	?	<JOINT NUMBER>	\n\r	GET angle for joint N	AT+GJA?M\n\r	Get joint angle of M	49.015\n\r
AT	+GCE	?	<JOINT NUMBER>	\n\r	GET error for joint	AT+GCE?P\n\r	Gets pinky error	0x0001\n\r
AT	+RCH	=	<VALUE.	\r\n	Recalibrate Hand	AT+RCH=1\n\r		OK\n\r

Pose Codes

Open Grip	0
Power Grip	1
Chuck Grip	2
Fine Pinch Grip	3
Key Grip	4
Hook Grip	5
‘Birds Up’ Grip	6

Finger Codes

Index	I
Middle	M
Ring	R
Pinky	P
Thumb - Flex	T
Thumb - Rotation	X
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