

# Alt-Bionics



## Technical Data Sheet

### Robotics Hand

Release Version 1.1

August 2024

#### Product Name:

Surge

#### Key Features:

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- ✓ Lift Capacity of 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 (43 – 58V Range)
- ✓ RS485 & CAN Communication
- ✓ < 1mm Finger Position Repeatability



#### Product Summary:

Surge is a 6 DoF robotic hand developed for humanoid and general robotic applications. Surge is equipped with a variety of advanced features that were inspired by human hands and simultaneously designed to overcome their limitations, helping robots better navigate and interact with a world that was built by hands, for hands.

## Mechanical

Height	7.4"
Width	3.6"
Palm Thickness (Widest)	1.5"
Weight	1.19 lbs. (540g)
Max Grip Force (4 Fingers)	8 lbs.
Minimum Closing Time	0.4 seconds
Single Finger Carrying Strength (Distal)	5 lbs. / finger
Single Finger Carrying Strength (Proximal)	20 lbs. / finger
Palm Carrying Strength	40 lbs.
Thumb Carrying Strength	15 lbs.
Single Finger Max Lateral Strength (at Distal)	15 lbs.
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	43 – 58 VDC
Nominal Input Current	40 mA
Peak Input Current	1.5 A
Electrical Protection	Reverse input, overvoltage, and overcurrent protection
Communication Interface Types	Controller Area Network (CAN)   RS485
Write Parameters	Individual finger joint angles & Move to preset grip

1. Input voltage source is not isolated from electromechanical system. It is recommended to use an isolated supply.

## Communication

Write Parameters

- Individual finger joint angles
- Move to preset grip
- PID gains of each finger

## 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 Finger codes table)	OK\n\r
AT	+SPP	=	<POSE NUMBER>	\n\r	SET predefined pose	AT+SPP=0\n\r	Sets hand to pose 0. (See Pose Codes table)	OK\n\r
AT	+SCP	=	<VALUE>,<J OINT NUMBER>	\n\r	SET P gain	AT+SCP=10,P\n\r	Sets Pinky P Gain value to 10	OK\n\r
AT	+SCR	=	<VALUE>	\n\r	SET command response on or off	AT+SCR=1\n\r	Set command response to true (0 = false)	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
-	-

## CAN Settings

Baud	50000
Parity	N/A
Stop Bits	N/A
Bytesize	8

## RS485 Settings

Baud	115200
Parity	None
Stop Bits	1
Bytesize	8