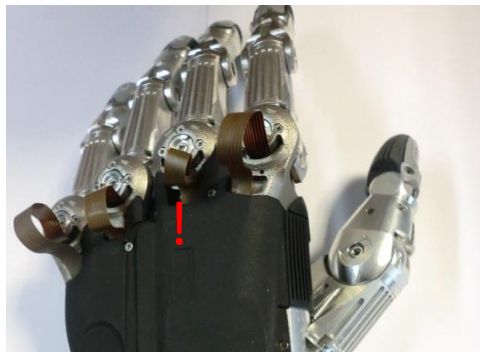


# Warning!

- Keep body parts away, when hand is powered. Unexpected movements may occur.
  - Handle with extreme care!
  - Take extra care during software development!
  - Electronics do not protect motor overload! Please check technical data of motors.
  - Do not leave motors in stall for extended period of time!
  - Not all fingers are back drivable!
  - Do not drive fingers into end position during operation, jamming might occur.
  - Home fingers only with limited current to find end stop.
- 
- Never place down on back of hand, finger motor cables must not be bent!



This hand is a prototype. Limited warranty applies!

## Homing

The hand has no absolute encoders therefore homing is required after power-up.

Home only with a limited current. Otherwise joints might jam. It is recommended only to home in one direction and to set a software limited away from the hard stop. Homing direction, software limit, recommended homing current and speed, and total tick count of movement is giving in the following table:

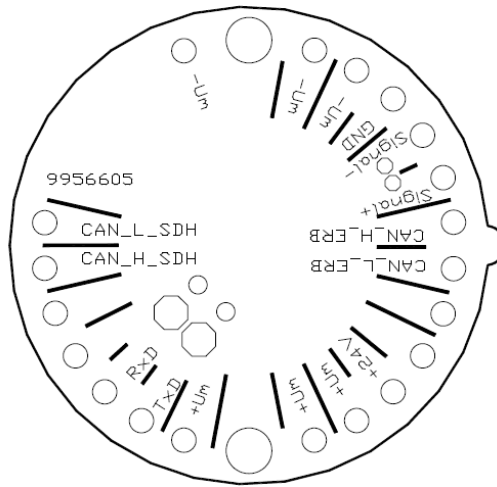
JOINT	HOMING DIRECTION	DISTANCE FROM HARD STOP	RANGE OF MOVEMENT	HOMING CURRENT	HOMING SPEED
THUMB FLEXION	Stretch	5.000	170.000	50mA	100rpm
THUMB OPPOSITION	Outer	5.000	100.000	100mA	100rpm
SPREAD	Close	2.000	25.000	500mA	100rpm
INDEX FINGER PROXI	Stretch	2.000	40.000	200mA	500rpm
INDEX FINGER DISTAL	Stretch	2.000	45.000	100mA	500rpm
MIDDLE FINGER PROXI	Stretch	2.000	40.000	200mA	500rpm
MIDDLE FINGER DISTAL	Stretch	2.000	45.000	100mA	500rpm
RING FINGER	Stretch	2.000	45.000	100mA	500rpm
LITTLE FINGER	Stretch	2.000	45.000	100mA	500rpm

## Motor Data

The following table gives the motor data. It is **highly recommended** to use the given currents as maximum currents for your software development. Please make sure you know what you are doing.

JOINT	MAX CURRENT	MAX RPM	MOTOR VOLTAGE	THEORETICAL MAX CURRENT
THUMB FLEXION	191mA	10000	24V	1999mA
THUMB OPPOSITION	191mA	10000	24V	1999mA
SPREAD	169mA	13600	24V	1210mA
INDEX FINGER PROXI	169mA	13600	24V	1210mA
INDEX FINGER DISTAL	176mA	12500	12V	750mA
MIDDLE FINGER PROXI	169mA	13600	24V	1210mA
MIDDLE FINGER DISTAL	176mA	12500	12V	750mA
RING FINGER	176mA	12500	12V	750mA
LITTLE FINGER	176mA	12500	12V	750mA

## Connecting



PowerSupply	Pad on Connector Board	
24VDC	+Um (3 connectors)	
Gnd	- Um (3 connectors)	
Bus RS485	Pad on Connector Board	RS485 DE-9 Socket
TxD+	CAN_H_SDH	Pin 2
TxD-	CAN_L_SDH	Pin 1
RxD-	RxD	Pin 6
RxD+	TxD	Pin 7

## Software

All software included is just meant as demo. It is not intended for extended use.

There is very limited error handling, no compatibility testing and no robustness. Software is completely unsupported!

