

ADROIT® SMALL ARM SYSTEMS

Robotic Arms Built from A24 and A48 Drives



HDT's Adroit® robotic arm system is uniquely powerful, rugged, and affordable. Developed to meet the Defense Advanced Research Projects Agency (DARPA)'s need for extreme strength-to-weight performance, the Adroit system is completely modular – allowing customers to configure manipulators to meet their exact needs.

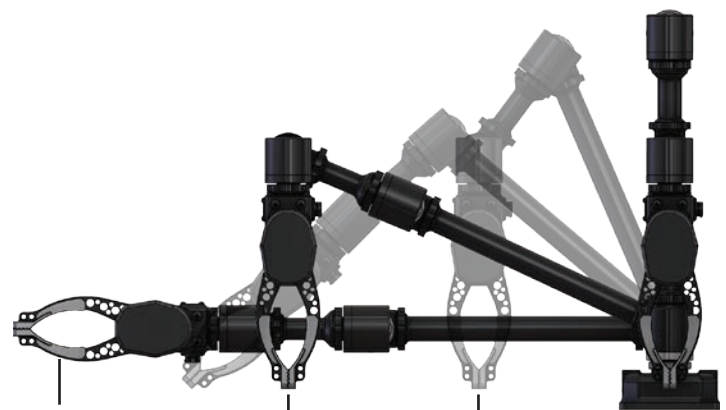
The Adroit system has many options for bases, joints, connections, and end-effectors – all with integral captive nuts that assemble in minutes with a single wrench. Each joint provides continuous 360° rotation and includes self-contained control electronics, absolute position sensing and optional force sensing. Accessory mounting points can be added in a variety of locations to support system payloads.

The HDT Adroit system is designed for harsh environment. All our manipulator arms meet the demanding IP66 waterproof standard – including high-pressure wash down. Arms operate in below-freezing temperatures as well as in very hot and humid conditions.



KEY FEATURES

- Customizable modular system of bases, joints, connectors and end-effectors
- High payload-to-mass ratio and excellent power efficiency
- Through-joint wiring, with slip-rings for continuous rotation
- Eight signal lines reserved for customer (up to gigabit Ethernet and/or analog video)
- Up to 100 W (24 V at 4 A) can be supplied to customer's accessories
- Accessory mounting points can be added anywhere on arm, with power and signal
- Input power 12 to 30 volts (speed and torque limited at less than 24 volts)
- Power consumption is less than 1 W per joint in standby, ~10 W per joint with no load moving at half speed, and ~50 W per joint during fast rotation or heavy lift
- Waterproof – standard: IP66 (high-pressure wash down); optional: IP67 (1 m submersion in water)
- Operating temperature – standard: -4° to 140° F (-20 to 60 C); optional: -40° to 160° F (-40 to 80 C)



8 lbs / 3 lbs lift at 34"
(4 kg / 2 kg at 85 cm)

11 lbs / 4 lbs lift at 23"
(5 kg / 2 kg at 60 cm)

25 lbs / 13 lbs lift at 12"
(12 kg / 6 kg at 30 cm)




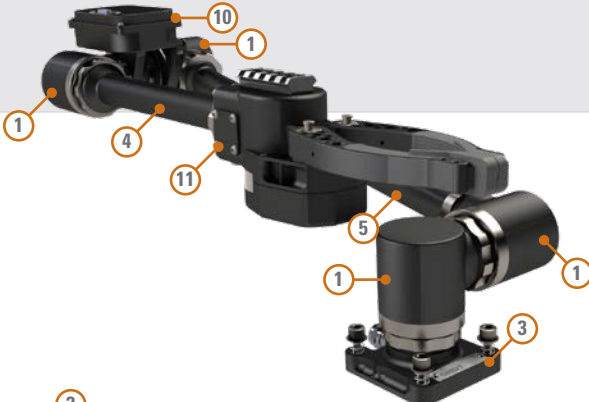
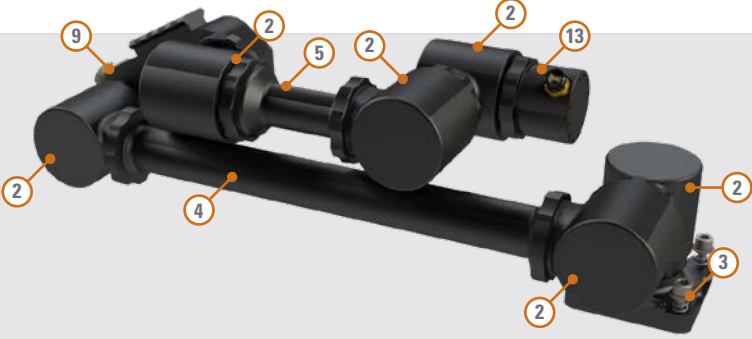
Lift capacity based on A48/A24 shoulder joints and an A48 pincer for objects over 15 lb (7 kg).



The Adroit small arm system is completely modular, and each connection seals with a single captive nut that conforms to IP66 environmental requirements (IP67 optional). The entire system can be disassembled and reassembled in minutes, using a single custom wrench.

ADROIT® SMALL ARM SYSTEMS

Robotic Arms Built from A24 and A48 Drives

Sample Adroit Small Arm Systems	Description
	<p>Degrees of Freedom: 6 Actuator: A48 and A24 Weight: 6.2 lbs (2.8 kg) Reach: 23.5" (60 cm) Payload Capacity: 12 lbs at 23.5" (5.4 kg at 60 cm) 25 lbs at 7" (11.3 kg at 18 cm)</p>
	<p>Degrees of Freedom: 2 Actuator: A24 Weight: 1.9 lbs (0.9 kg) Reach: -- Payload Capacity: 40 lbs (18.1 kg)</p>
	<p>Degrees of Freedom: 7 Actuator: A48 and A24 Weight: 6.6 lbs (3 kg) Reach: 32" (81.2 cm) Payload Capacity: 15 lbs at 11" (6.8 kg at 28 cm) 8 lbs at 32" (3.6 kg at 81cm)</p>
	<p>Degrees of Freedom: 4 Actuator: A48 Weight: 5.4 lbs (2.5 kg) Reach: 31" (78.7 cm) Payload Capacity: 25 lbs at 10" (55 kg at 25 cm) 10 lbs at 28" (4.5 kg at 71 cm)</p>
	<p>Degrees of Freedom: 6 Actuator: A24 Weight: 4.4 lbs (2 kg) Reach: 22" (56 cm) Payload Capacity: 13 lbs at 11" (6 kg at 28 cm) 6 lbs at 22" (2.7 kg at 56 cm)</p>

The Adroit small arm systems are completely modular, and each module is sealed to IP66 environmental requirements (IP67 optional). The arm can be disassembled and reassembled in minutes.

Actuators

see page 4 for drive performance details

1



A48 Drive

48 Nm (35 ft-lb) - 40° / S
Optional:
Torque sensing
Marinized available

2



A24 Drive

24 NM (18 ft-lb) - 65° / S
Optional:
Torque sensing

Links

3



Pedestal

Male or Female

4



Male to Male

Standard lengths:
250, 300, 350, 400mm

5



Male to Female

Standard lengths:
140, 270, 400mm

6



Male to Female Parallel

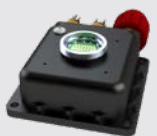
7



Male to Female Right Angle

Computers

8



Pedestal Computer

Male or Female
Marinized available

9



Arm Mounted Inline

Power and comms breakouts
Picatinny accessory mount

10



Arm Mounted Offset

Power and comms breakouts
Picatinny mount option
Bench mount option

End Effectors

11



A48 Pincer

48 lbf (210 N) Tip pinch
6" (15cm) Diameter grip
(Marinized available)

Optional:
Comms breakout
Power breakout
Torque Sensing

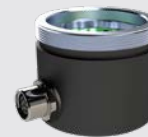
12



A24 Pincer

24 lbf (105 N) Tip pinch
5" (13cm) Diameter grip

13



Customer Payload Adapter

Male or Female connection
Power and comms breakout
M8 / M12 Industrial connector typical

Quick Release Pincer Fingers



Standard 5" (13cm)



Bypass



Flat Hook



Large Diameter 6"
(15 cm)



Extended Tip



To remove finger...



Press joint button



Finger is released

ADROIT® SMALL ARM SYSTEMS

Robotic Arms Built from A24 and A48 Drives



Accessories and Customization Options

Blade on Gripper Finger



Camera In-Line Module



Wrench for Assembly/Disassembly



Gripper-Actuated Wire Cutters



Actuator Specifications



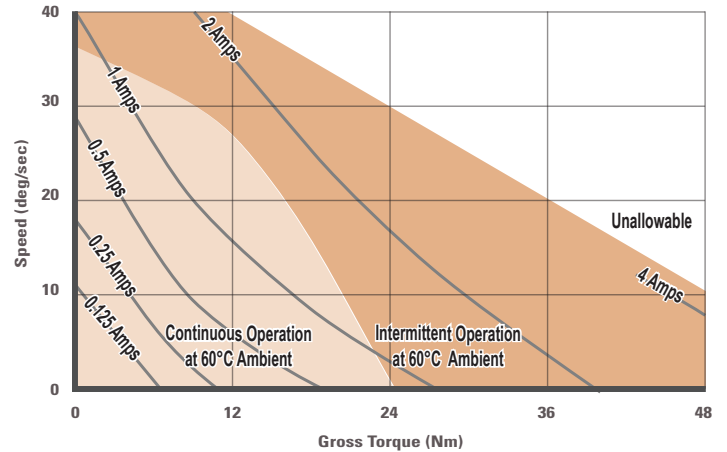
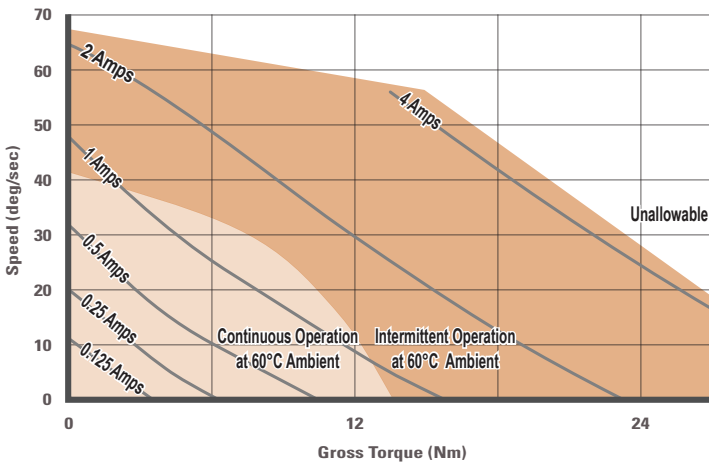
A24: Single Joint Bus Amperes at 24V

Active Driving (joints can hold torque at near zero power)



A48: Single Joint Bus Amperes at 24V

Active Driving (joints can hold torque at near zero power)



Products, product specifications and data are subject to change without notice to improve reliability, function, and/or design. Please contact Customer Service at 800.969.8527 for the most up-to-date product information.

HDT Expeditionary Systems, Inc.

30500 Aurora Road, Suite 100
 Solon, OH 44139 USA
 P 800.969.8527 / 540.887.4700
 sales@hdtglobal.com

NON EXPORT CONTROLLED INFORMATION
 Revision 12 09-23 03-01-01-0335