

# 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)

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## Sample Adroit Small Arm Systems

## Description



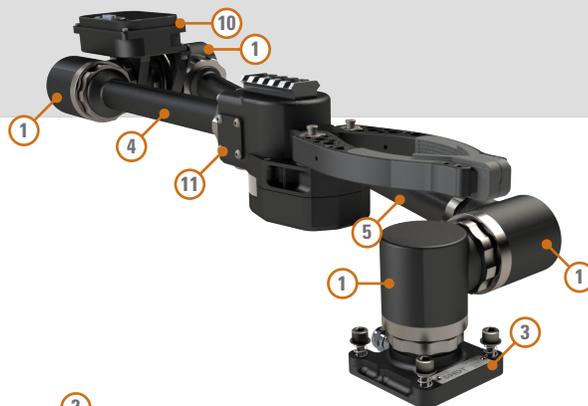
Degrees of Freedom: 6  
 Actuator: A48 and A24  
 Weight: 6.2 lbs (2.8 kg)  
 Reach: 23.5" (60 cm)  
 Payload Capacity: 12 lbs at 23.5"  
 (5.4 kg at 60 cm)  
 25 lbs at 7"  
 (11.3 kg at 18 cm)



Degrees of Freedom: 2  
 Actuator: A24  
 Weight: 1.9 lbs (0.9 kg)  
 Reach: --  
 Payload Capacity: 40 lbs (18.1 kg)



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 81 cm)



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)



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)

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

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## ACCESSORIES AND CUSTOMIZATION OPTIONS

### Blade on Gripper Finger



### Camera In-Line Module



### Wrench for Assembly/Disassembly



### Gripper-Actuated Wire Cutters



## ACTUATOR SPECIFICATIONS



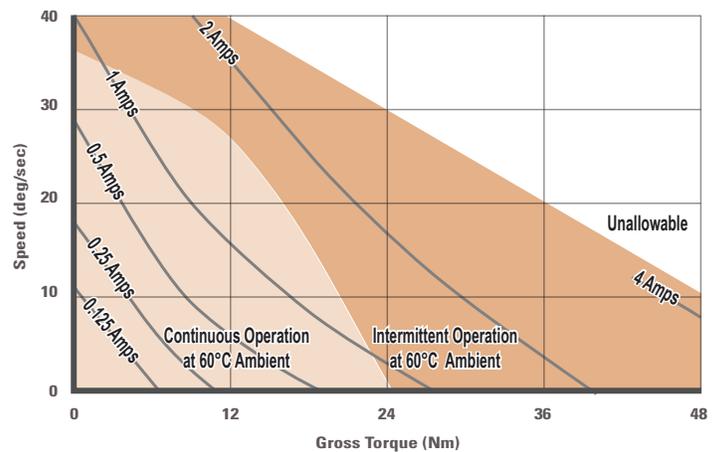
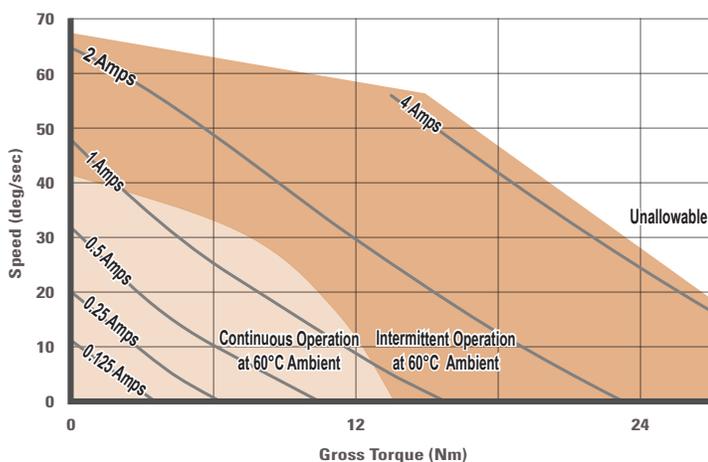
### A24: Single Joint Bus Amperes at 24V

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.

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