

Datasheet

Micro Pin Puller (uD3PP)

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Last updated on:
11.04.2023

Description

The DCUBED Micro Pin Puller (uD3PP) is a Shape Memory Alloy (SMA) based release actuator which locks sensitive equipment during launch and safely releases it on orbit. It is one of the smallest, yet powerful HDRM solutions on the market. Moreover, it is easily resettable, easy-to-use and readily available as a COTS component.

Specifications	Micro Pin Puller (uD3PP)
Body Size (L x W x H)	25.5 x 25.5 x 25.5 mm (Standard Interface)
Mass	80 grams
Material	1.4404 / 316L, Surface Treated Stainless Steel
Operating Temperature Range	-65°C to +80°C (TBC)
Pin Dimensions	Ø5 mm x 6.5 mm
Stroke	6.5 mm
Maximum Sideload (Shear)	300 N* (TBC)
Rapid Resetability	Yes
Redundancy	Redundant Wiring and Redundant SMA
Internal Actuation Sensor	Yes (Leads: AWG 28)
Shock Pad	Yes
Release Shock	TBD g (Low-Shock)
Reset Cycles	>400
TRL	6 (9 in 2023)

*Achieved via internal lubrication with space certified solid lubricant (Molykote 106). For sensitive optical applications, the lubricant can be omitted upon request.

Interfaces

Mechanical Interfaces

The standard mechanical mounting configuration for the uD3PP is comprised of two threaded M3 holes as shown in Figure 1.

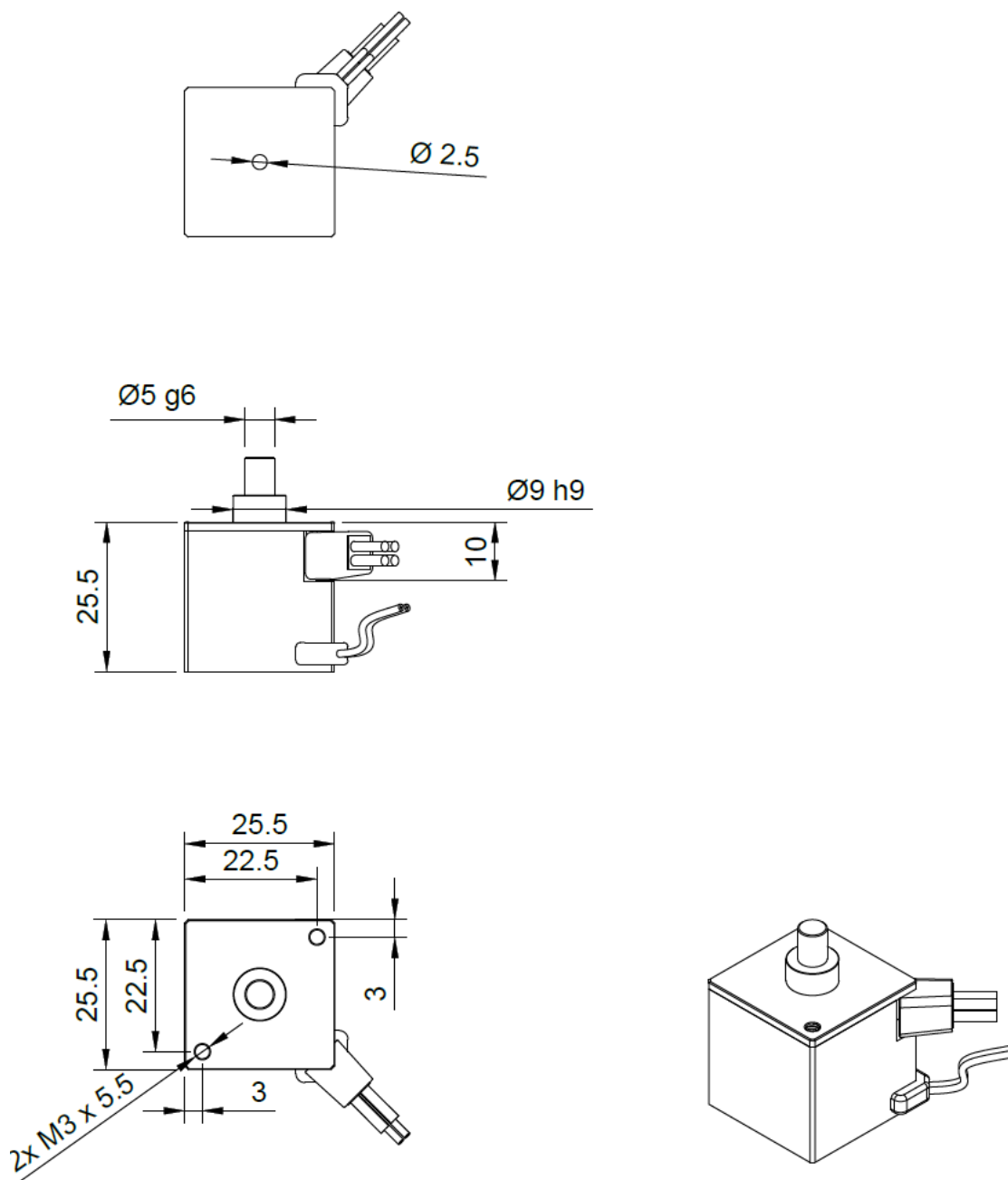


Figure 1: Dimensions and standard mechanical interfaces.

Besides the standard two point mount, custom interface plates are available to achieve any custom interface mounting (e.g. 3-point, 4-point).

Electrical Interfaces

The standard electrical interface of the uD3PP is shown in Figure 2.

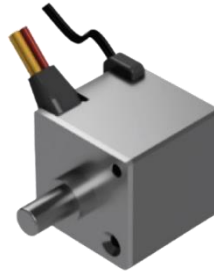


Figure 2: Electrical wiring of the uD3PP.

To trigger the pin puller, a current must be applied across one of its actuation lines. The actuation lines are color-coded as red and yellow wires pairs (red-red, yellow-yellow). The actuation line behaves like a simple resistor (see the table below), with no specific polarity.

The black wires are for the actuation sensor, which produces a binary telemetry signal following actuation. (i.e. open/closed circuit).

Electrical Details		
Activation Leads	2 x 2 (1 Primary Pair, 1 Redundant Pair)	
Wire Length	>200 mm	
Material	Silver-plated Copper, PTFE	
Activation Wire Gauge	24 AWG	
Actuation Current	1.6 to 2 A (DC)	
Resistance (Ω)	$1.2 \pm 0.2 \Omega$	
Sensor Wire Gauge	28 AWG	
Time to Trigger** (at 2.0 A)	0°C	2 sec
	20°C	1.3 sec
	60°C	0.5 sec

**More detailed specifications regarding temperature and current dependent trigger times can be found in the DCUBED user manual. It will be made available upon order placement.

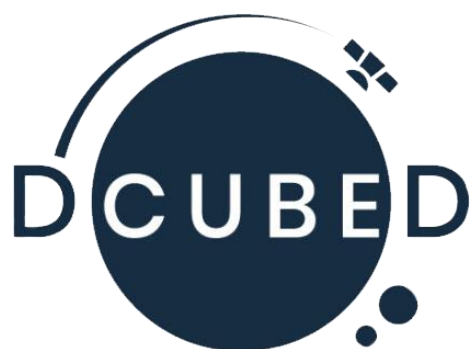
Loads

The uD3PP is designed to survive the following mechanical loads.

Details	Load Level	Note
Random Vibration (X, Y, Z)	22 GRMS (PSD)	1st Eigenfrequency: >1.7kHz
Sinusoidal Vibration (X, Y, Z)	20 g	20-130 Hz
Shock (X, Y, Z)	100 Hz: TBD g 1000 Hz-10000 Hz: TBD g	SRS
Max Sideload while Actuating	300 N (TBC)	-
Max Pin Retraction Force	100 N	-
Survival Loads	120 N Push-in Load (Axial) 3000 N Sideload (Shear)	-

Disclaimer

Please note, this is **not** the user manual. The more elaborate, user manual will be made available by DCUBED upon placement of an order.



**Contact us,
we'd love to hear from you!**

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