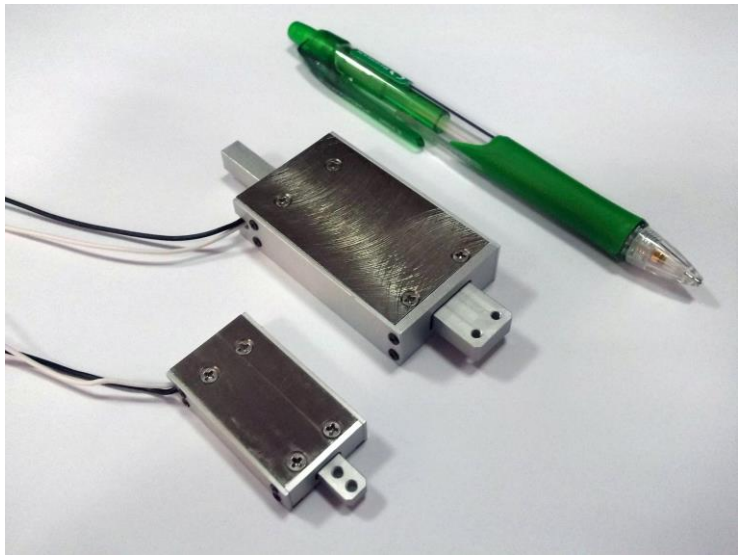
ATA Series (Patented)
Two Position Actuators



- **Only 24 VDC supply**
- **No compressed air needed**
- **Very fast response**
- **Controllable holding force**

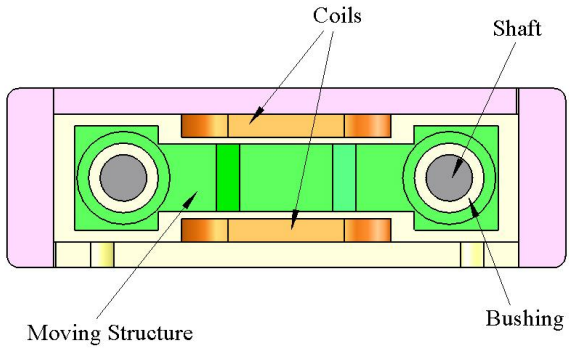
Introduction to ATA actuator

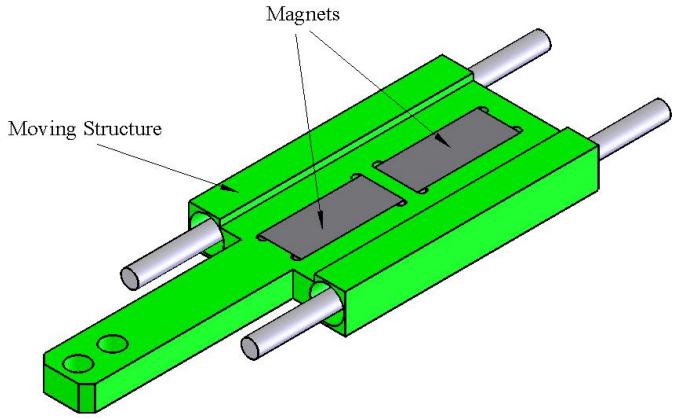
The ATA is a two position, direct drive actuator that is designed for applications that only need control of 2 positions, like pneumatic actuators. However, unlike pneumatic actuators, the ATA does not need compressed air, solenoid valves, air tubing and other components associated with pneumatic systems. Only 24 VDC is required to work with the amplifier, EOD, which drives all our ATA actuators. This makes the ATA actuators suitable even for portable devices/instruments, where compressed air is not readily available.

Design of ATA actuator

Patent Pending

The figures below show the design of an ATA actuator, which is patent pending.



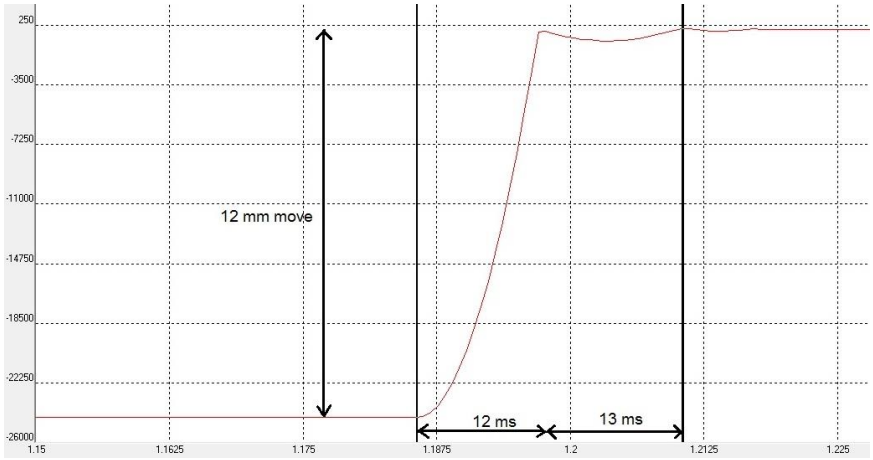


The coils are fixed to the casing, while the magnets are attached to the moving structure. The novel design does not require any magnet back iron. The magnets are held in the pockets of the moving structure, which is made from non-magnetic, low density material. This enables the actuator to have a low moving mass.

The cable that supplies current to the actuator is also fixed. Without any moving cable, the reliability of the actuator is much better than other actuators with moving cables, and high frequency cycling is possible.

Fast response

The response time for the ATA is significantly faster than traditional pneumatic actuators or other types of actuators. A 12 mm move can take only 12 ms. By controlling the peak current and peak current duration, the acceleration and motion time can be adjusted.



Comparison with pneumatic actuators

The table below compares ATA actuators with traditional pneumatic actuators:

Feature comparison	Pneumatic actuators	ATA actuators
Supply required	Compressed air for driving piston and 24 VDC for solenoid valve	24 VDC only
Components involved	Air cylinder, tubing, solenoid valve, pressure regulator etc.	ATA actuator and EOD amplifier
Response	Sluggish response	Fast response
Control of holding force	Passive, determined by air pressure and piston size (area of piston)	Can be adjusted on the EOD amplifier

Control Algorithm

EOD series drivers are designed to control ATA actuators for two position control.

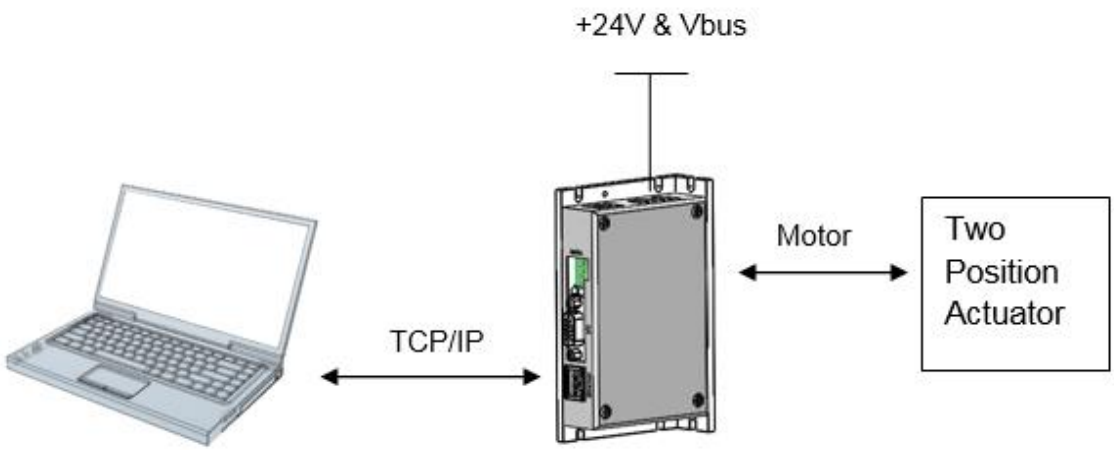


Figure 1

System integration setup is depicted in Figure 1.

Communication between PC and EOD can be established via TCP/IP or RS232.There are two control modes, namely Mode A, direction and move and Mode B, forward and backward. Mode selection is done by software through a GUI. In each mode, control is achieved by two I/O bit with the following truth table.

Mode A (direction and move)		
DIN 1 (Trigger bit 1)	DIN 2 (Trigger bit 2)	Function
0	0	No control
0	1	Retract
1	0	No control
1	1	Forward

Table 1. Mode A

Mode B (forward and retract)		
DIN 1(Trigger bit 1)	DIN 2(Trigger bit 2)	Function
0	0	No control
0	1	Forward
1	0	Retract
1	1	Retract

Table 2. Mode B

One unique function of EOD is user-defined current profile.

All settings, namely “Peak Current”, “Holding Current”, “Peak Current Time” “Motor Resistance”, need to be filled by user, whose relationship are described in Figure 2 and equations below,

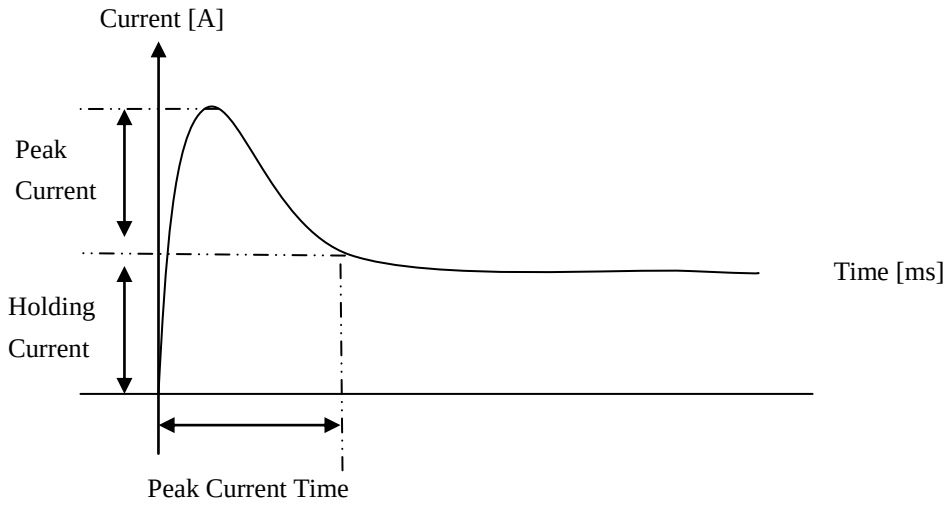


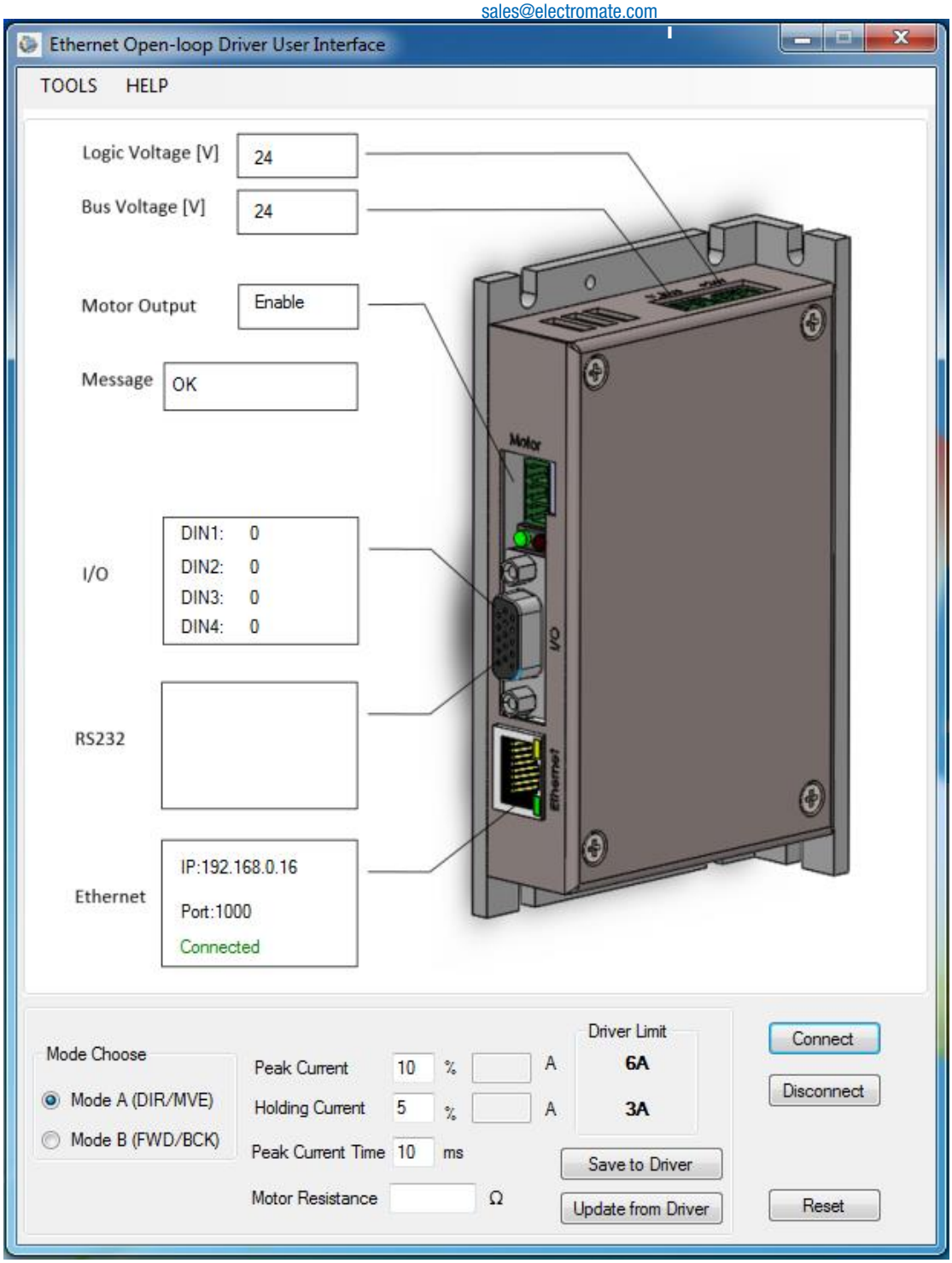
Figure 2. Relationship

Formula for Peak Current and Holding Current:

Peak Current [A] = Bus voltage [V] / Motor Resistance [ohm] * Peak Current Percentage

Holding Current [A] = Bus voltage [V] / Motor Resistance [ohm] * Holding Current Percentage

All these parameters can be changed through the GUI.

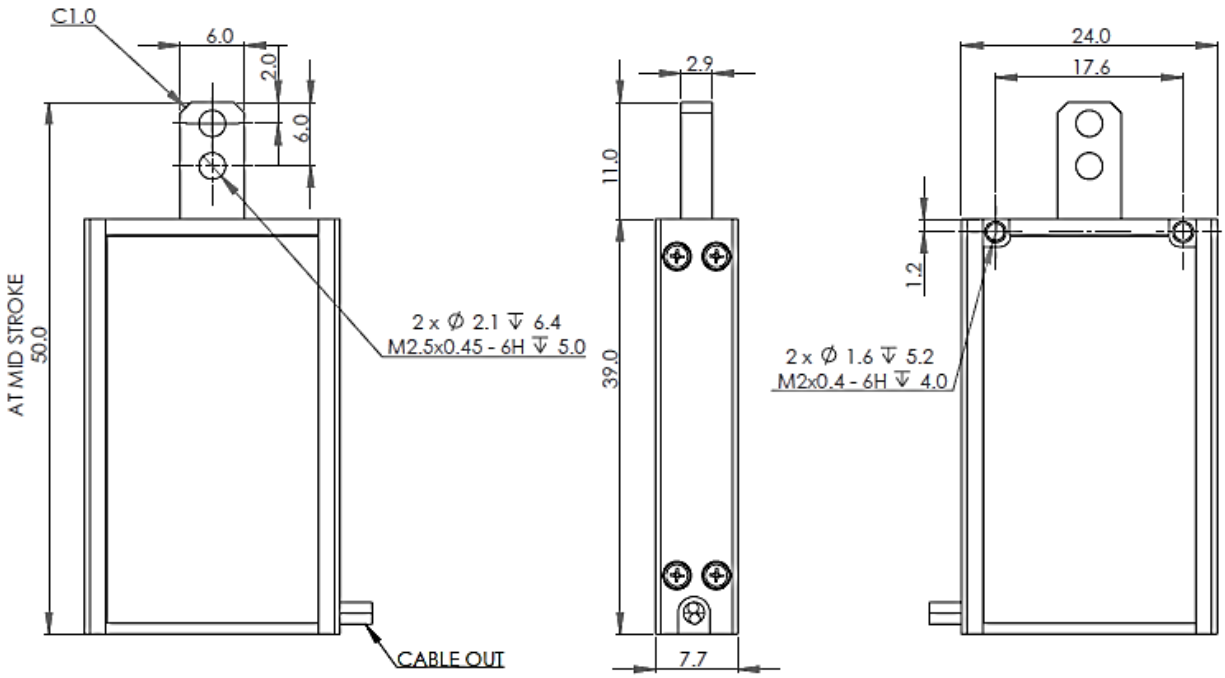


Please refer to Hardware Manual and Software & Operation Manual of EOD for details.

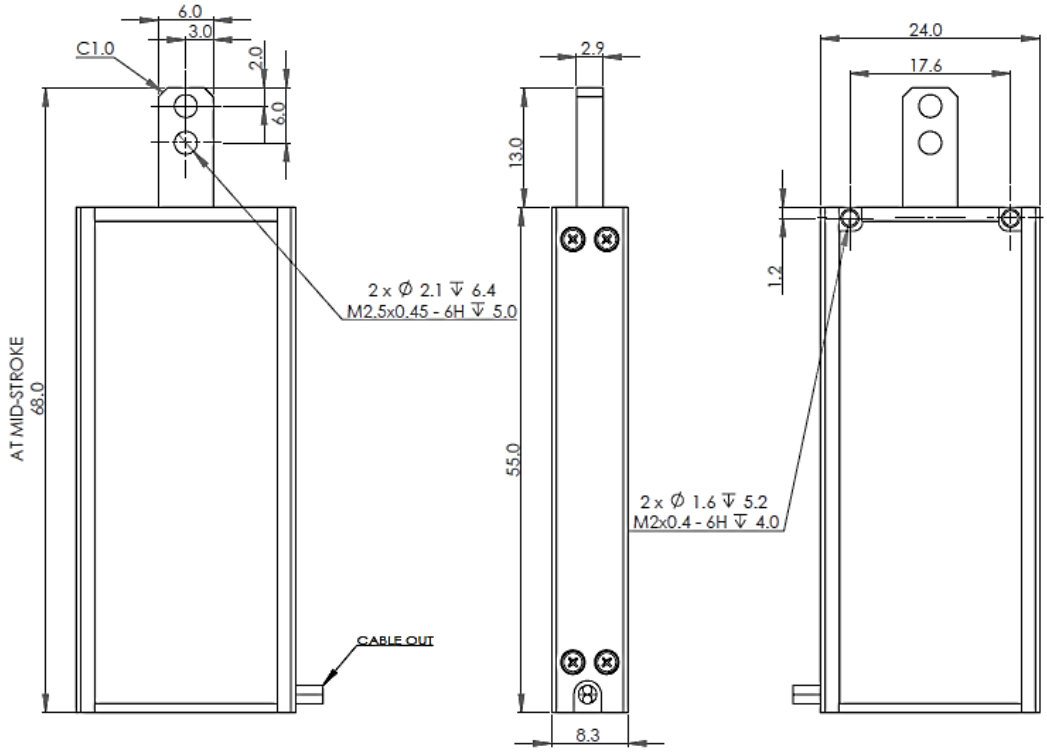
ATA-IG2

Model	Units	ATA-IG2-5	ATA-IG2-10
Stroke	mm	5	10
Force sensitivity (at mid stroke)	N/A	0.2	0.18
Back EMF constant	V/m/s	0.2	0.18
Continuous force	N	0.4	0.36
Peak force	N	1.6	1.44
Resistance	ohms	0.3	0.44
Continuous current	A	2	2
Peak current	A	8	8
Voltage at peak force	V	2.6	3.5
Actuator constant	N/SqRt(W)	0.35	0.27
Continuous power	W	1.3	1.8
Max coil temperature	Deg C	130	130
Moving mass	g	4.3	6.5

ATA-IG2-5



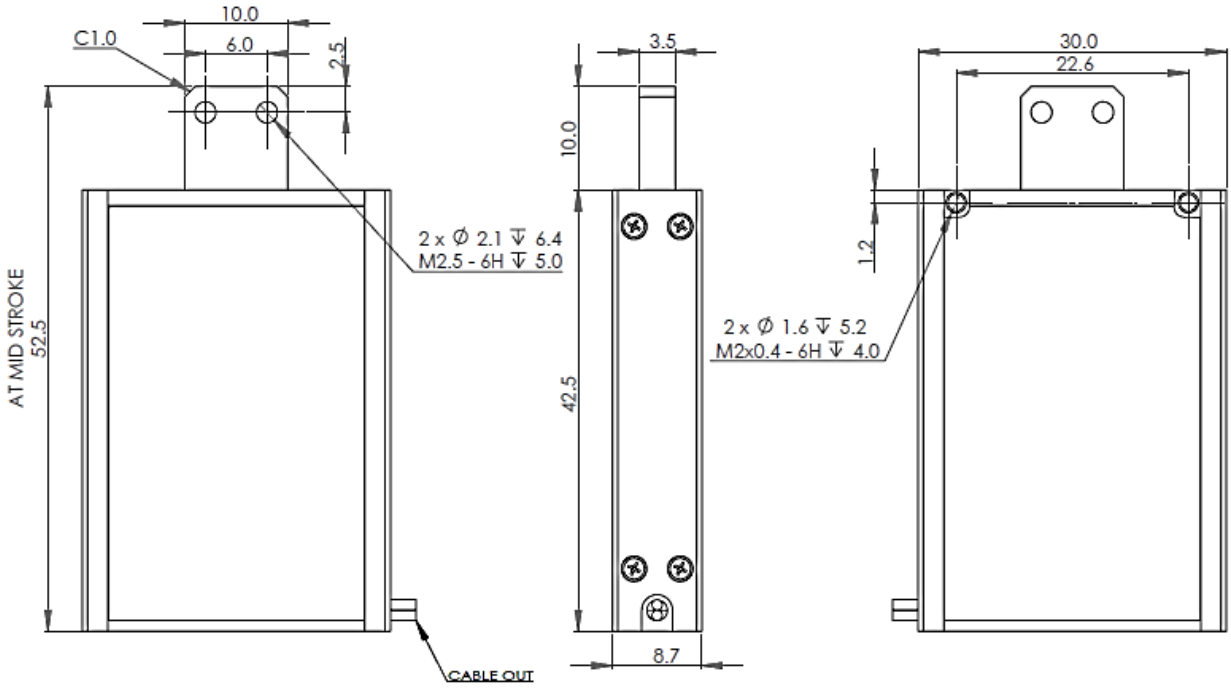
ATA-IG2-10



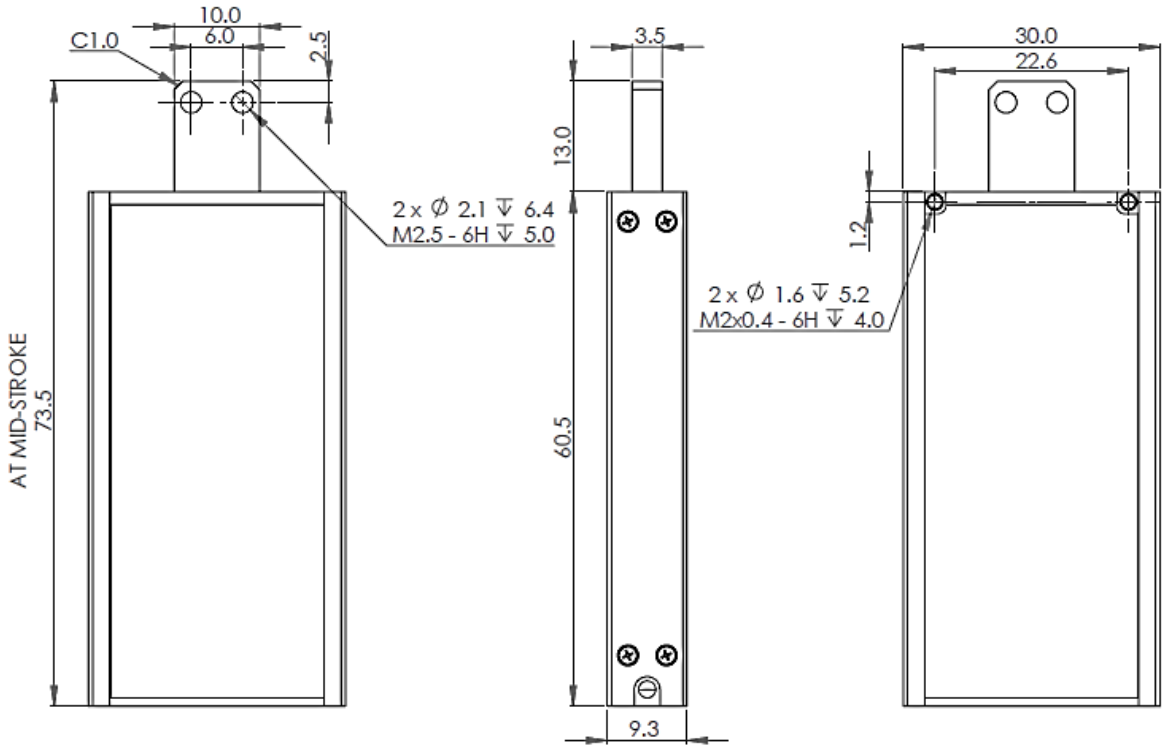
ATA-IG3

Model	Units	ATA-IG3-6	ATA-IG3-12
Stroke	mm	6	12
Force sensitivity (at mid stroke)	N/A	0.29	0.28
Back EMF constant	V/m/s	0.29	0.28
Continuous force	N	0.58	0.56
Peak force	N	2.32	2.24
Resistance	ohms	0.45	0.48
Continuous current	A	2	2
Peak current	A	8	8
Voltage at peak force	V	3.6	3.8
Actuator constant	N/SqRt(W)	0.43	0.4
Continuous power	W	1.8	1.9
Max coil temperature	Deg C	130	130
Moving mass	g	7.9	11.6

ATA-IG3-6



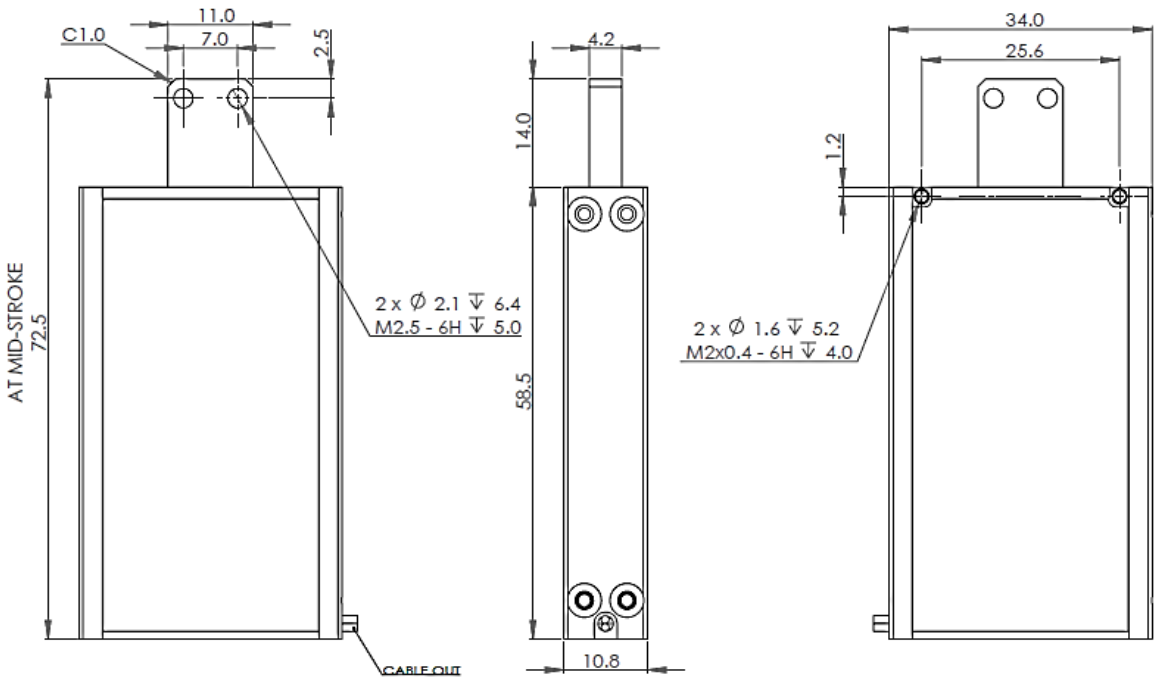
ATA-IG3-12



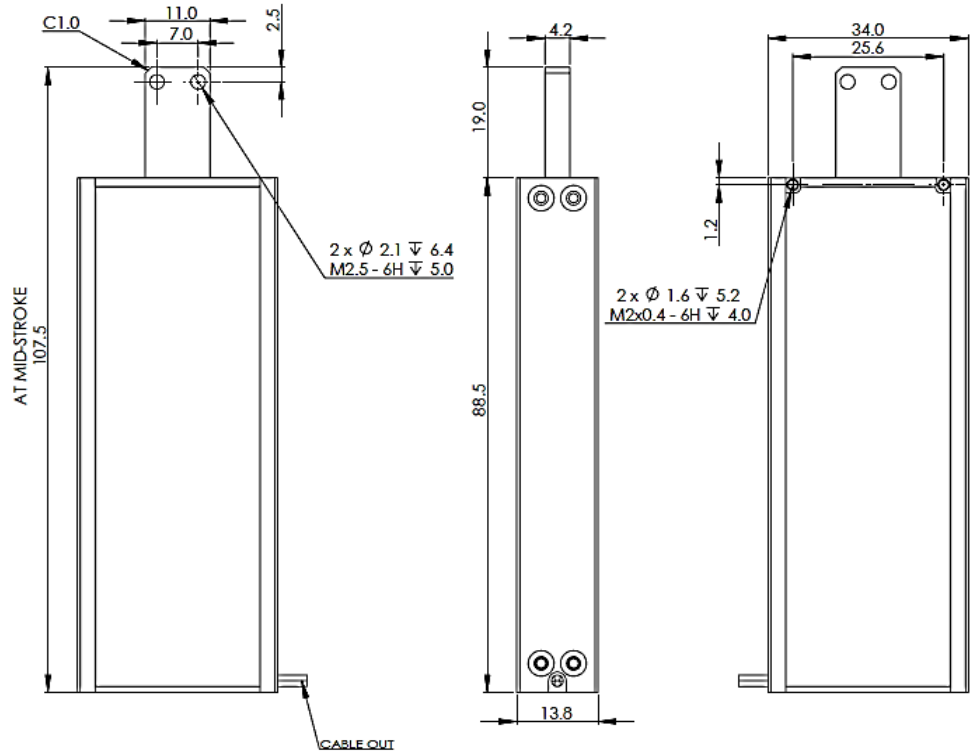
ATA-IG4

Model	Units	ATA-IG4-10	ATA-IG4-18
Stroke	mm	10	18
Force sensitivity (at mid stroke)	N/A	0.58	0.61
Back EMF constant	V/m/s	0.58	0.61
Continuous force	N	1.16	1.22
Peak force	N	4.64	4.88
Resistance	ohms	1.03	1.39
Continuous current	A	2	2
Peak current	A	8	8
Voltage at peak force	V	8.2	11.1
Actuator constant	N/SqRt(W)	0.57	0.52
Continuous power	W	4.1	5.6
Max coil temperature	Deg C	130	130
Moving mass	g	15.5	24.7

ATA-IG4-10



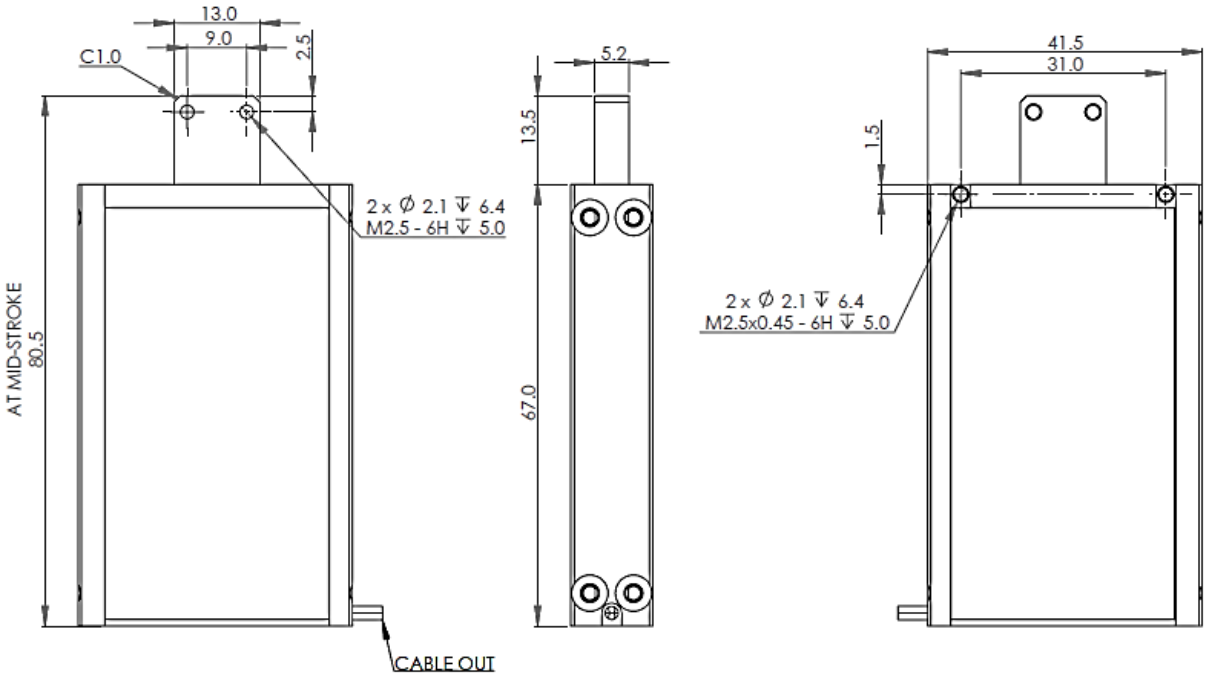
ATA-IG4-18



ATA-IG5

Model	Units	ATA-IG5-12	ATA-IG5-22
Stroke	mm	12	22
Force sensitivity (at mid stroke)	N/A	0.96	0.99
Back EMF constant	V/m/s	0.96	0.99
Continuous force	N	1.92	1.98
Peak force	N	7.68	7.92
Resistance	ohms	1.77	2.58
Continuous current	A	2	2
Peak current	A	8	8
Voltage at peak force	V	14.2	20.6
Actuator constant	N/SqRt(W)	0.72	0.62
Continuous power	W	7.1	10.3
Max coil temperature	Deg C	130	130
Moving mass	g	26.8	44.9

ATA-IG5-12



ATA-IG5-22