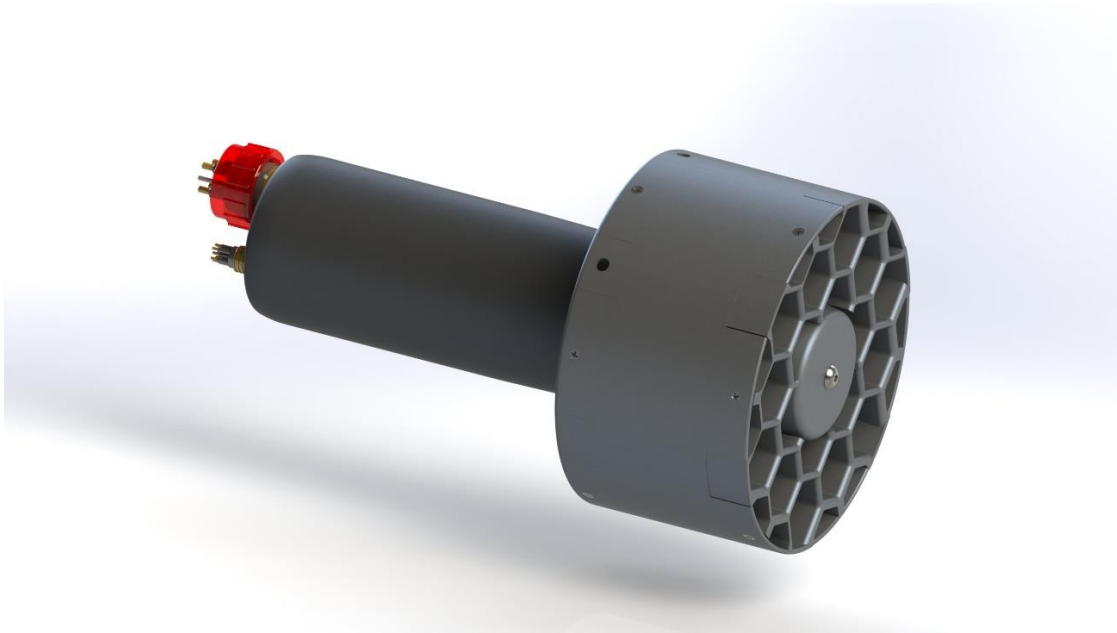




## **H106-12300RH10-SMC HEXSCREEN ELECTRIC THRUSTER**



- No maintenance for 5 years or 5,000 hours other than oil changes.
- No disassembly required for fresh water rinsing.
- Streamlined Brushless DC, oil filled and pressure balanced motors.
- True direct drive electric motors. No gearbox, no magnetic coupling, nor any other device to transmit power, simplifying the design and increasing reliability.
- Proven 3 tier seal system that includes Silicone Carbide Face Shaft Seals.
- 90% Reverse Thrust
- High Efficiency and Much Faster Response Time. Thrusters that will make a difference to any ROV's / Submarines performance
- All USA made materials, manufacturing and assembly.
- Independently Tested Off-The-Shelf Units that have a proven track record.

### ***PRECISION DESIGNED AND BUILT - COMPARE EFFICIENCIES & PROP TIP CLEARANCES.***

- Optional Hexscreens of Hydrodynamic Design Protects Divers & the Propeller.
- The Hexscreens Cancels 80% of the Propeller Torque While Reclaiming Thrust by Reducing the Jet Whirl. Makes for a more energy efficient & Steadier Vehicle.

Customized Solutions/Systems for R & D Programs or Prototype Vehicles, small or large. These thrusters can be precision matched to each application.



## PERFORMANCE DATA & THRUSTER DIMENSIONS

H106-12300RH10-SMC Motor Specifications				
Input Voltage	Max Thrust	RPM	Input Power	Shaft Power
300 VDC	205 lbf (93 kgf)	1,500	10.8 HP (8.1 kW)	9.5 HP (7.1 kW)
Reverse Thrust				
300 VDC	180 lbf (82 kgf)	1,500	10.8 HP (8.1 kW)	9.5 HP (7.1 kW)

### H106 Hexscreen Electric Thruster with 12300RH10 Motor Performance Table

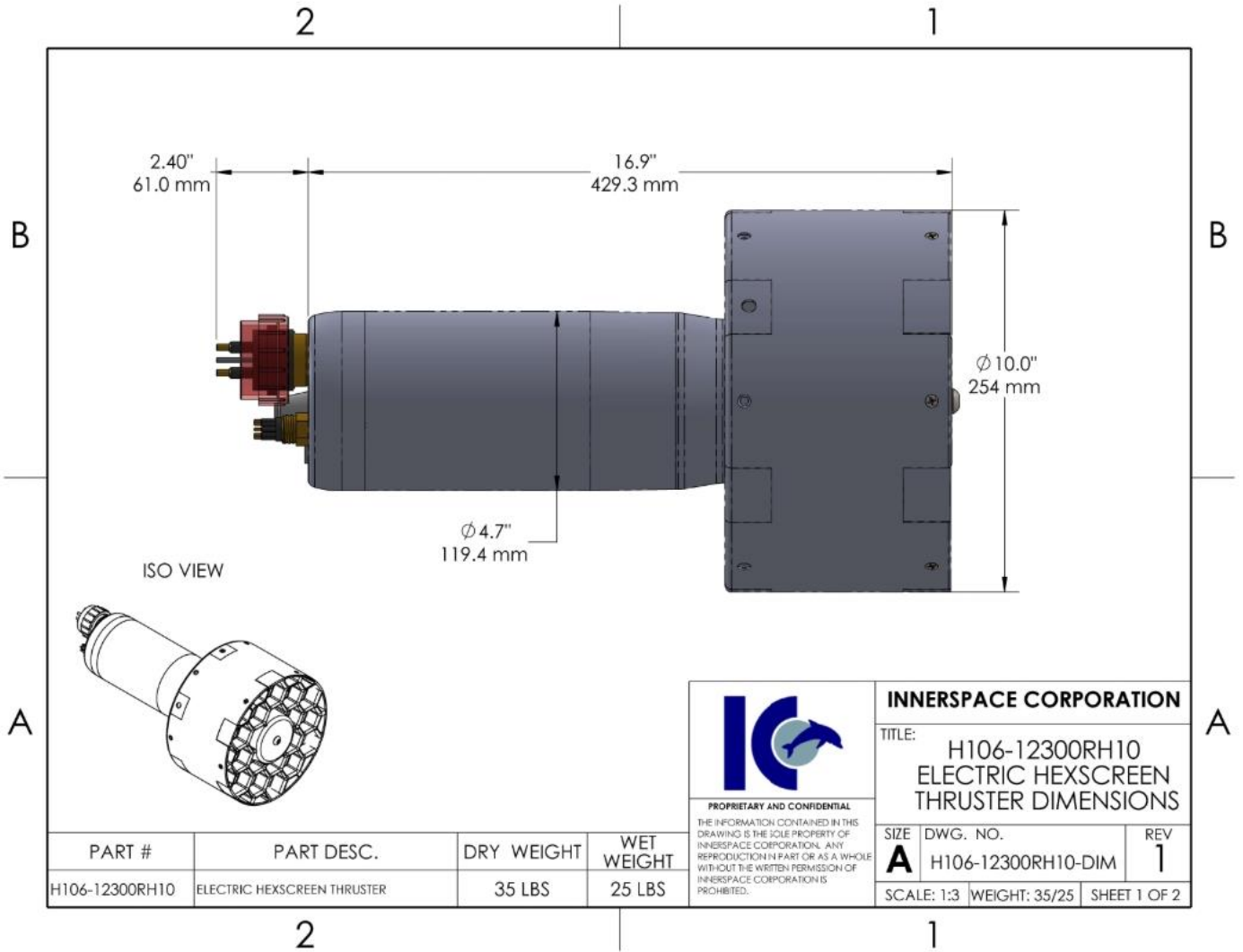
Speed (RPM)	System Voltage (VDC)	Min Voltage (VDC)	Current (A rms)	Bollard Thrust		Reverse Thrust		Power Shaft		Power In		Efficiency (Pout/Pin)
				0 (Lbf)	0 (Kgf)	(Lbf)	(Kgf)	(HP)	(Watts)	(Watts)	(HP)	
100	300	12.6	0.8	1	0.4	1	0.3	0.02	12	12	0.0	95.3%
200	300	24.7	1.3	3	1.5	3	1.3	0.05	35	37	0.0	96.3%
500	300	63.1	4.4	21	9.5	18	8.4	0.41	306	322	0.4	95.0%
800	300	104.6	10.3	55	24.8	48	21.9	1.52	1134	1220	1.6	92.9%
1000	300	134.0	15.7	87	39.6	77	34.9	2.90	2161	2362	3.2	91.5%
1050	300	141.6	17.2	97	44.1	86	38.9	3.34	2492	2733	3.7	91.2%
1100	300	149.2	18.8	108	48.9	95	43.1	3.83	2855	3144	4.2	90.8%
1150	300	157.0	20.5	118	53.4	104	47.2	4.36	3252	3595	4.8	90.5%
1200	300	164.8	22.3	129	58.5	114	51.6	4.94	3685	4089	5.5	90.1%
1250	300	172.7	24.1	141	63.8	124	56.3	5.57	4155	4628	6.2	89.8%
1300	300	180.7	26.0	152	69.0	134	60.9	6.25	4664	5215	7.0	89.4%
1350	300	188.8	28.0	166	75.1	146	66.3	6.99	5213	5852	7.8	89.1%
1400	300	196.9	30.1	178	80.8	157	71.3	7.78	5804	6540	8.8	88.7%
1450	300	205.2	32.2	191	86.7	169	76.5	8.63	6438	7283	9.8	88.4%
1500	300	213.6	34.4	205	92.8	180	81.9	9.54	7117	8082	10.8	88.1%

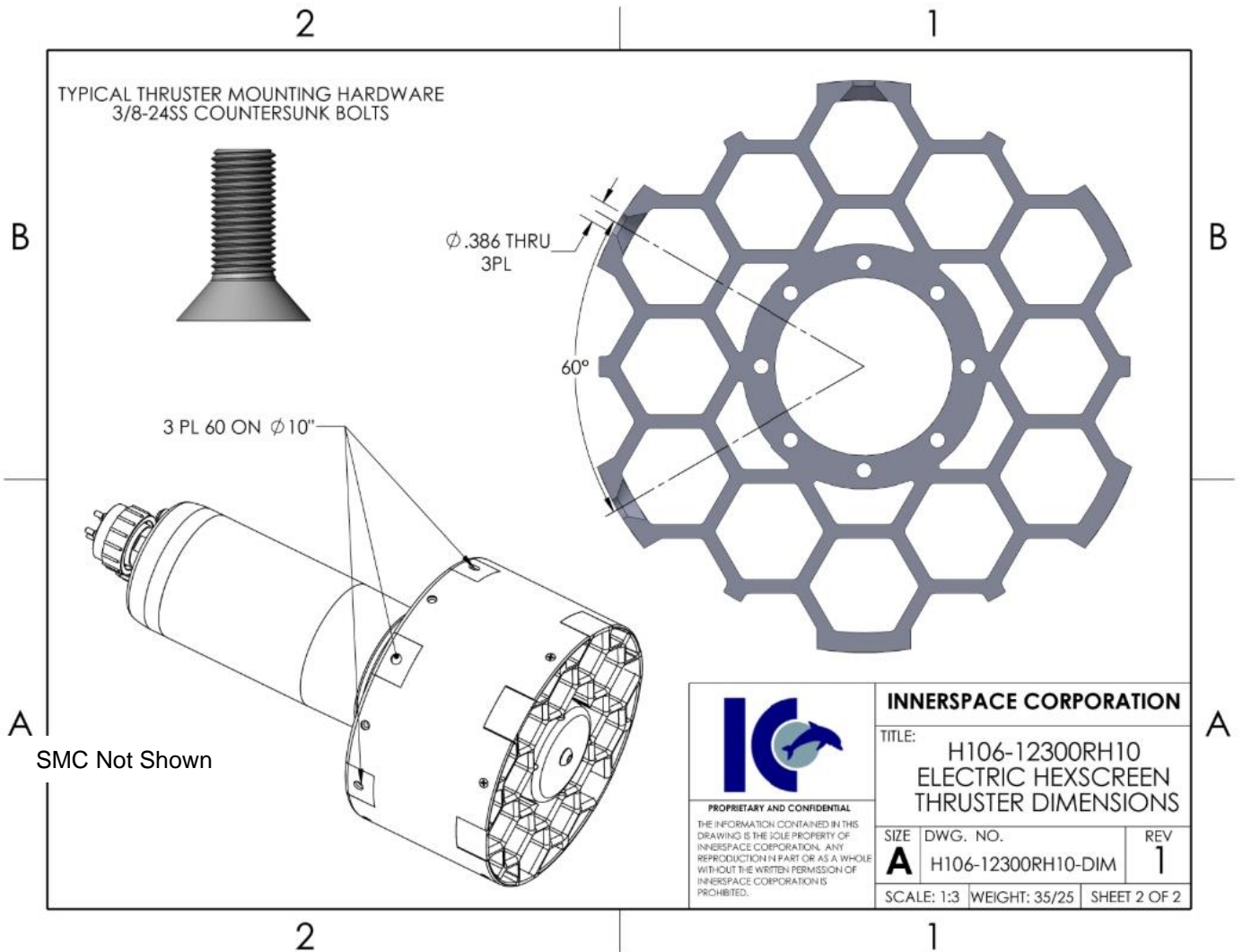
**Table Information:**

- 1) The Minimum Voltage column in the above table shows the minimum Voltage needed to achieve the performance at that corresponding propeller RPM/Thrust.
- 2) The Current shown represents the continues RMS Current to the motor to achieve the Thrust at the corresponding propeller RPM.
- 3) The Shaft HP developed is a function of the propeller and increases with propeller RPM.
- 4) The maximum performance achieved will depend on the limitations of customers system Voltage and driver Current capacity.
- 5) For Thrust at Forward Vehicle Speed (Kts), anything lower than 500 RPM varies greatly with vehicle design.
- 6) The Current/RPM might need to be limited depending on customer connector spec and or system Current limitations.
- 7) Minimum Voltage to achieve full Thrust is 214 VDC.
- 8) Max Voltage should not exceed 10% of rated Voltage.



H106-12300RH10 Dimensions





The Electric Thrusters can be ordered with almost any customer preferred connectors if Current ratings are taken into consideration.

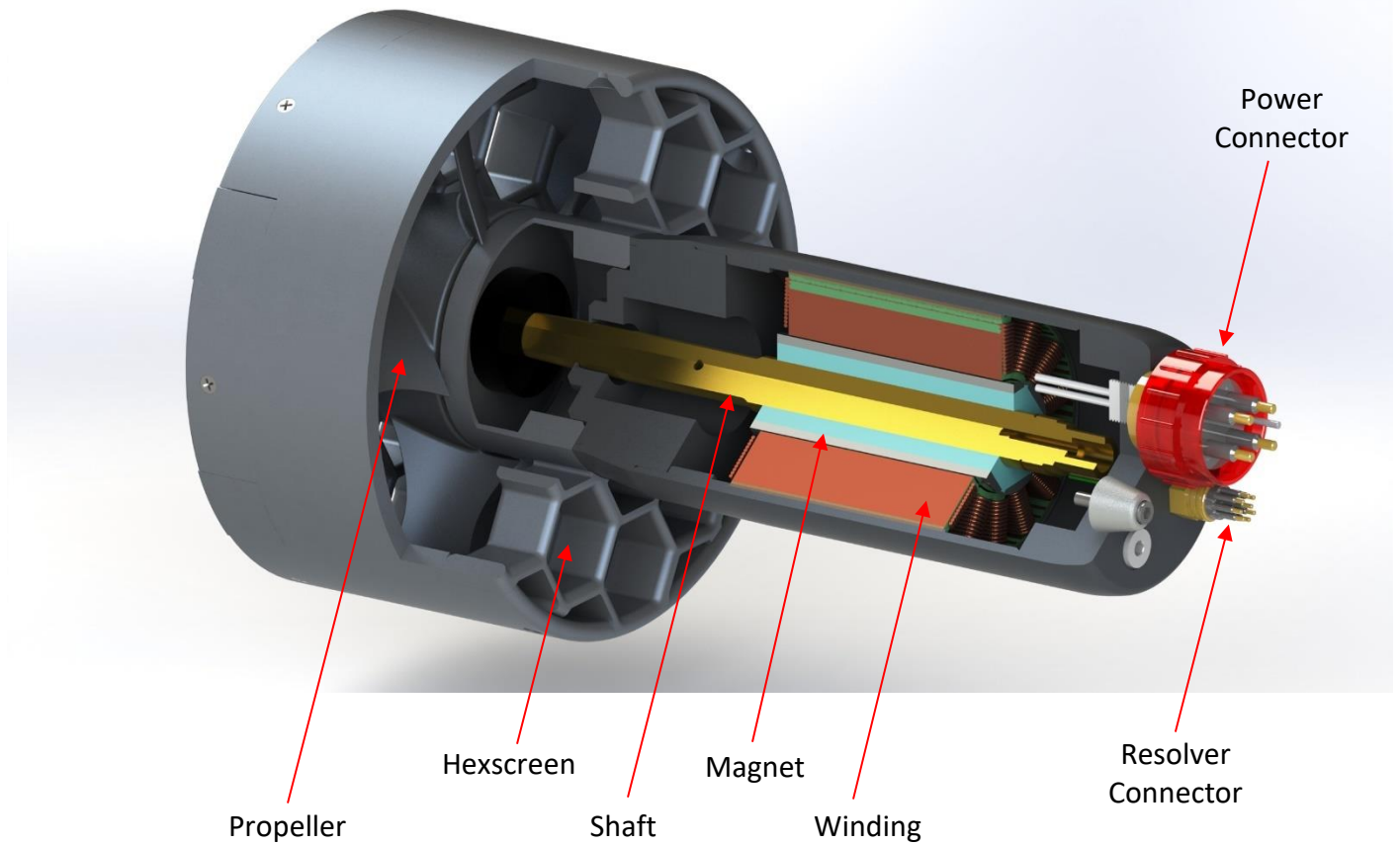
The above Drawing shows the H106-12300RH10 Thruster Dimensions with Vertical Fittings/Bulkheads (1) and Axial fittings/Bulkheads (2).



**INNERSPACE CORPORATION**  
1138 E. EDNA PLACE, COVINA, CA 91724  
TEL: (626) 331-0921 FAX: (626) 966-6391  
www.innerspacethrusters.com

## GENERAL ARRANGEMENT

12300RH10 BDC MOTOR  
DIRECT DRIVE – Propeller Attached on the same shaft  
that the Magnets are on without any other device to  
transmit power to the Propeller.





## **STATE-OF-THE-ART AMBIENT PRESSURE MOTOR CONTROLLER FROM 50 – 780 VDC**

The H106 Series Electric Thrusters are offered with a matching SMC (Stand-alone Motor Controller) housed in a separate one atmosphere bottle. Specially designed to match the H106 Series Electric Thruster range from Innerspace, the SMC controller operates in torque or velocity mode. Torque mode is particularly useful when integration to a vehicle stability control system is anticipated, allowing percentage torque thrust forward and reverse to the RPM limit of the motor. Feedback from the motor to the system controller receipt of the digital commands sent and provides real time RPM and motor Current, along with system health and performance monitoring data. Motor acceleration rates and other parameters can be set to suit the motor and application.

Recording of lifetime performance data including total shaft revolutions, hours since overhaul and power cycles provide data points for operation and maintenance purposes are standard.



Stand-alone Motor Controller (SMC)  
Sizes will vary depending on depth.



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### SPECIFICATIONS

#### SMC (Stand-alone Motor Controller):

#### Type:

Atmospheric Pressure Housed Three Phase BLDC motor controller.

#### Available Configurations:

Stand Alone (SMC): Independent control unit with cable connections to motor - phase (power) and sensing (resolver) Communication (Network).

Motor Power Rating: 1hp (750W) to 25hp (18kW) with options to 55hp (41kW)

#### General Characteristics:

Voltage: DC, 50VDC to 780VDC, Positive, Negative, Isolated from Frame Ground.

Current: Maximum Continuous 50A (in water)

Motor Type: Suitable for Three Phase water cooled BLDC Permanent Magnet motors

Operating Parameters: Stand Alone Controller: Sine/CoSine resolver and direct commutation  
Controller parameter matched to associated motor.

#### Connections

Power: Subconn HPBH4M - Positive, Negative and Frame Safety Ground

Data: SubConn DBH13M – 1. 24V+, 2. SHD, 3. 0V-, 4-7 RESERVED, 8. ECAT TX+, 9. ECAT TX-, 10. ECAT RX+, 11. ECAT RX-, 12 & 13 RESERVED

Motor Phase: Subconn HPBH4F - Phase A, B, C, Frame Ground/Shield

Motor Sensor: Subconn DBH8F Sensor SIN+/-, COS+/-, EXC+/- Frame Ground/Shield

#### Control

Electrical: Ethercat point to point connection.

A separate 24VDC LV supply used with the Ethercat connection. This enables the condition of the controller to be known without the HV being present. Communication of all the motor parameters is possible.

Command: Over 300 commands available please contact for requirements

Ethercat SDO and PDO:

Action Commands: RPM setting (velocity mode) - Forward and Reverse, to rated motor RPM

Power setting (torque mode)- Forward and Reverse, 0% to 100% of maximum rated/programmed torque

Safety Lockout (Manual)

Status query

Status Messages: Shaft RPM

Motor Current

Throttle/Thrust setting

Temperature

Safety State Action: Condition warnings (Temperature, Voltage, Current)

Control System Connectivity Failure - Automatic shutdown

#### Notes:

- Optional External Control Interfaces: Test interface and development code
- DC supply cables must meet minimum length/inductance requirements to eliminate requirement for an external HVDC soft start switch.
- Adequate DC bus capacitance and reverse EMF/Overvoltage protection must be used.
- All Data cable must be shielded for noise prevention
- Data cable should not exceed 6 meters between SMC and electric motors.