



ROV SKID MOUNTED CPT

ROV-CPT



Geo-Technical, Revolutionized.



ROV-CPT

Technical specifications:

1. Cone: 5 square cm, digital, tip/sleep/pore pressure with tilt and temperature
2. Depth rating: 5,000 meters salt water depth
3. Sounding depth: 30m
4. Push speed: 2.0cm/s
5. Max push force: 35kN
6. Suction anchor area: 1.04 square meters
7. Max suction pressure: 0.2 bar
8. Max reaction force: 35kN ($1.04\text{m}^2 * 0.345\text{Bar}$)
9. Minimum soil strength: greater than 15kPa (Can be configured for < 15kPa)
10. Maximum soil strength: less than 60MPa
11. Weight: 1,600kg (in air), 50kg in water
12. Emergency ROV separation by pulling two pins when on seabed
13. Manipulator actuated suction release valve
14. Mud Line Adjustment unit (MLA) provides 1.2m of vertical travel for adjustment and service
15. Can be shipped air freight
16. System re-configure allows 7-meter single core samples to be collected
17. Re-configure for Core-Sampling can take place on location and does not require work-shop refit

Requirements:

1. Platform: Any work class ROV (Perry XLX, Schilling UHD, Merlin WR200 etc.) with at least one 7 function manipulator and capable of accepting a skid (1.52m wide X 2.44m long X 0.53m high). The skid is mounted to the ROV by means of a floating through-frame lift plate that slides into the ROV-CPT skid horizontally. The skid can then be kept in place by either 2 T-handled pins mounted through the deck of the ROV into the skid (to prevent the skid from sliding horizontally off the ROV unless both pins are pulled using the manipulator) or by securing the ROV frame to the walls of the skid using fasteners.
2. Hydraulics: Operation and control of the system is accomplished by both supplying hydraulic power to the thruster unit, as well as using auxiliary hydraulic circuits to control the suction pump, Mud Line Adjuster, and sampler activation. The required hydraulic connections (shown in drawing GSD0001) are as follows:
 - a. The cone thruster requires one (1) hydraulic supply and return, capable of supplying at least 25 liters/min at a fix pressure of between 60 and 100 Bar (not to exceed 103 Bar). Return pressure (at the connection) must not exceed 10 Bar. Both connections are JIC-8 male fittings. No control of this circuit is necessary, as control is supplied by an integrated valve pack.
 - b. Control of the Mud Line Adjuster (MLA) must be provided by one (1) bi-directional control valve on the ROV (2 connections) capable of providing at least 4 liters/min at up to 140 Bar (not to exceed 206 Bar). Both connections are JIC-6 male fittings. This circuit

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must be able to reverse so that the double-acting rams of the MLA can raise and lower



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the thruster. A proportional valve is not required, but the flow rate should be restricted to 8 liters/min or less.

- c. To operate the suction anchor one (1) bi-directional valve on the ROV (2 connections) capable of supplying a minimum of 25 liters/min at a pressure of 140 to 206 Bar (not to exceed 206 Bar). Both connections are JIC-8 male. A proportional valve is required so that the flow rate can be adjusted to maintain proper anchor pressure and outflow.
 - d. If the sampler is used, a single open-center hydraulic valve on the ROV is required to activate the sampler. The required hydraulic flow is negligible (less than 1 liter/min) and pressure must be between 10 and 100 Bar (not to exceed 100 Bar) when activated, and less than 2 Bar prior to activation.
3. Electrical. Only one electrical connection is made to the ROV-CPT. A single Burton connector that connects between the ROV and the junction box on the unit. All other electrical connections to the skid are internal to the skid and already connected. This single Burton connector is a 20-shell female 8-pin and is wired per the electrical interconnect drawing (GSD0002). The connector supplies power and comms: 20-30VDC @ 2A (ripple voltage to be less than 500mV peak to peak) and RS485 at a data rate of 115kbps.



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ROV-CPT - Integration and Wet Test

Overview

The ROV-CPT geotechnical tool is designed to interface with any work class remotely operated vehicle (ROV). However, due to variations between different ROV makes, models, and revisions, the ROV-CPT may need to be modified in order to integrate into the particular ROV being used. What follows is a list of likely items to be checked and basic wet testing required for the system before operations begin.

Mechanical connections

Because the ROV-CPT is designed to accommodate many different models of ROVs, the mount point is a custom plate that can easily be changed or modified to suit a range of different vehicles. The stock mounting plate (P/N: GSM0002) is designed around a Perry XL* series ROV (XL, XLR, XLX,.. etc). The mounting plate must be narrower than 27.5 inches but can be any length (stock plate is 40.0 inches long) and should be at least 0.5 inches thick 6061T6 Aluminum or stronger. The plate is designed to slide freely under the two main load bearing rails on the top of the skid. These rails result in an opening of 20.75 inches in width and 96 inches long. A plate of up to 2.5 inches can be accommodated. The standard plate has pins (built to Perry specs) that are bolted through the plate and can be secured through the ROV frame (i.e. through frame lift).

The mounting plate is designed so that the ROV can be separated from the skid by detaching hydraulics (from the ROV pull release plate commonly found on most work class auxiliary hydraulic circuits) and flying forward without significant load on the plate. To prevent the plate sliding out during normal operations, two T-handled mounted pins should be installed near the front of the ROV, through the decking and into the skid. The exact location of these T-handled pin holes/mounts must be determined when the ROV is fitted to the ROV-CPT. If no emergency separation is desired, the ROV can be bolted to the skid using conventional corner mounting brackets; again, placement will vary by make and model of the vehicle used. Recommended pin diameter is 0.5 inches or larger and material should have a shear strength (in the size selected) of at least 2 tons.

Hydraulic connections

All hydraulic connections with the ROV are made near the front of the ROV-CPT, at a bulk head just inside the front of the skid, recessed approximately 3 inches behind the front of the skid. The connections are all male JIC (i.e. 37° flared) bulk head fittings and are stamped with identifying marks. Please refer to the hydraulic connection drawing (GSD0001) for further details. The system is designed to run on Shell Tellus 22/32 or similar hydraulic oil. Though not particularly sensitive to oil quality, particulates and poor oil quality will degrade the life of the system.

Electrical connections

Only one electrical connection is required. This is to be made near the back of the ROV via an 8-pin Burton 20 shell connector. The skid has a female connector and a male is required. A whip is also provided so that the customer can splice the Burton to the connector/cable of their choice. Power requirements and standard pinout are listed on drawing GSD0002.

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