

ITCH Air Winch



Technical Manual



Edition 1

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1. Product Description

The ITCH Air Winch is designed for safe and ergonomic carrying in stairs and narrow passages. It has a compact design and weighs 45kg and is easily carried by two people. The storage compartment houses the ITCH robot components. The winch has a self-locking worm gear and stalls out if overloaded.

The ITCH Air Winch has a pneumatic motor for use in marine environments near explosive conditions may be present. The pneumatic motor provides the following benefits:

Safety in Hazardous Environments: Pneumatic motors provide inherent safety in explosive environments by operating without electricity, eliminating ignition sources during pulling.

Variable Speed Control: The pneumatic motor allows for variable speed adjustments. This enables control over number of ITCH strokes, increasing the success of the hull cleaning.

Technical Data:

- Rated Capacity at bottom layer: 220kg
- Rated capacity at top layer with 300m rope: 188kg
- Pulling Speed at Rated Load: 1.5-8 meters per minute at bottom layer
- Air Consumption at full speed: 32 l/sec or 1,912m³/min (Free air)
- Supply Pressure: 6.3 bar
- Internal working Pressure: 4 bar
- Connection: 2 lug Chicago coupling
- Line Supply: 3/4" ID
- Weight without Accessories: 45kg
- Anchor Point for Securing of Winch: 500kg
- Max Rope Length: 400m
- Air System Diagram (PID): Refer to the manual.
- EX certifications: none

2. Safety Instructions

To ensure safe and effective ITCH operations, it is important to plan and follow the right procedures. The person operating winch on deck should be identified and heard clearly by the other person(s) involved in the ITCH operation. Communication between the ITCH operating personnels is part of ITCH procedures. VHF or talk back systems are recommended for communication. This will also help the ITCH operating personnel to communicate effectively with the bridge or to slow down the speed of the ship in case of emergency.

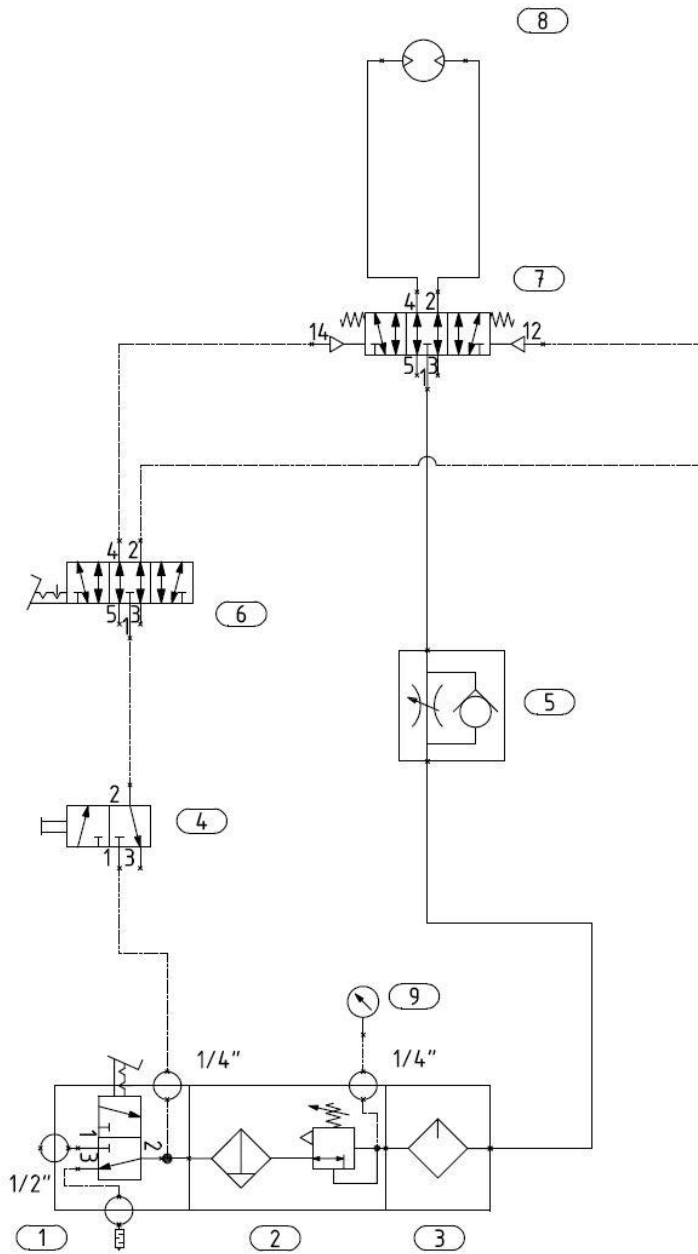
The ITCH operating personnels should always be wearing the proper personal protective equipment (PPE). Typical PPE while working on deck consists of the following items: coverall; safety boots; safety helmet; safety glass and gloves. A high visibility and buoyancy vest if working near shipside.

Poor weather conditions can hamper working on the deck and effective operation of the ITCH. Avoid ITCH operations in extreme weather conditions like in the case of ice and snow, foggy conditions that reduce the visibility. Ensure that the personnel on deck are appropriately dressed for weather conditions and check if cold weather clothing is needed before the ITCH operation.

On prolonged operation, the dripped oil may collect on deck. Ensure enough rugs or oil absorbent materials are available to clean the lubricant oil dripped from the winch. This will help to avoid the potential hazard of slipping on oil.

Condition of the winch rope needed to be inspected before the operation. Check for the color change of the rope to ascertain any wear to the rope. Attention to be paid to the rope area closer to the ITCH robot with knot. Additionally, avoid overloading the winch, excessive air pressure, using incorrect hoses and fittings, and being cautious of potential entanglement hazards associated with the winch's rope. Avoid wrapping the rope around the hands.

3. Piping and Instrumentation (PID) diagram



Pos. Item	Artikelnummer Article number	Ant. Quant.	Navn Description
9	N/A	1	Pressure gauge
8	VS4B14DP60FB434	1	Globe VS4 with 1:434 gear
7	PNV 46 PNS OC	1	Directional control valve 1/2"
6	MAV 26 LEO OC	1	Directional control valve 1/8"
5	A409EAS420-F0461/2"	1	Speed regulator 1/2"
4	VRM 065 R	1	EM-Stop valve
3	5X24L104	1	Lubricator SY2 1/2"
2	5X24B164	1	Filter-regulator SY2 1/2"
1	5X24V104	1	Shut-off valve SY2 1/2"
			Customer supply

Fig.1: PID Diagram

4. Operating Instructions

Setup and Installation: Ensure secure attachment to a strong point, such as a bollard, using a single rope. Place the winch directed towards the rope exit point at a distance of at least 5m to ensure even spooling. Make sure it stands on a flat and even surface. The winch stands by its own weight at the deck. Avoid a high exit point for the rope so that the winch does not lift with tension in the rope. While operating, the winch angle towards the exit point may be adjusted to optimize spooling. Before first use, cut the total length of rope or restrict its possible extension to ensure that the rope cannot reach the propeller even if the rope is fully unspooled.



Fig.2: Winch end secured to a strong point on deck.

Before connecting Air supply: Before connecting the air supply to the air winch, ensure the ship's hose is drained of water and debris. To do this, open the main valve on the ship's hose supply outlet slightly, while someone secures the end of the ship's hose to be attached.

Connect Air Supply: To connect the air supply to the air winch, first, identify the air inlet, located near the control panel or motor housing. Then, remove the Chicago Claw cap, a protective cover, from the air inlet. Use a compatible hose and fitting to securely connect the compressed air supply, ensuring there are no leaks. Attach the securing wire to the incoming hose. Refer to the provided images for visual guidance on the Chicago Claw cap removal process.



Fig.3: Images showing the Chicago claw end on the inlet pipe.

Power on the Air Winch: After connecting the air supply, the next step is to activate the air winch for operation.

1. **Open the Supply Line:** Ensure that the supply line is fully opened to allow a steady flow of compressed air to the air winch. Check that any valves or regulators in the supply line are adjusted to the proper position for normal operation.
2. **Turn ON the Main Air Inlet Valve:** Locate the main air inlet valve, usually positioned near the air inlet of the winch. Rotate the valve handle or lever counterclockwise to open the valve fully. This action allows compressed air to enter the winch's pneumatic system.



Fig.4: Images showing turning ON the main air inlet valve.

Prior to switching on the air winch, ensure that personnel are clear of the winch and the load.

Releasing the Emergency Stop Button:

1. Locate the emergency stop button near the control panel.
2. Twist the emergency stop button clockwise to release it. This action disengages the emergency stop function, allowing the air winch to operate.



Fig.5: Images showing releasing of emergency stop switch.

Only release the stop button after verifying safe conditions.

Controls: The air winch is equipped with controls that allow precise operation. Familiarize yourself with the following controls.

1. **Directional Lever:** The directional lever controls if you are spooling in and out.



Fig.6: Control lever on the winch for spool in and out.

- Stepless Speed Control:** The air winch's stepless speed control allows for adjustment of the winch speed. The minimum speed can vary depending on the load, and for cleaning operations, it's advisable to maintain a low winch speed. Refer to the speed reference table provided in the manual for guidance on selecting an appropriate speed setting based on the specific load requirements. This table helps to determine the optimal speed range.



Fig.7: Speed control knob on the winch.

Time for One rotation of drum (sec)	Speed (m/min)	Use
7	8	Deployment & Retrieval
10	5	
30	1.6	Normal Operation

Tab.1: Speed control guidance.

- Pressure Setting and regulator:** The pressure regulator is located between the main air inlet valve and the oil filter regulator, as shown in the figure below.

WARNING: The air winch's internal pressure setting is factory set and locked at 4 bar and should not be adjusted. Modifying the pressure beyond the specified limit can lead to hazards or damage.



Fig.8: The manometer and the pressure regulator.

4. **Emergency Stop Button:** Allows you to halt the winch operation promptly.



Fig.9: Image showing emergency stop switch.

Load Handling: The rope tension is higher when the ITCH robot goes down than when it goes up in the water. The winch will stall beyond the rated capacity of 220kg (at the first layer of rope on the drum). The winch will intentionally stall beyond this rated capacity to protect against overloading and breakage of the rope and robot. On a full drum, the pull force at the top layer can be 23% less than the bottom layer.

5. Maintenance Guidelines

Regular maintenance before and after use:

1. **Inspection of rope:** The colored core must not be visible. The rope end to be tied to the robot must be cut off regularly to ensure the worn knot section is not reapplied. Visible damage along the rope should be cut off or the rope should be replaced.
2. **Inspection of winch damage:** Inspect the pneumatic motor, drum, control valve, and other components for any signs of wear, damage, or malfunction.
3. **Lubrication:** The air supply require lubrication. No other part of the winch requires lubrication or greasing. Air lubrication is needed for longevity and smooth operation of the air winch. The lubricator is set to provide oil drips at a rate of approximately 1 drop per 8 seconds at full speed (this rate may be lower when the speed is reduced). Use high-quality air tool oil.

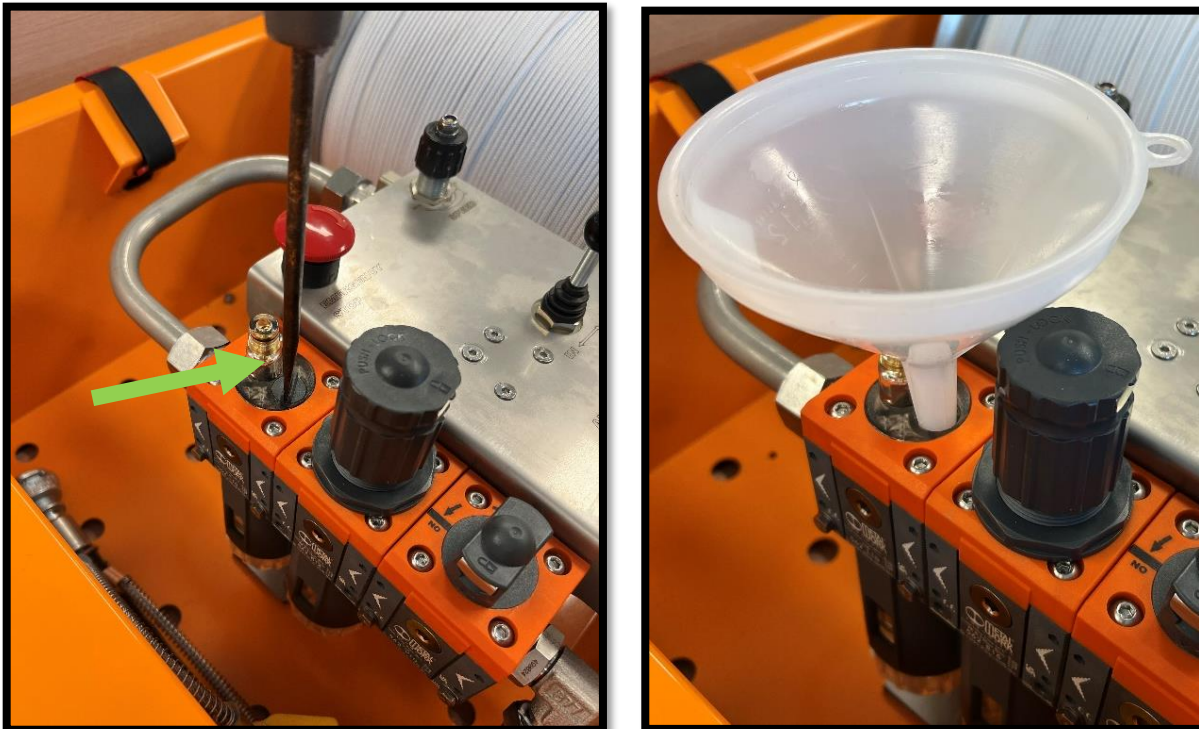


Fig.6: Opening the lubricator section and filling lubricant.

4. **Draining of Water:** Draining water from the air winch's pneumatic system is crucial for maintaining its performance and preventing damage.

To perform the draining procedure, follow these steps:

- a) Locate the regulator/filter unit: The regulator/filter unit is positioned between the main air inlet valve and the oil regulator near the control panel of the air winch. It is designed to regulate the air pressure and filter out contaminants, including water.



Fig.7: Drainage point below the regulator/filter unit.

- b) Identify the drainage point: Underneath the regulator/filter unit, there is a drainage point to remove accumulated water from the pneumatic system.
- c) Draining: Depressurize the air winch before proceeding. Open the drainage valve located under the filter housing. Allow any accumulated water to fully drain from the system. Close the drainage valve securely after completing the draining process.

Regularly inspect and drain water from the pneumatic system as part of your maintenance routine. Water accumulation can lead to corrosion, reduced efficiency, and potential damage to the air winch's components. By removing water from the system, you help ensure its smooth operation and extend its overall lifespan.

Cleaning and Storage: Clean the winch as needed and store it in a dry and safe location when not in use. During operation, clean any oil that comes out of the exhaust, which can accumulate in the bottom of the cabinet. To collect the exhaust oil, it is recommended to place an oil absorbent rag or mat underneath. This helps maintain cleanliness and prevents oil spill.

Testing and certification: ITCH Air winch is a portable pulling reel, not intended for lifting purposes. According to classification society, certification is not required.

6. Troubleshooting

Issue: Lack of Power or Motor Failure

Possible Causes:

- Insufficient air pressure.
- Air leaks in the pneumatic system.
- Clogged or restricted air filter.

Solutions:

- Check the air pressure supply and ensure it is within the recommended range.
- Inspect the pneumatic system for any leaks and repair or replace damaged components.
- Clean or replace the air filter and drain condensed water to ensure proper airflow.

Issue: Control Valve Malfunction

Possible Causes:

- Blockages or debris in the control valve.
- Leaks or damage to the control valve.

Solutions:

- Inspect the control valve for any blockages or debris and clean as necessary.

Issue: Rope Slippage or Improper Winding

Possible Causes:

- Rope entanglement or improper winding on the drum.
- Rope diving between previous layers of rope
- Tension adjustment issues.

Solutions:

- Carefully unwind any tangled rope and ensure it is properly wound onto the drum. Adjust the direction of the winch towards the position of the rope outlet.
- Spool in rope with back tension

For assistance, you may reach out to Shipshave Support on support@shipshave.no