ITCH Air Winch

Technical Manual

Rev 3

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Shipshave

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1. Product Description

The ITCH Air Winch is designed for safe and ergonomic carrying in stairs and narrow passages. With a weight of 49.5kg and compact design it is easily carried by two people. It has compartment for storing the ITCH robot components.

The ITCH Air Winch has a pneumatic motor for use in marine environments. 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.

Operational Safety: The winch has a self-locking worm gear which stalls out if overloaded.

Technical Data:

- Rated Capacity at bottom layer: 200kg
- Rated capacity at top layer with 300m rope: 180kg
- Pulling Speed at Rated Load: 1.2-6 meters per minute at bottom layer
- Air Consumption at full speed: 460 Nl/min. / 16CFM
- Supply Pressure: 6.3 to maximum 8 bar
- Internal working Pressure: 5 bar
- Connection: 3/8 inch quick connector
- Line Supply: 3/8" ID
- Weight without Accessories: 49.5kg
- 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 operators to communicate effectively with the bridge or to slow down the speed of the ship in case of emergency.

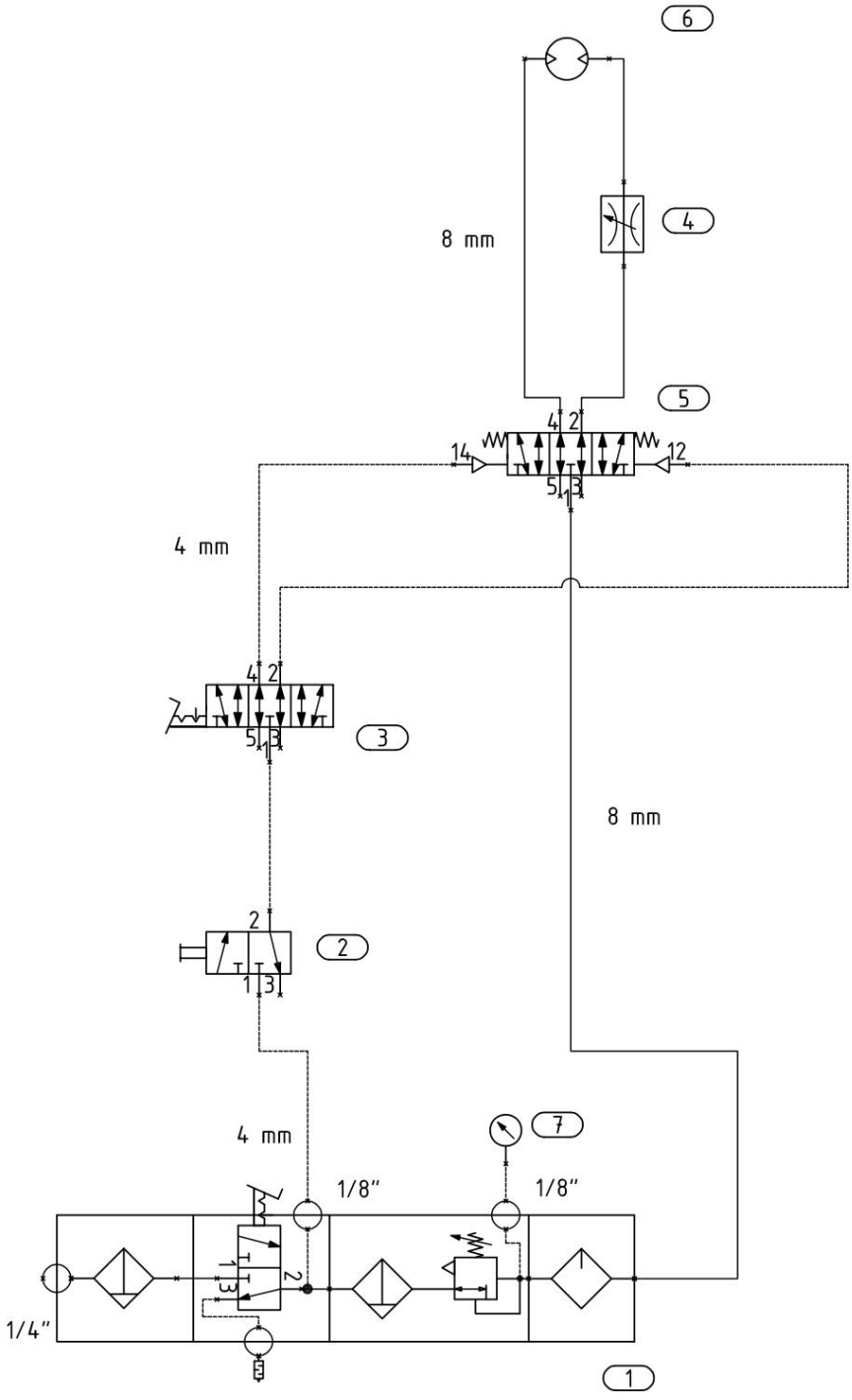
The ITCH operators should always be wearing the proper personal protective equipment (PPE) in with policy for the respective vessel. Shipshave recommends coverall; safety boots; safety helmet; safety glass and gloves. A high visibility and buoyancy vest if working near shipside.

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.

For prolonged operation use a collection tray to catch any oil that may drip onto the 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 and rope in general. 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 hands or other extremities.

3. Piping and Instrumentation (PID) Diagram



Pos. Item	Artikkelnummer Article number	Ant. Quant.	Navn Description
7	N/A	1	Pressure gauge Customer supply
6	VS4B14DP6QFB434	1	Globe VS4 with 1:434 gear Globe air motors
5	PNV 36 PNS OC	1	Directional control valve 1/4" Metal Work
4	Z30E90A3002	1	Flow controller 1/4" Metal Work
3	MAV 26 LEO OC	1	Directional control valve 1/8" Metal work
2	VRM 065 R	1	EM-stop valve Metal work
1	803586	1	FRL acc. to partslist Metal work

Fig.1: PID Diagram

4. Operating Instructions

Setup and Installation: Ensure secure attachment to a strong point, of 2T or more SWL such as a bollard, using a single rope. Place the winch directed towards the rope exit point at a distance of ideally 5m or more from the winch drum to the first contact point of the rope 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 an upward angle of the rope from the winch to the first contact point so that the winch is not lifted with tension in the rope. While operating, the winch angle towards the exit point may be adjusted to optimize spooling.

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

Before initial use, take measures to ensure that the robot does not reach within safe distance from the propeller by:

- shorten the rope length to limit the robot's extension and prevent it from reaching the even if the rope is fully unspooled.
- Measure and mark the rope length and observe closely during unspooling to turn winch direction at desired length of released rope.
- Tie in rope on drum flange using supplied rope length, this will ensure the winch changes pulling direction "automatically"

Before connecting Air supply: Before connecting the air supply to the air winch, ensure the ship's hose is drained of water and debris. Supplied with the winch is a female quick coupler *(See Figure 3)* a 3/8" air hose must be used to connect to the winch.

Fig.3: Images showing the 3/8th quick connector to be mounted on the air hose.

Before each time the hose will be connected to the winch, it is important to drain the hose to make sure to get rid of any condensed water and debris inside the hose. To drain the hose of water and debris, it must be temporarily connected to the supplied male connector with a ball-valve. *(See Figure 3)*

Connect the hose that will be used to drive the winch to this connector/ball valve, then gradually open the valve. Allow the air to flow out to atmosphere until you observe that no water or foreign particles come out of the hose. *(Figure 4)*

Close the valve, disconnect the male connector. Ensure you hold the male connector securely while disconnecting.

Figure 4: Opening connector/ball valve

Figure 5: Disconnecting male connector

Now you can connect the hose to the winch. *(See Figure 5)*

Connect Air Supply: To connect the air supply to the winch, identify the male quick connector located on the inlet filter. Make sure the main valve on the FRL is closed, then connect. ***See maintenance guidelines*** for more details.

Figure 6: Male quick connector located on the inlet filter

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

1. Locate Air Inlet Valve: Make sure the winch is in neutral, then turn ON the main air inlet valve, positioned near the air inlet of the winch. Ensure that the supply line is fully opened to allow a steady flow of compressed air to the air 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.

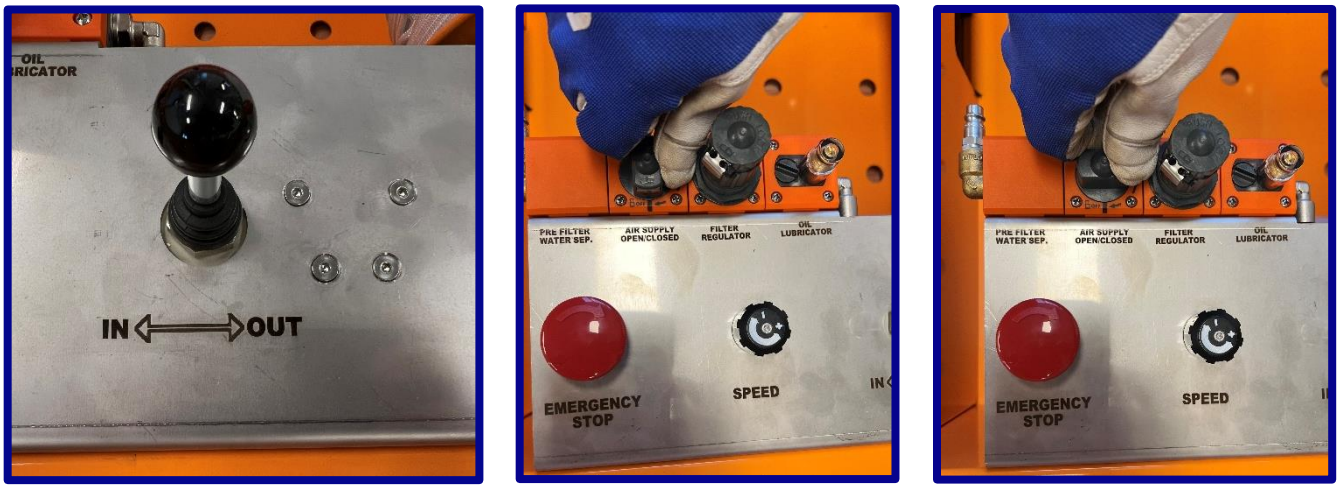


Fig.7: Images showing turning ON the main air inlet valve.

Warning: 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.8: Images showing releasing of emergency stop switch.

Warning: 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.

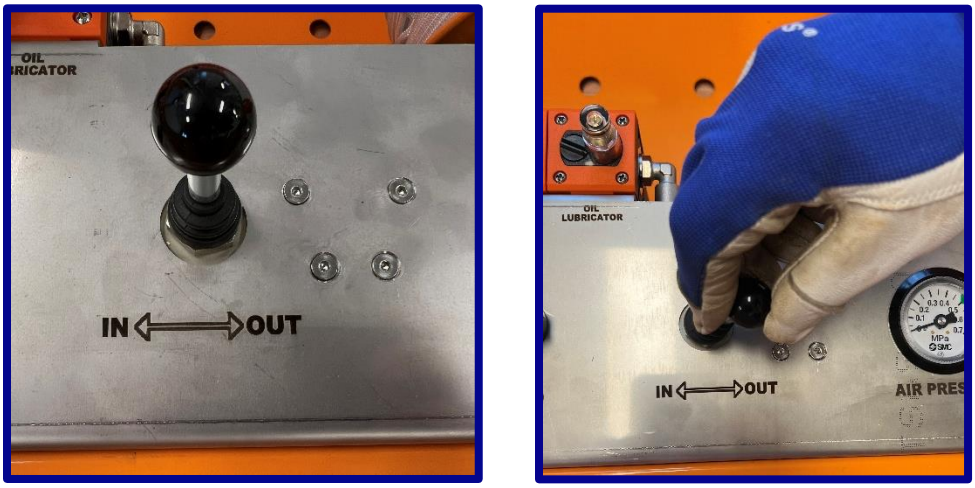


Fig.9: Control lever on the winch for spool in and out.

2. **Stepless Speed Control:** The air winch's stepless speed control allows for adjustment of the winch speed between 1.2 m/min and a maximum of 6 m/min, though the minimum speed can vary depending on the load. For cleaning operations, the recommended speed is always the lowest speed the winch can handle with a given load, which is 1.2 (m/min).

Fig.10: Speed control knob on the winch.

Time for One rotation of drum (sec)	Speed (m/min)	Use
7	6	Deployment & Retrieval
13	4	
26	2	Maximum Normal Recommended Operation Speed
43	1.2	Minimum Operation Speed

Tab.1: Speed control guidance.

3. **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 5 bar and should not be adjusted. Modifying the pressure beyond the specified limit can lead to hazards or damage.

Fig.11: The manometer and the pressure regulator.

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

Fig.12: Image showing emergency stop switch.

Load Handling: After the robot has started diving on launch, we recommend setting the speed to 1.2 (m/min). For the return when direction is reversed to spooling in, the resistance may increase somewhat, and it may be necessary to slightly adjust the speed button out to maintain robot speed.

When spooling in and the robot is at its deepest point in the operation, the resistance increases, and you may experience the winch stalling. This is normal and it will start again when the load decreases as it approaches the upper height of the dive.

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.

Fig.13: Colored core of rope. Cut or replace if visible.

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:** Test drive the engine and check for noises, check that the lubricator emits drops of oil. To check that there is the right amount of lubrication: Set the drive valve to out and adjust the drum speed to approx. 1.2 (m/min). The lubricator should then release approx. 2 drops per minute at this speed. Then adjust up to up to max speed. Then there should be about 6 drops +/- per minute.

Fig.14: Opening the lubricator section and filling lubricant.

***Warning:** Do not open unless the air supply is disconnected and winch is depressurized*

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 filter unit: The filter unit is positioned as the first section on the filter regulator unit (FRL).

Fig.15: Drainage point below the filter unit pos 1 and filter/regulator unit pos 3.

b) Identify the drainage point: Underneath the filter and regulator/filter unit (Pos 1 and 3) For the most part this is self-draining, but sometimes it needs to be drained manually…

Draining: Depressurize the air winch before proceeding. Open the drainage valve located under the filter housings. 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.

This winch is equipped with 2 filters, where filter pos 1 is slightly coarser. The idea is that it is this filter that will be changed/cleaned as a regular service interval. Filter under the regulator; pos3 has finer filtration and will not need to be replaced if service on filter pos 1 is carried out regularly.

Cleaning and Storage: Clean the winch with fresh water 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: No Response from Lever

Possible Causes:

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

Solutions:

- Inspect and clean filters.
- 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