# TIDYNE INC.

Advanced engineering solutions.

# Lift / Lower Plan

Application-Specific Pre-Lift Plans
Pilot Transfer Fall-Arrest · Emergency Evacuation · Confined Space · General Rescue

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## How to Use This Plan

This document is the controlled pre-lift hazard assessment and authorization record for every lift and lower operation conducted with a TIDYNE unit. It is mandatory: no personnel hoist, no critical lift, and no emergency response following a stand-down shall be initiated until a plan has been completed, reviewed, and signed by the responsible personnel below. The plan shall be retained on file as part of the vessel's safety management system and the TIDYNE unit's OEM-certified service record.

### Required Signatures

- **Operator** — directly controls the TIDYNE unit; TIDYNE OEM-certified.
- **Supervisor / Lift Director** — owns the plan, sequences crew, calls abort; TIDYNE OEM-certified.
- **Competent Person** — independently verifies rigging, anchor, and unit condition; TIDYNE OEM-certified.

### When a Plan Is Mandatory

- Every personnel hoist or lower, without exception.
- Every critical lift — overhead-of-personnel work, lifts above 75% of WLL, tandem lifts, or lifts over water in adverse conditions.
- Every emergency response immediately following a stand-down, fault recovery, or power-loss event, and the first lift of a shift or after any change of operator or sea state category.

### Standards Referenced

ASME B30.7 (base mounted drum hoists), ASME B30.23 (personnel lifting platforms), OSHA 29 CFR 1926.1431 (hoisting personnel), OSHA 29 CFR 1910.146 (permit-required confined spaces), SOLAS Chapter V Regulation 23 (pilot transfer arrangements), IMO LSA Code (life-saving appliances), the Lloyd's Register Code for Lifting Appliances in a Marine Environment (LR-CO-001) — whose scope explicitly covers handling/transfer of personnel on ships and under which the TIDYNE unit is in the process of pursuing classification — and the TIDYNE Operator's Manual (TDY-MAN-WCH-001). For Canadian operations these map to the Canada Labour Code Part II, the Maritime Occupational Health and Safety Regulations (SOR/2010-120), CSA Z259 (fall protection), CSA Z1006 (confined spaces), and CSA Z460 (hazardous-energy control); where two standards apply, the more stringent governs.

**CLASSIFICATION IN PROGRESS**

### Lloyd's Register Classification — In Progress

The TIDYNE unit is **in the process of pursuing classification** under the **Lloyd's Register Code for Lifting Appliances in a Marine Environment (LR-CO-001)**, whose scope explicitly covers the handling and transfer of personnel on ships. This equipment and its supporting documentation are engineered to this code; formal Lloyd's Register classification is being actively progressed with the class society.

### Common Pre-Lift Checklist

Applies to all four plans (A–D). Complete before the application-specific section.

| # | Pre-Lift Item | Acceptance Criteria | OK |
|---|---|---|---|
| 1 | Equipment ID / serial | TIDYNE unit S/N recorded; matches commissioning sheet. | ☐ |
| 2 | WLL vs planned load | Load ≤ 400 lb (180 kg) cargo limit; personnel hoisting (crane-suspended) ≤ 200 lb (90 kg) = 50% of rated [1926.1431(d)(1)]; de-rated for reeving and dynamics. | ☐ |
| 3 | Weather / sea state | Within published operating envelope; vessel motion logged. | ☐ |

| | | | |
|---|---|---|---|
| 4 | Rigging inspection | Wire rope, hook, latch, shackles inspected by competent person. | ☐ |
| 5 | Anchor structure | Boom, jib, king post, or pad eye rated ≥ 2× load and inspected. | ☐ |
| 6 | Communication plan | Hand signals or radio confirmed; call-signs assigned. | ☐ |
| 7 | Exclusion zone | Drop and snap-back zones barricaded; non-essential personnel clear. | ☐ |
| 8 | Brake / E-Stop function | B1/B2/B3 verified; E-Stop latches; Home retained on E-Stop. | ☐ |
| 9 | Battery / Home | 48 V pack SOC adequate for full mission profile; Home routine completed. | ☐ |
| 10 | Emergency action plan | Power-loss recovery (alternating Up / Home) briefed; permits attached (confined space, hot work) as required. | ☐ |

# Plan A — Pilot Transfer Fall-Arrest & Rescue Support

**Scenario.** The TIDYNE unit does not deploy or retrieve the pilot ladder. The ladder is rigged and tended by the crew in the conventional manner per SOLAS Ch. V Reg. 23. The TIDYNE unit is positioned at the pilot station as a dedicated fall-arrest and rescue appliance: the pilot climbs up or down the ladder connected to the TIDYNE wire rope via a rescue harness and lanyard, and if the pilot loses contact with the ladder — due to swell, ladder failure, loss of grip, or pilot-boat surge — the TIDYNE unit arrests the fall and prevents impact with the water or the deck of the pilot boat, then controllably lifts the pilot to a safe recovery position.

## Step-by-Step Procedure

1. Brief the pilot vessel and bridge on transfer side, freeboard, and pilot harness arrangement.
2. Confirm vessel speed, heading, and lee side per SOLAS Ch. V Reg. 23 and Master's pilot card.
3. Mount the TIDYNE unit at the pilot station directly above the rigged ladder; verify clamp seating, fairlead alignment, and clear fall path to both the water and the pilot boat deck.
4. Press the Home button; allow Home routine to complete before any rope movement.
5. Function-test Up, Down, and E-Stop with no load; confirm E-Stop retains Home state.
6. Confirm the pilot's rescue harness is rated, in date, and correctly donned; attach the TIDYNE hook to the harness dorsal-D via approved lanyard before the pilot steps onto the ladder.
7. Pay out wire rope to track the pilot's descent or take in to track the ascent — keep the line lightly tensioned with no slack and no upward pull on the pilot.
8. Maintain visual contact and radio comms with the pilot boat coxswain and the climbing pilot throughout the transfer.
9. If the pilot loses contact with the ladder, the TIDYNE unit arrests the fall automatically (B1/B2/B3 brakes); the operator then commands a controlled lift to bring the pilot back to deck or up clear of the pilot boat.
10. Once the pilot is safely aboard either vessel and has disconnected from the lanyard, return the TIDYNE unit to Home and stow.
11. Log the cycle (standby, any arrest event, and any controlled lift) and complete the debrief on the sign-off sheet.

## Application-Specific Hazards & Controls

| Hazard | Control |
|---|---|
| Pilot loses contact with ladder mid-transfer | TIDYNE unit on continuous standby with light line tension; B1/B2/B3 brakes arrest the fall automatically; controlled lift commanded by operator. |
| Slack line allows free-fall distance before arrest | Operator tracks pilot movement continuously — pay out on descent, take in on ascent; no slack permitted while pilot is on the ladder. |
| Inadvertent upward pull on the pilot during climb | Operator never commands Up while the pilot is climbing under their own power; rope follows the pilot, the pilot does not follow the rope. |
| Pilot boat surge causing harness shock load | Coordinate with coxswain via radio; pause climb during heavy surge; TIDYNE programmable rate limits arrest deceleration. |
| Cross-wind or ladder swing | Choose lee side; abort transfer if relative wind exceeds operating envelope; observer at rail for swing warning. |
| Wire rope fouling on hull, ladder, or pilot boat | Maintain fleet angle ≤ 4°; fairlead inspected pre-transfer; clear fall path verified before pilot steps onto ladder. |

## Communication & Signal Protocol

Primary channel VHF working frequency between bridge, pilot station, and pilot boat. Dedicated voice channel between the TIDYNE operator and the climbing pilot. Single agreed STOP word arrests all motion immediately. Operator confirms 'standby ready' before pilot leaves either vessel.

## Abort Criteria

- Pilot or coxswain calls STOP, or radio comms with the climbing pilot are lost.
- Sea state exceeds the agreed operating envelope or vessel motion becomes unpredictable.
- Any TIDYNE telemetry anomaly: overspeed, brake fault, battery undervoltage, or encoder error.
- Any rescue-harness, lanyard, or pilot-ladder defect identified before or during the transfer.

**Plan A sign-off:** Operator _____ Supervisor _____ Competent Person _____ Date _____

# Plan B — Life-Saving & Emergency Evacuation

**Scenario.** Rapid, dual-certified lowering and hoisting of personnel for emergency evacuation from vessels, offshore platforms, and elevated structures where conventional means are unavailable or compromised. The TIDYNE unit is self-contained on 48 V battery with onboard backup — no vessel power tie-in required.

## Step-by-Step Procedure

1. On alarm, retrieve the pre-staged TIDYNE unit; confirm SOC adequate; transit to point of need.
2. Identify a rated mounting structure (boom, jib, king post, pad eye) within reach of casualty.
3. Clamp-mount the TIDYNE unit; visually verify bracket seating and locking.
4. Press Home; wait for Home routine to complete before any motion.
5. Rig certified personnel harness or rescue stirrup to the hook; close and verify latch.
6. Function-test Up / Down / E-Stop with no person attached.
7. Lower harness to casualty; instruct or assist with donning; confirm secure attachment.
8. Hoist or lower under controlled programmed speed; maintain voice contact with casualty.
9. On power loss, use manual brake release with alternating Up / Home recovery per Operator's Manual.
10. Land casualty at muster point; do not release until line is slack and casualty is stable.
11. Hand over to medical responders; log cycle, faults, and any anomalies on the sign-off sheet.

## Application-Specific Hazards & Controls

| Hazard | Control |
|---|---|
| Power loss mid-evacuation | Onboard battery backup and manual brake release; alternating Up / Home recovery briefed. |
| Casualty incapacitation in harness | Stirrup or full-body harness sized to casualty; attendant escorts where possible. |
| Pendulum swing on long descent | Tag line on harness; control descent speed; stage observers at intermediate level. |
| Anchor structure overload | Competent person confirms rated ≥ 2× load; dynamic factor allowance. |
| Hot environment / fire proximity | Pre-plan an alternate evacuation route; do not run rope through smoke or flame. |

## Communication & Signal Protocol

Two-way radio between operator, lift director, and muster point. STOP overrides all other traffic. Hand signals used at the operator station within line of sight. Casualty is briefed on what to expect before motion begins where condition permits.

## Abort Criteria

- TIDYNE unit telemetry indicates brake fault, overspeed event, or encoder loss.
- Anchor structure shows any deflection, cracking, or movement.
- Casualty becomes unresponsive in the harness and recovery cannot be safely continued.
- Fire, smoke, or flooding compromises the rope path or operator station.

**Plan B sign-off:** Operator _____ Supervisor _____ Competent Person _____ Date _____

# Plan C — Cargo Hold Access & Personnel Retrieval

**Scenario.** Controlled personnel descent into, and emergency retrieval from, cargo holds, ballast tanks, voids, and other confined or deep spaces aboard commercial vessels. The TIDYNE unit's worm gear reducer prevents free-wheeling, and the helically-grooved drum ensures even rope layering during repeated cycles.

## Step-by-Step Procedure

1. Issue a permit-required confined-space entry permit per OSHA 1910.146 before any descent.
2. Conduct atmospheric testing (O2, LEL, CO, H2S) at top, middle, and bottom of the space; record values.
3. Assign a dedicated attendant at the opening; confirm rescue plan and means of summoning aid.
4. Clamp-mount the TIDYNE unit to the hatch coaming, king post, or rated temporary rigging point.
5. Press Home; verify Home routine completes before any motion in the space.
6. Confirm drum rope capacity exceeds planned depth plus 5 dead wraps; verify two-block prevention margin.
7. Rig full-body harness and dedicated retrieval line to the entrant; second independent fall arrest where required.
8. Function-test Up / Down / E-Stop; verify communication with entrant.
9. Lower entrant at programmed speed; pause at each atmospheric re-test interval; log encoder depth.
10. Maintain continuous attendant communication; on any alarm, retrieve entrant under power without delay.
11. After exit, repeat function tests, log run hours, and review any deep-travel Home routine triggers.
12. Close confined-space permit; secure TIDYNE unit; complete debrief.

## Application-Specific Hazards & Controls

| Hazard | Control |
|---|---|
| Atmospheric hazard (O2 / LEL / toxic) | Pre-entry and continuous monitoring; abort and ventilate on any excursion. |
| Entrant incapacitation | Dedicated retrieval line on the TIDYNE unit; attendant initiates non-entry rescue. |
| Two-blocking on shallow geometry | Confirm headroom and limit margin during pre-lift; do not run to hard stop. |
| Drum capacity vs depth | Verify rope length ≥ depth plus 5 dead wraps; reject lift if insufficient. |
| Deep-travel motor heating | Respect Home routine and duty-cycle guidance; allow cooldown between cycles. |
| Falling object into the hold | Tool tethers; barricade at opening; observer prevents drop hazard. |

## Communication & Signal Protocol

Hard-wired or intrinsically safe radio between entrant, attendant, and operator. Three-line check-in cadence at fixed intervals. STOP from attendant triggers immediate retrieval. Hand signals only as backup at the opening.

## Abort Criteria

- Any atmospheric reading exits the permit envelope.
- Entrant fails a scheduled check-in or reports symptoms (dizziness, vision change, taste, odor).
- TIDYNE unit reports brake fault, overspeed, or loses encoder feedback during travel.
- Attendant loses positive communication for more than the agreed interval.

**Plan C sign-off:** Operator _____ Supervisor _____ Competent Person _____ Date _____

# Plan D — General Emergency Rescue Operations

**Scenario.** Versatile, rapidly deployed rescue capability across maritime scenarios — man-overboard recovery, rescue at height from masts and cranes, and recovery from elevated work platforms. The TIDYNE unit's portable, clamp-mounted design lets the responder mobilize the equipment to the emergency.

## Step-by-Step Procedure

1. On alarm, designate Lift Director; retrieve TIDYNE unit and rescue rigging from staged locker.
2. Determine scenario: man-overboard, rescue at height, or platform recovery; select mounting point.
3. Transit to the nearest rated boom, jib arm, king post, or pad eye that reaches the casualty.
4. Clamp-mount the TIDYNE unit; verify bracket seating and locking; confirm anchor rating.
5. Press Home; confirm Home routine completes before motion.
6. Rig appropriate device: rescue harness, recovery sling, or stretcher bridle; close and verify latches.
7. Function-test Up / Down / E-Stop without load; set programmable speed to scenario.
8. Deploy to casualty; for man-overboard, coordinate with helm to maintain lee position.
9. Secure casualty; confirm harness or sling attachment; brief on motion before lifting.
10. Recover at controlled speed; mind vessel motion, swell timing, and snap-back zone.
11. Land casualty at safe receiving area; do not release rope tension until casualty is stable.
12. Demobilize TIDYNE unit, log cycle and any faults, and complete post-incident debrief.

## Application-Specific Hazards & Controls

| Hazard | Control |
|---|---|
| Casualty in water (hypothermia, surge) | Pre-attached recovery sling; helm holds lee; minimize time on rope. |
| Rescue at height — falling object | Tool tethers; exclusion zone below; observer assigned. |
| Vessel roll inducing pendulum | Tag line; time motion to swell; abort if motion exceeds envelope. |
| Improvised anchor structure | Competent person confirms rated ≥ 2× load before mounting. |
| Operator fatigue in extended response | Operator rotation; Lift Director enforces relief intervals. |

## Communication & Signal Protocol

Vessel-wide PA for muster; dedicated VHF channel for rescue team. STOP overrides all traffic. Lift Director is the only voice cleared to authorize motion. Hand signals supplement at the mount point.

## Abort Criteria

- TIDYNE unit reports any brake, encoder, or overspeed fault during recovery.
- Anchor structure shows movement, deflection, or any visible damage.
- Sea state, vessel motion, or weather deteriorates beyond agreed envelope.
- Casualty condition deteriorates and a safer recovery method becomes available.

**Plan D sign-off:** Operator _____ Supervisor _____ Competent Person _____ Date _____

# Sign-Off & Authorization

This page is the controlled record of authorization for the lift / lower operation described in the application-specific plan above. All signing personnel are TIDYNE OEM-certified for the duties they perform. Retain this completed page in the vessel safety management system and forward a copy to the TIDYNE OEM-certified service record for the unit.

## Operation Identification

| | |
|---|---|
| **Plan ID** | TDY-PLN-LFT-001 · Application Plan ____ (A / B / C / D) |
| **Vessel / Site** | _____ |
| **Date** | _____ Time (start) _____ Time (end) _____ |
| **TIDYNE Unit S/N** | _____ Battery SOC at start: _____ % |
| **Lift Director** | _____ |
| **Weather / Sea** | Wind: _____ Sea state: _____ Visibility: _____ |

## Authorized Personnel

| Role (TIDYNE OEM-certified) | Printed Name | Signature | Date |
|---|---|---|---|
| Operator | _____ | _____ | _____ |
| Supervisor / Lift Director | _____ | _____ | _____ |
| Competent Person | _____ | _____ | _____ |
| Witness (optional) | _____ | _____ | _____ |

## Post-Job Debrief

Anomalies observed during the lift:

_____

_____

Near-misses, deviations from plan, or aborted attempts:

_____

_____

Equipment condition (wire rope, brake response, telemetry, battery, mounting hardware):

_____

_____

## Filing Requirement

Retain this completed plan on file with the vessel safety management system and the TIDYNE unit's OEM-certified service / certification record. Any anomaly, near-miss, or fault recorded above shall be reported to TIDYNE OEM-certified service within 24 hours and the unit removed from service until cleared for return by a TIDYNE OEM-certified technician or engineer.