

TIDYNE INC.

Advanced engineering solutions.

Operator Training Manual

Step-by-Step Course for Certified Operators

Self-Contained 48 V Electric Personnel & Cargo Winch
Delivered exclusively by TIDYNE OEM-certified trainers.

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Table of Contents

A step-by-step training course for safe, competent operation of the TIDYNE unit. Delivered exclusively by TIDYNE OEM-certified trainers.

Ch.	Section	Page
1	Course Overview & Learning Objectives	3
2	Trainee Prerequisites & Course Delivery	4
3	Module 1 — TIDYNE System Familiarization	5
4	Module 2 — Pre-Operation Inspection	7
5	Module 3 — Power-On & Homing Procedure	9
6	Module 4 — Normal Lift Operation	10
7	Module 5 — Normal Lower Operation	12
8	Module 6 — E-Stop & Emergency Response	13
9	Module 7 — Triple-Redundant Brake Awareness	15
10	Module 8 — Personnel Hoisting Procedure	16
11	Module 9 — Application Scenarios	18
12	Module 10 — Smart Winch Telemetry & Anomaly Alerts	20
13	Module 11 — Pre-Use vs OEM-Certified Service Boundary	21
14	Module 12 — Lockout / Tagout & Hazard Control	22
15	Module 13 — Communication, Hand Signals & Lift Planning	23
16	Hands-On Practical Assessment	24
17	Written Knowledge Assessment	25
18	Certification, Re-Training Cadence & Recordkeeping	27
A	Glossary	28
B	Trainer Sign-Off Sheet	29
C	Contact & Support	30

1. Course Overview & Learning Objectives

This training manual is the authoritative step-by-step course for operators of the TIDYNE unit — a self-contained 48 V DC electric marine winch dual-certified for lifting and lowering of both personnel and cargo. Successful completion of this course is the minimum requirement for an individual to be designated a certified TIDYNE operator on a vessel or offshore installation.

The course is delivered exclusively by TIDYNE OEM-certified trainers and combines classroom theory, supervised hands-on practice, and structured assessment. The TIDYNE unit is human-rated equipment — every procedure in this course must be practiced under direct trainer supervision until competency is demonstrated.

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.

1.1 Learning Objectives

On successful completion, the trainee will be able to:

- Identify all major components, controls, and nameplate data of the TIDYNE unit.
- Perform a complete pre-operation inspection and sign off the inspection log.
- Execute the Power-On and Homing procedure consistently across at least five cycles.
- Conduct normal lift and lower operations for both cargo and personnel loads.
- Recognise and respond correctly to E-Stop, overspeed, power-loss, and solenoid-failure scenarios.
- Explain the triple-redundant brake architecture (B1 / B2 / B3) plus centrifugal overspeed brake.
- Apply application-specific procedures for pilot transfer, evacuation, cargo hold access, and rescue.
- Interpret Smart Winch telemetry and respond appropriately to anomaly alerts.
- Distinguish operator-permitted tasks from tasks reserved for TIDYNE OEM-certified technicians and engineers.
- Implement lockout/tagout, hazard controls, hand signals, and written lift-plan documentation.

1.2 Course Structure

The course is organized into 13 sequential modules followed by a hands-on practical assessment and a written knowledge assessment. Trainees must pass both assessments before being signed off as a certified TIDYNE operator.

Phase	Content	Minimum Hours
Phase 1	Classroom theory (Modules 1–2, 7, 11–13)	4 hours
Phase 2	Supervised hands-on practice (Modules 3–6, 8–10)	4 hours
Phase 3	Practical and written assessments	3 hours
Total	Initial certification course duration	11 hours minimum

2. Trainee Prerequisites & Course Delivery

2.1 Trainee Prerequisites

Before being admitted to a TIDYNE operator training course, the candidate must satisfy each of the following prerequisites. These are minimums — a vessel operator or flag administration may impose additional requirements.

- Minimum age 18 years; fit for offshore or shipboard work per company medical policy.
- Documented competence with general marine deck operations and basic rigging.
- Functional command of the language in which the course is delivered (English by default).
- Familiarity with the vessel-specific lift-plan and permit-to-work process.
- No safety-critical disciplinary action within the previous 12 months.
- Personal PPE issued and inspected: hard hat, eye protection, marine-grade gloves, fall-protection harness rated for the work, steel-toed footwear, high-visibility vest, and PFD where required.

2.2 OEM-Certified Trainer Requirement

OEM-Certified Delivery Only

This course may be delivered only by a TIDYNE OEM-certified trainer. Any inspection, repair, maintenance, testing, or service of the TIDYNE unit performed during training must be carried out by a TIDYNE OEM-certified technician or engineer. Operators completing this course are certified to operate the TIDYNE unit — they are not authorised to perform component-level service.

The OEM-certified trainer is responsible for confirming trainee prerequisites, controlling the training environment, supervising every live evolution, documenting each module sign-off, and recommending the trainee for or against certification.

2.3 Course Delivery Format

Element	Requirement
Trainer ratio	No more than 4 trainees per OEM-certified trainer for hands-on phases.
Training unit	A serial-numbered TIDYNE unit with a current commissioning sheet and valid annual inspection.
Environment	Controlled training rig with safe lifting headroom, certified load weights, and a clear deck area.
Language	English by default; alternate languages by prior arrangement with TIDYNE Inc.
Records	Module sign-offs, assessment scores, and certificates retained for a minimum of 5 years.
Re-training	Annual refresher mandatory — see Chapter 18.

2.4 PPE Required for Hands-On Phases

- Hard hat to current EN / ANSI standard.
- Impact-rated eye protection.
- Marine-grade cut-resistant gloves.
- Steel- or composite-toed footwear.
- Full-body fall-protection harness when working at height or over the side.
- PFD (personal flotation device) when working over water.
- Hearing protection in machinery spaces.

3. Module 1 — TIDYNE System Familiarization

Module 1 establishes a shared vocabulary and component map. The trainee must be able to point to and name every item below on a physical TIDYNE unit before advancing to Module 2.

3.1 Published Specifications

Working Load Limit	400 lb / 180 kg (personnel and cargo, dual-certified)
Rated Speed	~193 FPM / 3.2 FPS / 0.98 m/s
Reference Descent	45 ft in approximately 14 seconds
Power Supply	Self-contained 48 V DC battery with onboard backup
Drive Motor	1 kW servo motor with electronic, programmable drive
Position Sensing	Absolute encoder with Home reference
Drum	Helically-grooved wire rope drum
Final Drive	Heavy-duty nickel-plated chain and sprocket
Braking	Triple-redundant (B1 motor torque, B2 worm gear, B3 gravity brake) plus automatic centrifugal overspeed brake
Certification	Personnel + cargo (human-rated)
Monitoring	Real-time telemetry with anomaly detection

3.2 Anatomy Walk-Around

Under trainer supervision, the trainee performs a 360° walk-around of the TIDYNE unit and identifies each of the following.

#	Component	What the Operator Needs to Know
1	Mounting bracket	Clamps to booms, jib arms, king posts, and pad eyes — no permanent hull modification.
2	Drum & wire rope	Helically-grooved drum ensures even rope layering; minimum dead turns must always remain.
3	Chain & sprocket	Nickel-plated final reduction drive — visual inspection only by the operator.
4	Gear reducer	Low-ratio worm gear; inherently self-locking (this is brake B2).
5	Servo motor	1 kW; provides electronic torque-controlled braking (B1).
6	Emergency gravity brake	Normally-engaged brake on the drum shaft (B3) — fail-safe.
7	Centrifugal brake	Automatic overspeed brake on the worm shaft.
8	Brake release lever	Manual lever to release B3 for controlled centrifugal descent in a power-loss scenario.
9	Control enclosure	Houses Up / Down / E-Stop. Home button on the underside.
10	Nameplate	Serial number, WLL, rated speed, manufacture date. Always verify before each shift.
11	Commissioning sheet	Unit-specific configuration shipped with each winch. Must remain on file.
12	Battery & charger	Self-contained 48 V battery; 110 V charger included for top-up.

3. Module 1 — System Familiarization (cont.)

3.3 The Four Operator Controls

Control	Location	Function
Up	Control enclosure face	Commands the drum to wind in. Releasing the button stops motion and engages brakes.
Down	Control enclosure face	Commands a regulated descent. Releasing the button cuts solenoid power; B3 engages immediately.
Home	Underside of control enclosure	Sets / restores the absolute encoder reference. Required at first power-on each shift.
E-Stop	Control enclosure face (red mushroom)	Cuts solenoid power, engages B3. The Home position is retained through an E-Stop event.

3.4 Nameplate & Commissioning Sheet

The trainee will be given a sample nameplate photograph and a sample commissioning sheet and must, without assistance, read out the serial number, WLL, rated speed, manufacture date, latest annual inspection date, and confirm that the TIDYNE unit is presently in-service. Any of these fields being absent, illegible, or out of date means the TIDYNE unit is out-of-service until cleared by a TIDYNE OEM-certified technician.

3.5 Module 1 Sign-Off Criteria

- Trainee can name every component in §3.2 from memory on a physical unit.
- Trainee can describe the function of Up / Down / Home / E-Stop without prompting.
- Trainee can locate and read all nameplate and commissioning data.
- Trainee verbally confirms the OEM-certified service boundary (operator vs. technician).

4. Module 2 — Pre-Operation Inspection

Module 2 trains and verifies the operator pre-operation inspection routine, aligned with Chapter 5 of the TIDYNE Operator's Manual. The trainee performs this inspection on the training unit and signs off the inspection log. Findings beyond the operator scope are escalated to a TIDYNE OEM-certified technician.

4.1 Pre-Operation Inspection — Numbered Procedure

1. Confirm the TIDYNE unit is the same serial-numbered unit listed on the lift plan and is in-service per its commissioning sheet and annual inspection record.
2. Inspect the mounting bracket, clamp, and host structure (boom, king post, pad eye) for cracks, deformation, corrosion, and missing fasteners. Confirm clamp torque against the commissioning sheet.
3. Verify the nameplate is legible — serial number, WLL of 400 lb / 180 kg, rated speed ~193 FPM, manufacture date, latest inspection sticker.
4. Inspect the wire rope along its full length for broken wires, kinks, birdcaging, corrosion, and reduction in diameter. Refer to ASME B30.30 criteria summarised in the operator's manual.
5. Inspect the helically-grooved drum and confirm at least the minimum dead turns of rope remain on the drum at the lowest expected hook position.
6. Inspect the nickel-plated chain and sprocket for visible wear, missing teeth, or corrosion. Do not adjust — record findings only.
7. Inspect the gear reducer for oil weeping, visible damage, or unusual marks. Do not open the housing — this is an OEM-certified-technician task only.
8. Inspect the emergency gravity brake (B3) and its solenoid actuator for visible damage, loose linkages, and proper lever return. Do not disassemble.
9. Inspect the centrifugal brake housing on the worm shaft for visible damage. Do not disassemble.
10. Inspect the control enclosure: confirm Up, Down, Home, and E-Stop buttons are intact, undamaged, and free of corrosion or moisture ingress.
11. Confirm the battery state-of-charge meets the minimum for the planned lift cycle count (10 cycles per charge typical; recharge with the supplied 110 V charger if below threshold).
12. Inspect the hook, swivel, and any rigging for cracks, deformation, latch function, and current inspection tags.
13. Confirm the work area is clear of personnel during the next step.
14. Perform a no-load functional test: power on, execute Homing per Module 3, run a short Up / Down cycle, verify smooth motion, and confirm brake engagement when buttons are released.
15. Sign and date the pre-operation inspection log. Any failed item places the TIDYNE unit out-of-service pending a TIDYNE OEM-certified technician.

Out-of-Service Means Out-of-Service

If any inspection step in §4.1 fails, tag the TIDYNE unit out-of-service, apply lockout/tagout per Module 12, and notify a TIDYNE OEM-certified technician. The operator is not authorised to repair, adjust, or override any failed item.

4. Module 2 — Pre-Operation Inspection (cont.)

4.2 Inspection Log — Trainee Sign-Off

#	Inspection Item	Pass / Fail	Trainee Initial
1	Serial number / commissioning record	■ Pass ■ Fail	_____
2	Mounting bracket & host structure	■ Pass ■ Fail	_____
3	Nameplate legibility	■ Pass ■ Fail	_____
4	Wire rope condition	■ Pass ■ Fail	_____
5	Drum dead turns	■ Pass ■ Fail	_____
6	Chain & sprocket	■ Pass ■ Fail	_____
7	Gear reducer (external only)	■ Pass ■ Fail	_____
8	Gravity brake B3 (external only)	■ Pass ■ Fail	_____
9	Centrifugal brake (external only)	■ Pass ■ Fail	_____
10	Control enclosure & buttons	■ Pass ■ Fail	_____
11	Battery state-of-charge	■ Pass ■ Fail	_____
12	Hook, swivel & rigging	■ Pass ■ Fail	_____
13	Work area clear	■ Pass ■ Fail	_____
14	No-load functional test	■ Pass ■ Fail	_____
15	Inspection log signed & dated	■ Pass ■ Fail	_____

4.3 Module 2 Sign-Off Criteria

- Trainee performs the §4.1 inspection unaided on at least two consecutive shifts.
- Trainee correctly identifies at least two trainer-introduced defects in a controlled test.
- Trainee escalates findings — never overrides them.
- OEM-certified trainer countersigns the trainee's inspection log.

5. Module 3 — Power-On & Homing Procedure

Module 3 trains the Power-On and Homing sequence. The Home function sets the absolute-encoder reference position; without it, the TIDYNE unit will only run at a reduced homing speed and cannot enter normal operation. Homing also enforces the minimum dead turns on the drum.

5.1 What "Home" Means

- Home is the encoder zero — the position from which all subsequent travel is measured.
- Until Home is set, the TIDYNE unit runs only at slow homing speed.
- The Home position is retained through an E-Stop event.
- The Home position is lost only if power is removed with the stirrup or hook in the Down position. Recovery is via the alternating Up / Home procedure (see Module 6).

5.2 Power-On & Homing — Numbered Procedure

1. Confirm the pre-operation inspection (Module 2) is complete and signed.
2. Confirm the work area below the hook is clear of personnel.
3. Confirm no load is rigged to the hook.
4. Energise the TIDYNE unit at the battery isolator.
5. Observe the control enclosure indicators come up to ready state.
6. Press and release Up briefly — the unit will move at slow homing speed only.
7. Continue to drive Up at slow speed until the hook is within a few inches of the head pulley.
8. Press the Home button on the underside of the control enclosure.
9. Verify normal speed is now enabled by a short, controlled Up / Down test.
10. Record Homing complete on the daily operator log.

5.3 Module 3 Sign-Off Criteria

- Trainee completes five (5) successful Power-On and Homing cycles in sequence with no trainer prompts.
- Trainee correctly identifies when the unit is in homing-speed-only state vs. normal-speed state.
- Trainee never bypasses the Home step and never homes with a load on the hook.

6. Module 4 — Normal Lift Operation

Module 4 trains normal lift (Up) operation. The trainee progresses from cargo loads to personnel loads only after demonstrating consistent, controlled cargo lifts. All personnel lifts require Module 8 sign-off in addition to Module 4.

6.1 Cargo Lift — Numbered Procedure

1. Confirm a current written lift plan is on station and the load weight is within the 180 kg WLL.
2. Confirm Homing is complete (Module 3) and the operator log is up to date.
3. Brief the signaller and any spotters on hand signals (Module 13).
4. Establish two-way voice communication with the landing crew or signaller.
5. Confirm the load is correctly rigged with inspected slings, shackles, and a closed hook latch.
6. Confirm tag lines are deployed where required to control swing.
7. Confirm the lift path and landing zone are clear of personnel and obstructions.
8. Sound the start-of-lift signal per vessel procedure.
9. Press Up with a gentle, increasing pressure — allow the smooth acceleration ramp to take up slack and lift the load. Do not jog the button.
10. Monitor wire rope spooling on the helically-grooved drum — it must remain even and within the drum flanges.
11. Maintain continuous communication with the signaller; respond only to the designated signaller.
12. Slow the lift in advance of the target elevation. Release Up to stop — the brakes will engage automatically.
13. Hold position only as long as necessary. Do not leave a suspended load unattended.
14. Confirm the load is landed and de-rigged before resetting for the next cycle.
15. Record the lift in the operator log, including Smart Winch telemetry observations.

6. Module 4 — Normal Lift (cont.)

6.2 Smooth Ramp Control

The TIDYNE unit uses electronic acceleration and deceleration ramps so that the load — including personnel — is never taken by surprise. The operator's responsibility is to support that behaviour: apply Up with a steady, deliberate press rather than tapping the button; release Up cleanly to allow the brakes to engage smoothly; never attempt to override or speed up the ramp.

6.3 Communication During the Lift

- Designate exactly one signaller per lift.
- Operator obeys only that signaller — except an E-Stop signal from anyone.
- Maintain continuous radio or voice contact; loss of contact stops the lift immediately.
- Confirm-back every command before executing.

6.4 Personnel Lift Progression

Personnel Lifts Require Module 8 Sign-Off

A trainee may not perform a personnel lift evolution under this module alone. Personnel lifts require Module 8 sign-off plus a written, approved lift plan, and may only be conducted under direct OEM-certified-trainer supervision until the trainee is fully certified.

6.5 Module 4 Sign-Off Criteria

- Trainee performs at least 10 cargo lifts with smooth ramp control and even drum layering.
- Trainee uses correct hand signals and maintains single-signaller discipline.
- Trainee never leaves a suspended load unattended.
- Trainee logs every lift correctly, including Smart Winch observations.

7. Module 5 — Normal Lower Operation

Module 5 trains the normal lower (Down) operation. The TIDYNE unit automatically regulates descent speed via intelligent torque and RPM adjustment. The operator's role is to authorise the descent, monitor the load and rope, and stop at the target landing.

7.1 Descent Regulation — What the Operator Sees

- Lowering speed is governed to ~193 FPM / 0.98 m/s by the drive — the operator cannot exceed this.
- Smooth start and stop ramps prevent shock loading of the personnel or cargo.
- Releasing Down cuts power to the brake solenoid; B3 engages immediately and the drum locks.
- Pressing E-Stop has the same braking effect as releasing Down, and additionally inhibits restart until the E-Stop is reset.

7.2 Normal Lower — Numbered Procedure

1. Confirm Homing is complete and the load is correctly rigged for descent.
2. Confirm the landing zone is clear and the receiving party is in position and in communication.
3. Brief the signaller and confirm the descent rate per the lift plan.
4. Sound the start-of-descent signal per vessel procedure.
5. Press Down with steady pressure — allow the drive to take up the load and start the descent. Do not jog the button.
6. Monitor wire rope condition, drum layering, and any swing; correct via tag lines or by pausing.
7. Pause as needed by releasing Down — the brakes engage automatically. Resume with steady pressure.
8. Slow well in advance of the landing by easing pressure. Release Down to stop above the landing.
9. Verify the landing zone is still clear and the receiving party is ready.
10. Resume Down for the final landing inches; release Down the instant the load is supported.
11. Confirm the load is supported by the landing or receiving structure before slackening the wire rope.
12. De-rig and record the descent in the operator log.

7.3 Module 5 Sign-Off Criteria

- Trainee performs at least 10 controlled descents with smooth ramps and accurate landings.
- Trainee correctly pauses, holds, and resumes descent on signaller command.
- Trainee never releases tension while the load is unsupported.

8. Module 6 — E-Stop & Emergency Response

Module 6 trains responses to abnormal events. Every TIDYNE unit failure mode is anticipated by design — the operator's job is to recognise the event, take the correct immediate action, and escalate to a TIDYNE OEM-certified technician before returning the unit to service.

8.1 E-Stop — Numbered Procedure

1. Strike the red E-Stop mushroom button immediately on recognising any unsafe condition or on instruction from any person on the lift team.
2. Confirm the drum is locked and motion has stopped.
3. Hold the load steady — do not attempt to restart until the cause is identified and cleared.
4. Communicate the E-Stop event to the signaller and supervisor.
5. Investigate the cause with the supervisor; if any TIDYNE unit fault is suspected, tag out per Module 12.
6. When safe, reset the E-Stop by rotating the mushroom button. Home position is retained — no re-homing is required.
7. Resume operation only after the cause is cleared and the supervisor authorises restart.

8.2 Power-Loss Recovery — Numbered Procedure

If power is lost while the stirrup or hook is in the Down position, the Home reference is lost. The recovery procedure restores the Home reference without requiring a TIDYNE OEM-certified technician.

1. Confirm power is restored at the battery isolator and the control enclosure indicators are live.
2. Confirm the load is stationary and safely held by the brakes.
3. Alternately press Up and Home in short, repeated cycles to gradually lift the stirrup.
4. Continue alternating Up and Home until the stirrup is within a few inches of the head pulley.
5. Press Home one final time to restore the absolute position reference.
6. Verify normal speed is enabled by a short Up / Down test before resuming operation.

8. Module 6 — E-Stop & Emergency Response (cont.)

8.3 Overspeed Response

An overspeed condition is detected automatically by the drum rotation speed sensor. The drive will command stop and the centrifugal brake will engage — no operator action is required to stop the descent.

1. Recognise the overspeed event from the drum braking response and the Smart Winch alert.
2. Do not attempt to reset or restart the TIDYNE unit.
3. Communicate the event to the supervisor and to the load-side party.
4. Apply lockout/tagout per Module 12.
5. Notify a TIDYNE OEM-certified technician — the unit is out-of-service pending inspection.

8.4 Solenoid Failure Behaviour

If the emergency-brake solenoid fails, the TIDYNE unit can still lift — the brake freewheels in lifting mode without requiring the solenoid. Descent under a failed solenoid is not authorised under normal operation; the unit is to be placed out-of-service for OEM-certified service after the load is safely lifted and landed.

8.5 Manual Brake Release for Controlled Centrifugal Descent

Emergency Use Only — Supervisor Authorisation Required

Manual release of the gravity brake (B3) is for power-loss emergencies in which a controlled descent is the safest course of action. Centrifugal brake B2 limits descent speed mechanically once the gravity brake is released. This procedure is to be rehearsed only on a training unit under direct OEM-certified-trainer supervision.

1. Confirm power cannot be restored within the time required for safe descent.
2. Confirm the supervisor has authorised a manual brake release.
3. Confirm the landing zone is clear and the descending party (if personnel) is briefed.
4. Take a firm position on the brake release lever — never stand under the load.
5. Progressively operate the brake release lever to initiate descent; the centrifugal brake will regulate speed automatically.
6. Monitor descent; close the lever instantly if any unsafe condition develops.
7. After landing, return the lever to its normal position and tag the TIDYNE unit out-of-service for OEM-certified inspection.

8.6 Module 6 Sign-Off Criteria

- Trainee demonstrates a correct E-Stop response within 1 second of cue.
- Trainee executes a complete simulated power-loss recovery using the alternating Up / Home procedure.
- Trainee verbally describes the overspeed response and the solenoid-failure behaviour.
- Trainee demonstrates the manual brake release procedure on a training unit only.

9. Module 7 — Triple-Redundant Brake Awareness

Module 7 is awareness only. The operator must understand the architecture of the TIDYNE unit braking system, but brake service, adjustment, and testing are reserved for TIDYNE OEM-certified technicians and engineers.

9.1 The Three Independent Brakes

Brake	Name	Location	Activation	What the Operator Should Know
B1	Motor Torque Control	Servo motor	Continuous, electronic	Governs descent speed via regenerative torque. Smooth, electronically controlled.
B2	High-Ratio Worm Gear	Gear reducer	Inherent — self-locking geometry	Mechanically prevents the load from backdriving the motor, even with zero power.
B3	Emergency Gravity Brake	Drum shaft	Normally engaged; released electromagnetically during lifting	Fail-safe. Any power loss closes it instantly. Manual release lever is for emergencies only.

Any one of B1, B2, or B3 can hold the full rated load on its own. The TIDYNE unit also has an automatic centrifugal overspeed brake on the worm shaft that activates without operator input if descent speed exceeds the design limit.

9.2 What the Operator May Do

- Visually inspect the external condition of B3 and the solenoid linkage during pre-operation inspection.
- Observe correct brake engagement during the no-load functional test.
- Operate the manual brake release lever only in a sanctioned emergency under supervisor authorisation.
- Record brake engagement status as reported by the Smart Winch telemetry.

9.3 What Requires a TIDYNE OEM-Certified Technician

- Any disassembly, adjustment, or replacement of B1, B2, B3, or the centrifugal brake.
- Solenoid replacement, lever calibration, or linkage adjustment.
- Periodic brake load testing and certification.
- Investigation of any brake-related Smart Winch anomaly.

9.4 Module 7 Sign-Off Criteria

- Trainee verbally explains B1, B2, B3, and the centrifugal brake.
- Trainee correctly distinguishes operator-permitted tasks from OEM-certified-technician tasks.

10. Module 8 — Personnel Hoisting Procedure

Module 8 trains personnel hoisting — the highest-consequence use of the TIDYNE unit. The TIDYNE unit is dual-certified for both lifting and lowering of personnel; this distinction places elevated responsibility on the operator. Personnel hoists may only be conducted with an approved written lift plan and under conditions specified in that plan.

10.1 Pre-Hoist Requirements

- Written lift plan approved by the lift supervisor, with hoist purpose, route, load, sea state limits, communications, and abort criteria.
- Confirmation that the TIDYNE unit is current on annual inspection and all Module 2 items pass.
- Briefing of the rider, signaller, and standby rescue team — every party confirms their role aloud.
- Inspection of the personnel stirrup, harness, and connecting hardware to current standard with valid in-date tags.
- Confirmation that two-way voice communication is established and tested between operator, rider, and signaller.
- Sea state and environmental conditions within the limits stated in the lift plan.

10.2 Personnel Hoist — Numbered Procedure

1. Confirm the lift plan is signed and present at the operator station.
2. Confirm Homing is complete and the no-load functional test has been performed this shift.
3. Confirm the rider is correctly harnessed and clipped to the stirrup, with secondary attachment as required by the lift plan.
4. Confirm "ready" verbally from the rider, the signaller, and the standby rescue team.
5. Authorise the start-of-hoist signal and announce the start over communications.
6. Initiate the lift with steady Up pressure — let the ramp profile do the work; never jog the button.
7. Maintain continuous communication; halt motion immediately on any "stop" call from any party.
8. Monitor wire rope condition, drum layering, swing, and the Smart Winch telemetry throughout.
9. Manage swing by pausing motion and allowing the rider or tag-line crew to dampen it before resuming.
10. Slow well in advance of the target elevation. Release Up to stop above the landing.
11. Confirm landing party is ready; resume Up or Down as needed for final positioning.
12. Release the button at the instant the rider is supported by the landing structure or deck.
13. Disconnect only after the rider confirms "off the wire" verbally.
14. Log the hoist, including telemetry observations, sea state, and any anomalies.

10. Module 8 — Personnel Hoisting (cont.)

10.3 Sea State & Environmental Considerations

For pilot transfer, evacuation, or any over-water personnel evolution, the operator must reassess sea state, wind, vessel motion, and visibility immediately before each hoist. The lift plan governs the upper limits; the operator and supervisor jointly hold the authority — and the duty — to abort when conditions exceed those limits.

10.4 SOLAS & Personnel Transfer Context

The TIDYNE unit supports SOLAS-compliant pilot ladder and deck operations and is compatible with personnel transfer requirements for crew evacuation, pilot boarding, and man-riding operations. The unit is in the process of pursuing Lloyd's Register 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. Where vessel, flag, or port-state requirements are more restrictive than this manual, those requirements govern.

10.5 Abort Criteria

- Any "stop" call from the rider, signaller, or supervisor.
- Loss of two-way voice communication with the rider.
- Any Smart Winch anomaly alert during the hoist.
- Sea state, wind, or visibility exceeding the lift-plan limit.
- Any unexpected sound, vibration, or behaviour from the TIDYNE unit.

10.6 Module 8 Sign-Off Criteria

- Trainee successfully completes at least 3 supervised personnel-equivalent hoists on a test load configured to represent a rider, plus a minimum number of live evolutions as specified by the OEM-certified trainer.
- Trainee correctly executes abort criteria when introduced by the trainer.
- Trainee demonstrates correct communications discipline throughout.

11. Module 9 — Application Scenarios

Module 9 contextualises the TIDYNE unit across four published application scenarios. Each scenario shares the same core operator competence — what changes is the lift planning, the rigging, the communications, and the abort criteria.

11.1 Pilot Ladder & Deck Operations

"Marine pilots boarding vessels in open water face one of the most hazardous routines in the industry. TIDYNE provides powered, speed-controlled deployment and retrieval of pilot ladders, eliminating the manual effort and unpredictability associated with rough seas and high freeboard vessels."

- Controlled lowering speed prevents ladder swing and shock loads during boarding.
- Certified for both personnel and equipment transfer per SOLAS requirements.
- Mounts directly to existing boom or king post — no hull modification needed.
- Programmable drive accommodates different sea states.
- Operator focus: pre-set descent profile, single-signaller discipline, abort on swing.

11.2 Life-Saving & Emergency Evacuation

"In emergency scenarios, reliable and rapid personnel evacuation is critical. TIDYNE is certified for lowering and hoisting personnel, making it a compliant and effective solution for emergency evacuation from vessels, offshore platforms, and elevated structures where conventional means are unavailable or compromised."

- Dual-certified for both lifting AND lowering of personnel — a rare and critical distinction.
- Self-contained 48 V DC battery with onboard backup — no vessel power tie-in required.
- Manual override capability for power-loss scenarios (Module 6).
- Operator focus: rapid Homing, communications under stress, abort on equipment doubt.

11. Module 9 — Application Scenarios (cont.)

11.3 Cargo Hold Access & Personnel Retrieval

"Accessing cargo holds, ballast tanks, voids, and other confined spaces is a routine but high-risk activity aboard commercial vessels. TIDYNE enables controlled personnel descent and retrieval, dramatically reducing the risk of falls and providing a reliable means of emergency extraction from below-deck spaces."

- Precise speed control for safe descent into deep cargo holds and void spaces.
- Emergency retrieval capability — hoist an incapacitated worker to safety.
- Worm gear reducer prevents free-wheeling under load.
- Helically-grooved drum ensures even wire rope layering during repeated cycles.
- Operator focus: confined-space permit, atmospheric monitoring coordination, retrieval readiness.

11.4 General Emergency Rescue Operations

"Maritime emergencies are unpredictable by nature. TIDYNE's portable, clamp-mounted design means it can be rapidly deployed wherever it is needed most — from man-overboard recovery to rescue operations at height. Its versatility across mounting points makes it an indispensable part of any vessel's emergency response toolkit."

- Rapid deployment to any boom, jib arm, king post, or pad eye aboard the vessel.
- Man-overboard recovery — lower a rescue harness, retrieve the casualty under power.
- Works at height for rescue from masts, cranes, or elevated work platforms.
- Programmable drive allows first responders to set safe operating speeds on the fly.
- Operator focus: rapid setup verification, abbreviated lift plan, casualty welfare communications.

11.5 Module 9 Sign-Off Criteria

- Trainee selects and describes the correct procedure for each of the four scenarios.
- Trainee identifies the application-specific abort criteria for each.

12. Module 10 — Smart Winch Telemetry & Anomaly Alerts

Every operation of the TIDYNE unit is monitored in real time by the onboard Smart Winch system. The operator must be able to read the basic telemetry, recognise anomaly alerts, and respond correctly to each alert class.

12.1 What the Operator Sees

Telemetry	Typical Value	What It Tells You
Load	0 – 180 kg	Current load on the wire rope.
Speed	0 – ~193 FPM	Drum rotation translated to rope speed.
Brake 1	ENGAGED / STANDBY	Motor torque control state.
Brake 2	STANDBY	Worm gear self-lock (always present mechanically).
Brake 3	ENGAGED / STANDBY	Gravity brake state.
Anomaly	NONE DETECTED / flagged	ML-driven anomaly detection output.
Status	IDLE / ASCENDING / DESCENDING / FAULT	Operational state machine.

12.2 Anomaly Alert Classes & Required Response

Alert Class	Operator Action
Informational (logged, no alarm)	Continue operation; review at end of shift; log for the technician.
Caution (yellow / non-blocking)	Complete the current evolution, do not start a new one, notify supervisor.
Stop (red / blocking)	Cease operation immediately, apply E-Stop, hold load, lock out, notify TIDYNE OEM-certified technician.
Overload / Overspeed	Drive stops automatically. Tag out and notify TIDYNE OEM-certified technician — do not attempt to reset.

12.3 When to Stop Operations

- Any Stop-class or Overload / Overspeed alert.
- Any persistent Caution alert that recurs after the current evolution.
- Loss of telemetry display or any indication the Smart Winch is offline during a personnel evolution.
- Any operator doubt about the meaning of a displayed value.

12.4 Module 10 Sign-Off Criteria

- Trainee reads and explains each telemetry value during a live evolution.
- Trainee correctly responds to trainer-injected simulated alerts in each class.

13. Module 11 — Daily Pre-Use vs OEM-Certified Service Boundary

The certified TIDYNE operator is responsible for safe day-to-day operation. All inspection findings, anomalies, and component-level service are escalated to a TIDYNE OEM-certified technician or engineer. This boundary is non-negotiable and is the single most important governance principle for safe operation of the TIDYNE unit.

13.1 The Boundary, in One Table

Task	Operator	OEM-Certified Technician / Engineer
Pre-operation visual inspection	Yes	—
No-load functional test	Yes	—
Power-On and Homing	Yes	—
Normal lift and lower operation	Yes	—
Reading Smart Winch telemetry	Yes	—
E-Stop response and reset	Yes	—
Power-loss recovery (alternating Up / Home)	Yes	—
Manual brake release for emergency descent	Authorised	Trainer / technician oversight
Cleaning external surfaces	Yes	—
Battery charging via supplied 110 V charger	Yes	—
Brake adjustment, replacement, or load testing	No	Yes — sole authority
Gear reducer service or oil change	No	Yes — sole authority
Wire rope replacement or termination	No	Yes — sole authority
Servo motor or drive electronics service	No	Yes — sole authority
Solenoid or sensor replacement	No	Yes — sole authority
Smart Winch software, firmware, or calibration	No	Yes — sole authority
Annual inspection and re-certification	No	Yes — sole authority
Recommissioning after any fault or alert	No	Yes — sole authority

13.2 Module 11 Sign-Off Criteria

- Trainee correctly assigns 10 trainer-presented scenarios to "operator" or "OEM-certified technician".
- Trainee verbally commits to the boundary and the escalation path.

14. Module 12 — Lockout / Tagout & Hazard Control

Module 12 trains the operator to safely isolate the TIDYNE unit and to identify and control hazards before, during, and after operation.

14.1 Lockout / Tagout — Numbered Procedure

1. Confirm no load is suspended and any rigging is supported independently of the TIDYNE unit.
2. Press E-Stop and confirm motion is stopped.
3. Open the battery isolator and verify zero electrical energy at the control enclosure indicators.
4. Apply a personal lock and tag at the battery isolator. The tag must identify the operator, date, time, and reason.
5. Verify isolation by attempting to operate Up and Down — there must be no response.
6. Record the lockout in the operator log and notify the supervisor.
7. Remove the lock and tag only when the cause of lockout is resolved and the operator personally performs the removal.

14.2 Hazard Identification

Hazard	Control
Falling load	Clear lift path; tag lines; no personnel under suspended loads.
Crush from moving rope/drum	Hands clear of drum and fairlead; long sleeves and jewellery removed.
Electrical shock	Battery isolator off during any cleaning, inspection, or LOTO.
Slip / trip / fall	Deck housekeeping; fall-protection harness for work at height.
Pinch points	Identify all pinch points during Module 1 walk-around.
Environmental	Sea state, wind, visibility, ice — reassess before every personnel lift.
Communication failure	Pre-test radios; halt motion on any loss of communications.

14.3 Module 12 Sign-Off Criteria

- Trainee performs a complete LOTO sequence unaided.
- Trainee identifies the seven hazards above on an inspection walk-around.

15. Module 13 — Communication, Hand Signals & Lift Planning

15.1 Single-Signaller Discipline

For every TIDYNE unit evolution, exactly one signaller is designated. The operator obeys only that signaller. The single exception is an E-Stop signal — an E-Stop may be issued by any person on the lift team and is acted on immediately, without question.

15.2 Standard Hand Signals

Signal	Meaning
Forearm vertical, finger pointing up, small circular motion	Hoist up.
Arm extended downward, finger pointing down, small circular motion	Lower down.
Hands clasped in front of body	Hold / stop motion.
Both arms extended horizontally, palms down	Stop — emergency.
Hand drawn horizontally across throat	E-Stop.
Tap the top of the head, then standard signal	Use slow speed.

15.3 Lift-Plan Documentation

The written lift plan for any TIDYNE unit evolution shall include:

- Purpose and description of the lift.
- TIDYNE unit serial number and current inspection status.
- Load weight, including rigging, with margin to WLL of 180 kg.
- Lift path, landing zone, and exclusion zones.
- Rigging plan with sling, shackle, and hook details.
- Communications plan (channels, call signs, abort cues).
- Environmental limits (sea state, wind, visibility).
- Personnel roster with named operator, signaller, rider (if personnel), and standby rescue.
- Abort criteria and the recovery plan.
- Sign-off by the lift supervisor before commencement.

15.4 Module 13 Sign-Off Criteria

- Trainee correctly executes all signals as signaller and as operator.
- Trainee writes a compliant lift plan for a trainer-issued scenario.

16. Hands-On Practical Assessment

The hands-on practical assessment is administered by the TIDYNE OEM-certified trainer at the end of the course. Every line item must be observed and signed as Pass before the trainee proceeds to the written assessment.

#	Practical Task	Pass Criteria	P/F	Trainer Initial
1	Component identification (Module 1)	All 12 components named on a live unit.	■P ■F	_____
2	Pre-operation inspection (Module 2)	All 15 steps executed; defects escalated, not overridden.	■P ■F	_____
3	Power-On & Homing (Module 3)	Five consecutive successful Homing cycles.	■P ■F	_____
4	Normal lift (Module 4)	10 cargo lifts with smooth ramp and even drum layering.	■P ■F	_____
5	Normal lower (Module 5)	10 controlled descents with accurate landings.	■P ■F	_____
6	E-Stop response (Module 6)	E-Stop applied within 1 second of cue.	■P ■F	_____
7	Power-loss recovery (Module 6)	Alternating Up / Home recovery executed correctly.	■P ■F	_____
8	Manual brake release (Module 6)	Demonstrated under direct supervision on training unit.	■P ■F	_____
9	Brake awareness (Module 7)	Verbal explanation of B1 / B2 / B3 plus centrifugal.	■P ■F	_____
10	Personnel hoist (Module 8)	3 supervised personnel-equivalent hoists, correct comms.	■P ■F	_____
11	Application scenarios (Module 9)	Correct procedure for each of four published scenarios.	■P ■F	_____
12	Telemetry response (Module 10)	Correct response to each injected alert class.	■P ■F	_____
13	Service boundary (Module 11)	Correct assignment of 10 scenarios.	■P ■F	_____
14	Lockout / Tagout (Module 12)	Complete LOTO sequence executed unaided.	■P ■F	_____
15	Communication & lift plan (Module 13)	Compliant written lift plan; correct signals.	■P ■F	_____

A single Fail on any line item requires remediation and re-assessment of that line item. Repeated Fail on the same line item requires the trainee to repeat the corresponding module in full.

17. Written Knowledge Assessment

25 sample questions. Pass mark: 80% (20 of 25 correct). Questions are rotated and updated by TIDYNE Inc.; the form below is the sample bank.

#	Question
1	What is the published Working Load Limit of the TIDYNE unit? A) 100 lb / 45 kg B) 400 lb / 180 kg C) 800 lb / 360 kg D) 1000 lb / 450 kg
2	What is the rated speed of the TIDYNE unit? A) 60 FPM B) 120 FPM C) ~193 FPM D) 300 FPM
3	Approximate descent time for 45 ft is: A) 7 seconds B) 14 seconds C) 28 seconds D) 45 seconds
4	Which control sets the absolute-encoder reference position? A) Up B) Down C) Home D) E-Stop
5	Where is the Home button located? A) Top of the control enclosure B) Underside of the control enclosure C) On the drum housing D) On the battery
6	Pressing E-Stop has which effect on Home? A) Home is lost B) Home is retained C) Home is reset to factory D) None of the above
7	Home position is lost only when: A) The E-Stop is pressed B) The battery is changed C) Power is cut with the stirrup or hook in the Down position D) The Up button is pressed at slow speed
8	Power-loss recovery is achieved by: A) Holding Down for 10 seconds B) Alternating Up and Home repeatedly until the stirrup is near the head pulley, then Home C) Cycling the battery isolator D) None of the above

9	Which brake is the high-ratio worm gear self-locking effect? A) B1 B) B2 C) B3 D) Centrifugal
10	Which brake is the normally-engaged gravity brake on the drum shaft? A) B1 B) B2 C) B3 D) Centrifugal
11	The automatic centrifugal brake activates on: A) Operator command B) Power loss C) Overspeed of the worm shaft D) E-Stop press
12	When the brake solenoid fails, the TIDYNE unit: A) Cannot operate at all B) Can still lift; the brake freewheels in lifting mode C) Releases all brakes D) Disables the Home function
13	Manual brake release for controlled centrifugal descent is: A) A normal-operations technique B) For emergency use only, under supervisor authorisation C) Required before each shift D) Performed by the rider, not the operator
14	Brake adjustment, replacement, and load testing are performed by: A) Any trained operator B) The signaller C) A TIDYNE OEM-certified technician or engineer only D) The vessel's electrician
15	Single-signaller discipline means: A) Only one operator at the controls B) The operator obeys only the designated signaller, except E-Stop, which any person may call C) Only one radio channel is active D) Only one rider per hoist
16	A written lift plan is required for: A) Cargo lifts only B) Personnel hoists only C) Every TIDYNE unit personnel evolution and any non-routine cargo lift D) Annual inspections only
17	The TIDYNE unit is certified for: A) Cargo only B) Personnel only C) Both personnel and cargo (dual-certified, human-rated) D) Equipment under 50 kg only
18	The Smart Winch "Stop" alert class requires the operator to: A) Continue and log the event B) Complete the current evolution then stop C) Cease immediately, E-Stop, hold load, lock out, notify a TIDYNE OEM-certified technician D) Reset the alert and continue

19	Which mounting points are valid for the TIDYNE unit? A) Hull penetrations only B) Booms, jib arms, king posts, and pad eyes — no permanent hull modification C) Any cleat D) Welded foundations only
20	Minimum dead turns on the drum: A) Are optional B) Must always be maintained; verified during inspection and enforced by Homing C) Are required only for personnel lifts D) Are set by the operator each shift
21	Wire rope inspection criteria reference: A) ASME B30.30 B) ISO 9001 C) IEEE 802.11 D) None — visual only
22	Battery life under typical lift-and-descent cycles is: A) 1 cycle per charge B) Up to 10 cycles per charge with regenerative braking on descent C) 100 cycles per charge D) Unlimited
23	In a personnel hoist, loss of two-way voice comms with the rider means: A) Continue to landing B) Lower at slow speed C) Abort — halt motion immediately and re-establish comms before any further movement D) Continue and log the loss
24	Initial TIDYNE operator certification is valid for: A) Lifetime B) 12 months, with mandatory annual refresher C) 5 years D) Until the next vessel inspection
25	Recertification is also triggered by: A) Any reportable incident involving the TIDYNE unit B) A 6-month gap in operation C) Any change to the TIDYNE unit configuration confirmed by a TIDYNE OEM-certified technician D) All of the above

18. Certification, Re-Training Cadence & Recordkeeping

18.1 Initial Certification

- Issued by TIDYNE Inc. on the recommendation of the OEM-certified trainer.
- Valid for 12 months from the date of issue.
- Certificate identifies the operator by name and links to the serial number(s) of the TIDYNE unit(s) trained on.

18.2 Annual Refresher

- Mandatory once every 12 months for currency.
- Minimum 4 hours: structured review of changes, practical re-validation of Modules 3 – 8 and 10.
- Delivered by a TIDYNE OEM-certified trainer.

18.3 Re-Certification Triggers

Trigger	Action
Any reportable incident involving the TIDYNE unit operated by the certified individual	Re-certification before resuming operations.
Lapse of more than 6 months since last hands-on operation	Practical re-validation of Modules 3 – 8 before resuming.
Change to the TIDYNE unit configuration confirmed by a TIDYNE OEM-certified technician	Delta training and re-issue of certificate.
Operator transfer to a different TIDYNE unit serial number	Familiarization sign-off on the new unit before independent operation.
Failure of an annual refresher	Full initial course required to restore certification.

18.4 Recordkeeping

- Training records, module sign-offs, assessment scores, and certificates retained for a minimum of 5 years.
- Records made available to flag administration, port state, and client auditors on request.
- Smart Winch logs aligned to operator certification records for traceability.

Appendix A — Glossary

B1	Motor torque control brake — electronic, continuous, regenerative.
B2	High-ratio worm gear self-locking effect; mechanically prevents backdrive.
B3	Emergency gravity brake on the drum shaft; normally engaged, released electromagnetically during lifting.
Centrifugal brake	Automatic overspeed brake on the worm shaft; engages without operator action.
Commissioning sheet	Unit-specific configuration record shipped with each TIDYNE unit.
Dead turns	Minimum wraps of wire rope that must always remain on the drum.
E-Stop	Emergency stop control; cuts solenoid power and engages B3. Home is retained.
FPM	Feet per minute — rope-speed unit. Rated speed: ~193 FPM (0.98 m/s).
Home	Absolute-encoder reference position; required before normal operation.
OEM-certified	Holding current TIDYNE Inc. certification (trainer / technician / engineer).
SOLAS	International Convention for the Safety of Life at Sea.
Smart Winch	Onboard real-time telemetry, anomaly detection, and logging system.
Stirrup	Personnel harness lifting attachment used in pilot transfer.
WLL	Working Load Limit — 180 kg / 400 lb for the TIDYNE unit.

Appendix B — Trainer Sign-Off Sheet

Completed by the TIDYNE OEM-certified trainer for each trainee. Retain on file with the certificate of issue.

Trainee name	_____
Trainee employer	_____
TIDYNE unit serial number(s)	_____
Course start date	_____
Course end date	_____
Classroom hours	_____
Hands-on hours	_____
OEM-certified trainer name	_____
Trainer certification ID	_____

Module Sign-Off

Module	Description	Pass / Fail	Trainer Initial	Date
1	System familiarization	■P ■F	_____	_____
2	Pre-operation inspection	■P ■F	_____	_____
3	Power-On & Homing	■P ■F	_____	_____
4	Normal lift	■P ■F	_____	_____
5	Normal lower	■P ■F	_____	_____
6	E-Stop & emergency response	■P ■F	_____	_____
7	Brake awareness	■P ■F	_____	_____
8	Personnel hoisting	■P ■F	_____	_____
9	Application scenarios	■P ■F	_____	_____
10	Smart Winch telemetry	■P ■F	_____	_____
11	Service boundary	■P ■F	_____	_____
12	LOTO & hazard control	■P ■F	_____	_____
13	Communication & lift planning	■P ■F	_____	_____

Final Recommendation

■ Recommend certification as a TIDYNE operator on the serial number(s) listed above.

■ Do not recommend certification. Required remediation:

Trainer signature: _____ Date: _____

Appendix C — Contact & Support

All training enquiries, certification, recertification, and OEM-certified technician requests are directed to TIDYNE Inc.

Company	TIDYNE Inc.
Tagline	Advanced engineering solutions.
Web	tidyne.com
General contact	solutions@tidyne.com
Training enquiries	solutions@tidyne.com — subject line "Training"
Service & technician dispatch	solutions@tidyne.com — subject line "Service"
Document	TDY-TRN-WCH-001 · Revision 2.0
Issued	June 2026

Operator. Trainer. Technician. Engineer.

Operate the TIDYNE unit only when currently certified. Be trained only by a TIDYNE OEM-certified trainer. Be serviced only by a TIDYNE OEM-certified technician or engineer. Every component of this discipline keeps personnel and cargo safe on every lift.