



Cable Engines, Linear 21 WP Dowty AC Drive LCD

Asset No. CL1-2

Manufacturer	Dowty PHS
Size: -	
Length	14.28m
Width	1.5m
Height	1.8m
Weight	21 Tonne
Wheel Drive	AC Vector Drive
Wheel Configuration	Seven groups of three
Cable Size	21 - 125mm Diameter
Repeater Size	400mm Diameter
Maximum Tension, Picking Up	14 Tonne @ 4 knots
Maximum Speed	8 knots
Maximum Tension, Paying Out	16.75 Tonnes @ 0-4 knots
Maximum Speed	8 knots
Speed & Distance Measurement	Encoder on Cable Guide Roller
Tension Measurement	Integrated Shear Pin Load Cells
Wheel Motors	3kW, Type M2AK100M
Wheel Pinch Force	1 Tonne
Tyre Size	7 x 18"
Tyre Pressure	5.8 bar
Power Pack	AC Vector Drives housed in 40' ISO Separate dedicated Hydraulic set for wheels and guides
Electrical Supply	440V, 3Ph, 60Hz
Control Console	EC21-2



1 GENERAL AND TECHNICAL INFORMATION

1.1 INTRODUCTION

This Operations and Maintenance Manual is applicable to the Linear Cable Engine (LCE) (Figs. 1.1 to 1.3).

The LCE is used for the laying and hauling of submarine cable either for the initial installation of cables or where repair or modification is necessary during the working life of the cable. Cable sizes of up to 125mm diameter and repeaters to a maximum diameter of 400mm can be handled by the equipment.

The Linear cable engine system comprise the major assemblies:

- A 21 Wheel Pair LCE, which is mounted on the ships Cable Working deck (3A) and used for handling the cable.
- AC electric motors and their associated drives are used to power and control the wheel pairs of the LCE.
- A hydraulic Power Pack used to provide hydraulic fluid to the 21 wheel pair LCE to control the wheel arm and pedestal guides of the LCE.
- A LCE AC Drive/Motor Control Centre (MCC) Cubicle, housed in a container, which provides stopping and starting procedures and overall control of the wheel pair motors.
- A LCE Control Console, also housed in a container, from which remote operation of the LCE electric motors, wheel arms, pedestal guides, and Emergency Cable Brake (Stonker) can be controlled using a PLC located in the Console. LCE Status reporting is provided to the HMIs located on the Cable Drum and DOHB/Control Console, the Test Room, the Bridge and to the deck mounted display .
- An Emergency Cable Brake which is used to clamp and hold the submarine cable in the unlikely event of the LCE losing control of the cable.

1.2 MODES OF OPERATION

The LCE can be used in a number of modes of operation to maintain the tension in the cable as it passes to and from the storage tanks, depending on whether the cable is being laid or recovered.

1. Laying

This is defined as a condition when the outboard weight of the cable exceeds the inboard machinery friction and is pulling the LCE in an outboard direction. This mode is often referred to as dynamic braking and is the most common mode of operation for the LCE.

2 Picking up (or Hauling)

This is defined as powering the LCE inboard.

3. Pushing Out

This is the opposite of Picking Up ie powering the LCE in the outboard direction.

1.2.1 Laying Operation

In the laying operation, the wheels are rotated in an outboard direction. When the tension outboard is greater than the inboard tension the motors act as generators and produce electrical power which is dissipated in the braking resistor units. The tension in the cable is controlled from the LCE Control Console. The speed of cable laying is controlled by the speed of the ship.

1.2.2 Picking up

For picking up duties the electric motors drive the wheels which are driven in the inboard direction.

Speed/tension range of the LCE is achieved by configuring a number of wheel pairs to give different overall drive capacities selectable from the LCE Control Console, whilst the engine is in motion and under load.

1.2.3 Paying Out

Paying out is achieved in the same way as picking up except that the pump flow is reversed to power the cable in an outboard direction.

1.2.4 Braking

In addition to the braking effect which is achieved during the normal modes of operation, cable movement can be held or arrested as follows:

- By electrical braking resistors
- By application of the emergency cable brake.

WARNING: THE EMERGENCY CABLE BRAKE SHOULD ONLY BE USED IN AN EMERGENCY SITUATION SHOULD THE CABLE ENGINE LOOSE CONTROL OF THE SUBMARIING CABLE AND THERE IS A DANGER TO THE SHIP'S CREW AND /OR THE SHIP.

1.3 CONTAINERS (Figs 1.2 and 1.3)

1.3.1 Containers

The container No.1 which houses the LCE AC Drives is a standard 40 foot steel container. At one end of the container is a cargo door for loading and unloading equipment with a separate personnel door in one side. Two air conditioning units located at either end of the container provide an equipment operating environment.

The container includes the following electrical equipment fed from the ship's supply through a 5-way distribution board:

- 4 fluorescent strip lights controlled by a switch at the side of the personnel doors
- two twin 16 Amp three-pin power sockets below the switch near the floor next to the heaters.

The Container No. 2 is a standard 30 foot container which houses the LCE and Drum / DOHB Control Consoles. The container includes two air conditioning units. One which draws in ambient air and the other which circulates and heats air already in the container. Two fire extinguishers are located near the personnel doors for emergencies.

- 4 fluorescent strip lights controlled by a switch at the side of the personnel doors
- two twin 16 Amp three-pin power sockets below the switch near the floor next to the heaters.