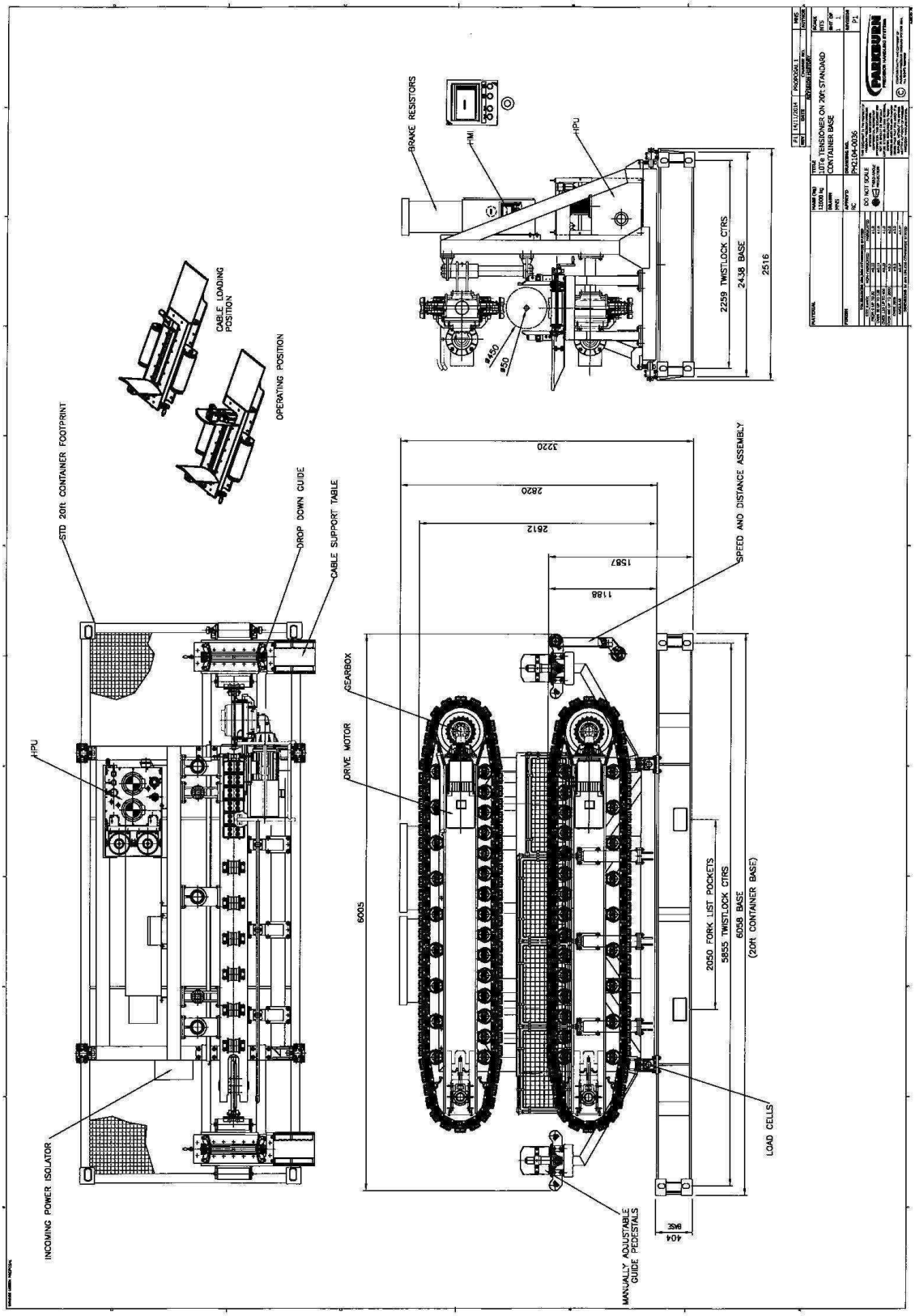
TENSIONER


BRAKE RESISTORS
HMI
HPU
2259 TWISTLOCK CTRS
2438 BASE
2516
CABLE LOADING POSITION
OPERATING POSITION
STD 20ft CONTAINER FOOTPRINT
DROP DOWN GUIDE
CABLE SUPPORT TABLE
SPEED AND DISTANCE ASSEMBLY
3220
2820
2612
1587
1188
GEARBOX
DRIVE MOTOR
6005
2050 FORK LIST POCKETS
5855 TWISTLOCK CTRS
6058 BASE
(20ft CONTAINER BASE)
LOAD CELLS
INCOMING POWER ISOLATOR
MANUALLY ADJUSTABLE GUIDE PEDESTALS
404
BASE

1. TECHNICAL SPECIFICATION

1.1 AC Electric Tensioner General Description

The following 1 x 10 Te self-contained ("plug and play") side loading AC electric 2-track tensioner complete with the following benefits & features:

- 400 V/50 Hz AC electric drive for smooth & stepless operation
- No external cooling required from vessel
- Digital motor / track / machine to machine speed synchronisation*
- Integral & independent dual redundant speed and distance system
- Integral load cell and pitch compensated tension control system
- Integral hydraulic supply for track open/close, track squeeze and brakes (using bio degradable oil)
- System alarms and instrumentation provided on tensioner mounted HMI display & remote control console
- Back up tensioner control via hardwired local control pendant.
- Hydraulic manifold / valve block housed with a stainless steel enclosure
- Drive panels to be painted stainless steel with sealed-air marine air conditioning units
- Resistor banks to be "run quiet" natural self-cooled units
- Designed and manufactured in accordance with IP56 (minimum) ingress protection levels

*Speed synchronisation with other manufacturers equipment is subject to the 3rd party equipment's capability.

2. 10Te Tracked Tensioner Specification Table

Item	Design Element	Specification / Description
1	Max Tension*	10 Te (in either direction)
2	Performance	0-17 m /min
3	Product Ø Range	From approx. 50 mm to 450 mm
4	Max Opening	Approx. 500 mm
5	Max Grip Force	Approx. 110 kN/m/track adjustable from 30% to max
6	Track Orientation	2 track – side loading (c/w top loading side bars)
7	Track Contact Length	Approx. 3 m
8	Assumed Product CoF	0.15
9	Track Pad Type	V- grooved rubber bonded bolted pads (bolted type)
10	Motor Type	The AC electric motors fitted will be totally enclosed, force fan cooled, foot and flange mounted, to IP 56. The motors will be supplied c/w anti condensation heaters and Class F insulation.
11	Drive Type	Integral AC vector drives will allow the tensioner speed and / or torque to be controlled smoothly in either direction from zero to 100% and continuously be able to hold full torque at zero speed. Drive panel is painted stainless steel with sealed-air marine air conditioning unit to IP56.
12	Gearbox Type	Flange mounted rotating case planetary type c/w coupling.
13	Brake Type	Suitably rated spring applied hydraulic released failsafe brake (integral with gearbox assembly)
14	Track Squeeze Pressure	Track squeeze shall be manually adjusted via a pressure valve located on the tensioner.
15	Integral HPU	An integrally mounted HPU shall be provided to provide track squeeze, track open and close and track brake functions. The HPU shall be rated for open deck use to a minimum of IP56 and shall be rugged and reliable in design. The HPU shall be manufactured c/w stainless a steel reservoir, pipework & stainless/zinc plated fittings
16	Tension Measurement & Control	Integral (4 x) load cell based & pitch compensated system to allow accurate measurement of outboard tension and tension controlled operations.
17	Speed and Distance	Via freely rotating wheel/roller and dual encoder assembly.
18	Inboard / Outboard Cable Guides	Manually adjustable horizontally oriented roller guides shall be fitted at the product entry and exit points.
19	Controls	Controlled via remote console or back up hardwired pendant control unit.
22	Instrumentation	Integral HMI display on tensioner panel & remote console.
23	Maximum Power Demand	Approx. 60 kW
24	Weight	Approx. 11,000 KG
25	Space Envelope	Approx. L 5,700 x W 2,550 W x H 2,850
25	Supply Voltage	400 V @ 50Hz

*** Note to Tensioner Performance Figures**

The equipment is designed to run continuously subject to the maintenance operations defined within the technical manuals. It should be noted that the stated performance with respect to tension is dependent upon the coefficient of

friction between track pad or tyre and the product being adequate, under the working conditions encountered. In the case of products of small diameter, that have low crush resistance and/or a low coefficient of friction, the equipment has to be de-rated accordingly for tension.

Example Aft Deck 10Te Side Loading 2 -Track Tensioner (on vessel)

2.1 Controls

Parkburn designs and manufactures the drive and control systems for its tensioners in house, so a high degree of flexibility is offered for controls hardware, software, style and layout.

For this proposal we have included a fixed position hardwired remote control console which shall incorporate all required control features and provide all required alarm and instrumentation features from an integrally fitted HMI. The tensioner shall also be fitted with a HMI to provide local instrumentation features, and a hardwired hand held pendant as a back-up control position to the remote console.

We assume the remote console is to be fitted within an existing dry and temperature controlled cabin and that all required interconnecting cabling is the responsibility of the client.

The control console will have the following **minimum** tensioner control functions;

- System start/stop pushbuttons
- Direction selector switch
- Local/remote/synchronised operations selection
- Track open/close pushbuttons
- Speed control pushbuttons

- Tension control pushbuttons
- Emergency stop push button
- Emergency stop RESET push button

2.1.1 Instrumentation

The following information shall be displayed at the remote console and the tensioner mounted HMI unit;

- Status (on/off)
- Tracks' status (open/closed)
- Mode (pay in / pay out)
- Linear product speed
- Product distance - in/out
- Tension (bi-directional)
- High HPU oil temperature
- Low HPU pressure
- Misc. additional system alarms

Also, the following information shall be available in ASCI format, for transmission to a remote location;

- Tension indication
- Speed indication
- Length indication

All necessary hardware/software and related instructions for rebooting/reinstalling the entire control system software shall be supplied. The control system layout shall be designed and manufactured specific to client requirement by in house Parkburn engineers.

Example 10Te Tensioner Control Console

3. TECHNICAL AND MANUFACTURING STANDARDS

3.1 Design & HSE Standards

The following rules will, where applicable, be used as guidelines for design and manufacture of the system;

- DNV Standard for Certification No 2.22 lifting Appliances - 2013
- DNV Rules for the Classification of Ships - 2012
- DNV Rules for the Planning and Execution of Marine Operations Jan 1996.
- The complete drive and control system as standard is designed and built in accordance with EN 60204-1 Safety of machinery - Electrical equipment of machines.
- The Supply of Machinery (Safety) Regulations 1992

Other areas of the system will be designed using good engineering practice and principles

It is currently understood that the equipment specified above (excluding including all lift points) will not be subject to any class design / manufacture or test verification requirement.

3.2 Example Manufacturing Standards

BS EN 10025-2: 2004	Hot rolled products of non-alloy structural steels. Technical delivery conditions
BS EN ISO 15614-1: 2004 +A4: 2012	Specification and approval of welding procedures for metallic materials. Arc welding of steel
BS EN 287-1: 2004	Approval testing of welders for fusion welding steels
BS EN 9001: 2008	Quality systems
SOLAS 2011	International convention for safety at sea
Institution of Electrical Engineers	Recommendations for the electrical and electronic equipment aboard mobile and fixed offshore installations.
IEC 60092	Electrical Installations in Ships
IEE 6th Edition	Electrical and Electronic Equipment on-board ships
BS EN 12385-1: 2002 + A1: 2008	Specification for ropes
BS EN 10083-1:2006 BS EN 10083-2:2006	Specification for quenched and tempered steels
ISO	Metric system