



Kenya Power

TITLE:

**SPECIFICATION FOR  
PULLING AND LIFTING  
MACHINES**

Part 2: Ratchet Hoist (Pull Lift),  
Tirfor and Hoisting Blocks

Doc. No.

KP1/3CB/TSP/09/061-2

Issue No.

1

Revision  
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**ANNEX A:** **Guaranteed Technical Particulars** (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of complete type test certificates and type test reports for tender evaluation, all in English Language)

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**0.2 Amendment Record**

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0	2014-08-08	New Issue	Michael Apudo	Eng. Simon Kimitai 

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**FOREWORD**

This specification has been prepared by the Standards Department in collaboration with Network Management Division, both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for pulling and lifting machines (ratchet hoist (pull lifts), tirfor and hoisting blocks) for use on power lines. It is intended for use by KPLC in purchasing the items.

**1. SCOPE**

- 1.1. This specification is for pulling and lifting machines for use on power lines. The specification covers the following items:
  - a) Ratchet Hoist (Pull Lift) rated up to 5tons
  - b) Tirfor rated up to 5tons
  - c) Hoisting Blocks (Pulleys) Single Sheave of up to 40kN
- 1.2. The specification also covers inspection and test of the ratchet hoist (pull lifts), tirfor and hoisting blocks as well as schedule of Guaranteed Technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for ratchet hoist (pull lifts), tirfor and hoisting blocks; acceptable for use in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the ratchet hoist (pull lifts), tirfor and hoisting blocks for The Kenya Power & Lighting Company.

The specification does not purport to include all the necessary provisions of a contract.

**2. REFERENCES**

The following standards contain provisions which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) apply:

ISO 724: ISO general-purpose metric screw threads — Basic dimensions

ISO 185: Grey cast irons – Classification

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- ISO 8458-1: Steel wire for mechanical springs - Part 1: General requirements
- ISO 2766: Single lifting hooks with shank -- Capacity up to 25 tons -- Grades M, P, S (T, V) -- Hammer and drop forged hooks.
- ISO 15: Rolling bearings -- Radial bearings -- Boundary dimensions, general plan
- ISO 1234: Split pins
- ISO 1461: Hot dip galvanizing coatings on fabricated iron and steel articles. Specification and test methods
- ISO 898: Mechanical properties of fasteners made of carbon steel and alloy steel
- ISO 606: Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets
- BS EN 12385-4: Steel wire ropes- Safety- Part 4 : Stranded ropes for general lifting application
- BS 1449-1.1: Steel plate, sheet and strip. Carbon and carbon-manganese plate, sheet and strip. General specification
- BS EN 1706: Aluminium and aluminium alloys. Castings. Chemical composition and mechanical properties.
- BS EN 10250-3: Open die steel forgings for general engineering purposes -Part 3: Alloy special steels
- BS 4429: Specification for rigging screws and turnbuckles for general engineering, lifting purposes and pipe hanger applications
- PD 970: Wrought steels for mechanical and allied engineering purposes. Requirements for carbon, carbon manganese and alloy hot worked or cold finished steels

### 3. TERMS AND DEFINITIONS

For the purposes of this specification the definitions given in the reference standards shall apply.

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**4. REQUIREMENTS**

**4.1. SERVICE CONDITIONS**

The ratchet hoist (pull lifts) , tirfor and hoisting blocks shall be tropicalized, designed and constructed for continuous outdoor operation in tropical areas and harsh climatic conditions including areas exposed to:

- a) Sea spray (along the coast),
- b) Humidity of up to 95% and
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.
- d) Altitudes of up to 2000m above the sea level.

**4.2. PARTICULAR REQUIREMENT**

**4.3. Ratchet hoist (Pull Lift) of up to 5 tons**

**4.3.1. Design**

The ratchet lever hoist shall be so designed that all components shall withstand all the tests given in clause 5 and provisions of this specifications..

**4.3.2. Construction**

**4.3.2.1. Housing-** The housing of hoist, either cast or fabricated, shall be designed for proper strength and maintain alignment under all expected condition of service. It shall be of fabricated construction and be stress relieved before machining and assembly.

**4.3.2.2. Gears** -The gears shall be made of alloy steel and designed for proper strength and surface durability, such as to afford efficient operation throughout the period guaranteed by the manufacturers. In case of enclosed gearing, means shall be provided for ample lubrication.

**4.3.2.3. Load Brake**

**4.3.2.3.1.** An automatic mechanical brake shall be provided, -will prevent self-lowering of the load and arrest and sustain load in all working positions whilst the load chain is in tension. The load brake shall also allow smooth lowering of the load without serious overheating which may impair efficient working of the ratchet lever hoist.

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4.3.2.3.2. After each operation the brake shall automatically and instantaneously engage, so that the load is held suspended in any position.

**4.3.2.4. Pawls**

4.2.3.4.1. Pawls shall be of sufficient strength to arrest the full load from lowering due to gravity and shall engage with the ratchet wheel either by means of a spring other than tension spring or by some other equally effective means.

4.2.3.4.2. It shall be so positioned that it engages the ratchet wheel under gravity, should its operating mechanism fail.

4.2.3.4.3. Adequate arrangement shall be made to ensure that the pawl does not seize on the pawl pin.

4.2.3.4.4. The pawl and the ratchet shall be made of steel duly heat treated to provide satisfactory degree of wear resistance together with toughness. The hardness of the pawl tip shall not be less than 40 HRC and that of ratchet not less than 30 HRC.

**4.3.2.5. Suspension assembly**

**4.3.2.5.1. Hooks**

a) Top and bottom hook shall conform to ISO 2766. The bottom hooks shall be so designed that it shall be free to swivel in the loaded conditions without twisting the load chain. The top hook shall also be free to swivel and be fitted with plain bearings. Ball and roller bearing shall not be used. Both the hooks shall be fitted with safety latches.

b) The continuous length of the shank engaged by nut on the load side shall be at least equal to 2/3 times the diameter of the shank before being interrupted by the drilling for split pins or other fixings unless the shank is shaped from the solid to afford the same degree of security as though fitted with a nut

4.3.2.5.2. Other fittings on the top and bottom blocks such as suspension fittings other than hooks shall be of sufficient strength.

**NOTE:** All suspension fittings shall be readily detachable for inspection of stressed parts such as the shanks.

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**4.3.2.6. Load Chain**

4.3.2.6.1. The load chain shall be of suitable grade and comply with the requirements of relevant standards. A terminal chain stop shall be provided at the free end of the chain. They shall be either:

- a) Roller chain - Load chain of roller type and shall conform to ISO 606:2004 or
- b) Link chain - Calibrated short link alloy steel chain of minimum Grade T (8) with mean stress at the specified minimum breaking force of  $800 \text{ N/mm}^2$  shall be used conforming to ISO 1834:1999.

4.3.2.6.2. **Length of the chain** -The total length of the load chain shall exceed the minimum length required to give the presented range of lift by not less than three links per fall to ensure that the slack end anchorage is not loaded.

**4.3.2.6.3. Load chain wheel**

- a) For roller chain - It shall be made of suitable material duly heat treated and shall conform to ISO 606:2004.
- b) For link chain - The load chain wheel shall be made of material suitable for use with load chain employed and be of adequate strength and shall be suitably designed to ensure effective operation of the chain. It shall be suitably heat treated for longer use.

4.3.2.6.4. **Guide** - Means shall be provided to ensure effective guidance of the load chain into chain wheel.

4.3.2.6.5. **Stripper** - A stripper shall be provided to ensure effective disengagement of the load chain from the load chain wheel.

4.3.2.6.6. **Idler wheels**- The ratchet lever hoist shall be provided with idler wheels in case of multifalls so shaped as to avoid the twisting of the chain when passing round, The pitch diameter of the idler wheel shall not be less than 16 times of size of the chain unless they are so shaped as to avoid the bending action of the link.

4.3.2.7. **Actuating ratchet wheel** - It shall be made of steel with machine cut teeth and suitably heat treated for improving surface hardness.

4.3.2.8. **Operating lever** - It shall be made of light weight and adequate strength. Its shape shall be such to have an easy grip. The manufacturer shall declare the operating effort

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on the lever required to raise a load equal to the working load limit, together with the effective radius of the operating lever of the hoist,

4.3.2.9. **Reversing knob** - A suitably shaped and designed reversing knob shall be provided to reverse the direction of the operation without lowering the load.

4.3.2.10. **Hand wheel**

- a) A hand wheel of convenient shape shall be provided to enable quick winding of loose chain when the hoist is not under load.
- b) Quick-release lever shall be provided for releasing pawl engagement in case of quick winding under no load which increases the life of pawl.

4.3.3. **Material requirements**

The material used in the construction of the ratchet hoist (pull lift) shall conform to the following standards as per the table 1;

**Table 1: Standards of materials**

Name of part	Conforming to
Frame	Structural steel conforming to ISO 7452:200
Top and bottom block	Aluminium alloy conform to BS EN 1706 standard designation LM4, tensile strength 280 N/mm <sup>2</sup>
Operating lever	Grey iron casting conforming to grade FG 200 of ISO 185:2005
Chain wheel	
Fasteners	Shall conform to ISO 898:2013

**NOTE:** If other materials are used, the manufacturer shall provide satisfactory evidence to KPLC that such materials have the essential qualities of standard materials

4.3.4. **Dimensions and rating**

4.3.4.1. The dimensions of the ratchet hoist (pull lift) shall be as given in Table 2 and the general arrangement shall be as shown in Fig. 2.

4.3.4.2. Ratchet lever hoist (pull lift) shall be rated according to the safe working load, which in case of a hoist with multi-falls shall be determined from the safe working load of the load chain, considering the angles introduced into the chain run and the friction occurred during movement. These can be manufactured in the range of capacity:

**0.8, 1.6, 3.2 and 5.0 tons.**

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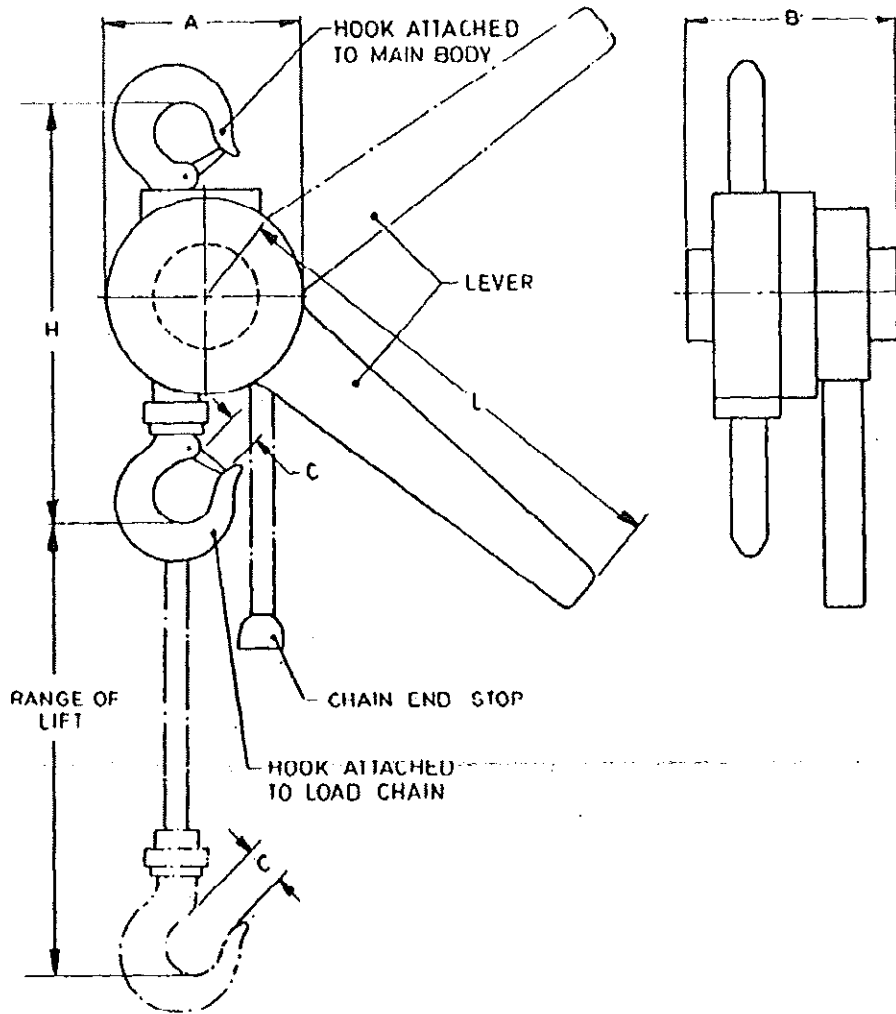


Table 2: Dimension and ratings

Size No.	Capacity	Lift Min.	A Max.	B Max.	C Max.	H Max.	L Max.	No. of Falls	Mass Max.
	Tons	m	mm	mm	mm	mm	mm		kg
1	0.8	1.3	145	150	25	310	500	1	10
2	1.6	1.3	200	160	34	390	500	1	16
3	3.2	1.35	200	175	44	465	500	2	25
4	5.0	1.35	255	175	55	600	500	3 - 4	35

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**4.4. Tirfor of up to 5 tons**

**4.4.1. General requirements**

- 4.4.1.1. This specification covers a universal gearless hand-operated pulling and lifting machine of lifting capacities up to 5 tons suitable for a rectilinear pulling of steel wire ropes by gripping and releasing actions of two sets of jaws alternately.
- 4.4.1.2. Each set shall consist of a pair of smooth parallel jaws of suitable length which grip the wire rope firmly by closing top and bottom without causing damage to the rope.
- 4.4.1.3. These jaws shall work on the self-clamping principle, that is, they shall lock by the pulling force of the wire rope itself. The jaws shall be enclosed in a casing and shall be connected by rods to forward (or up) and reverse (or down) mechanism which is operated by a telescopic handle.

**4.4.2. Material requirements**

- 4.4.2.1. The steel forgings, bars, plates and sections shall conform to those of any grade of PD 970:2005 standard requirement, whereas the aluminium and aluminium alloy parts shall conform to BS EN 1706 standard designation LM4, tensile strength 280 N/mm<sup>2</sup>.
- 4.4.2.2. All the ferrous parts shall be hot dip galvanized as per ISO 1461 with average minimum thickness of zinc coating of 80 µm.
- 4.4.2.3. The jaws and the anchor hook shall be made from the alloy steel conforming to BS EN 10250-3 containing at least 0.90 % chromium to ensure resistance to abrasion. The alloy steel after suitable heat treatment (hardening and tempering) shall have the following properties:
  - a) Tensile strength, Min 900 MN/m<sup>2</sup>
  - b) Elongation (at gauge length 5.65 A), Min 15 %
  - c) Izod impact value, Min 40 Nm
  - d) Hardness, Min 300 BHN
- 4.4.2.4. The anchor hook shall have safety catches and constructed to ISO 2766 grade T, whereas the wire ropes shall conform to BS EN 12385-1 standard requirements and the coil spring shall made from a high tensile strength (SH) steel wire grade conforming to ISO 8458-1 requirements.

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**4.4.3. Capacity**

The machines shall be manufactured with the following lifting capacities:

**0.8, 1.0, 1.6, 2, 3.2 and 5 tons.**

The corresponding pulling capacity shall be specified by the manufacturer.

**4.4.4. Construction and Workmanship**

All parts of the machine shall be constructed with a minimum factor of safety of 5. The various components of machine are as shown in Fig. 1.

- a) **Casing** - The casing of the machine shall either be cast or fabricated and shall maintain alignment under all expected conditions of service.
- b) **Bearings** -The crank shall be supported by suitable rolling bearing or plain bush bearing.
  - (i) **Ball and Roller Bearings** - Ball and parallel roller bearings shall comply with the requirements of ISO 15 with the provision that needle roller bearings are permitted. The load life rating and grade of diametric clearance for all types of anti-friction bearings shall be as recommended by the bearing manufacturer for the particular service required.
  - (ii) **Plain Bearings** – When plain bearings are used, facility for proper lubrication shall be provided and their maximum bearing pressure shall not exceed the following values in Table 1:

**Table 1: Pressure values for lubrication**

<i>Property/Material</i>	<i>Bronze Bearings</i>	<i>Cast Iron Bearings</i>
	Kgf/cm <sup>2</sup>	kgf/cm <sup>2</sup>
Mild steel shaft ground	180	140
Mild steel shaft not ground	140	100

**NOTE:** For plain bearings made of material other than bronze or cast iron, the load/life rating and the maximum allowable bearing pressure shall be as recommended by the bearing manufacturers.

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**c) Wire Ropes**

- (i) Galvanized steel core wire ropes of 6 x 19 constructions up to 12 mm diameter and 6 x 36 or 6 x 37 constructions above 12 mm diameter shall be used.
- (ii) A galvanized wire rope with fibre steel mixed core may also be used if agreed to between the manufacturer and the purchaser.
- (iii) The tolerance on wire rope diameter shall be +4, -2 %. The rope shall conform to BS EN 12385-1.

**4.4.5. Operation**

- 4.4.5.1. The load shall be moved by the operation of a lever and the direction of movement shall be determined by selecting one of the two separate levers provided for the purpose.
- 4.4.5.2. It shall be possible to change the direction of movement of the wire rope without releasing the load.
- 4.4.5.3. Suitable release lever shall be provided to allow the operator to move the slack wire rope quickly to its required position when the hoist is not underload.
- 4.4.5.4. **Back Slippage** -When a load is being lifted, some back slippage of the load is bound to occur. Permissible back slippage of the load as a percentage of total lift in one stroke (forward and backward) shall be as Table 2 below:

**Table 2: Back slippage allowance.**

<i>Lifting Capacity of Machine</i>	<i>Load Applied</i>	<i>Permissible Back Slip Percent</i>
<b>Ton</b>	<b>Ton</b>	<b>%</b>
0.8	0.8	10
1.0	1.0	10
1.6	1.6	10
2.0	2.0	10
3.2	3.2	15
5.0	5.0	15

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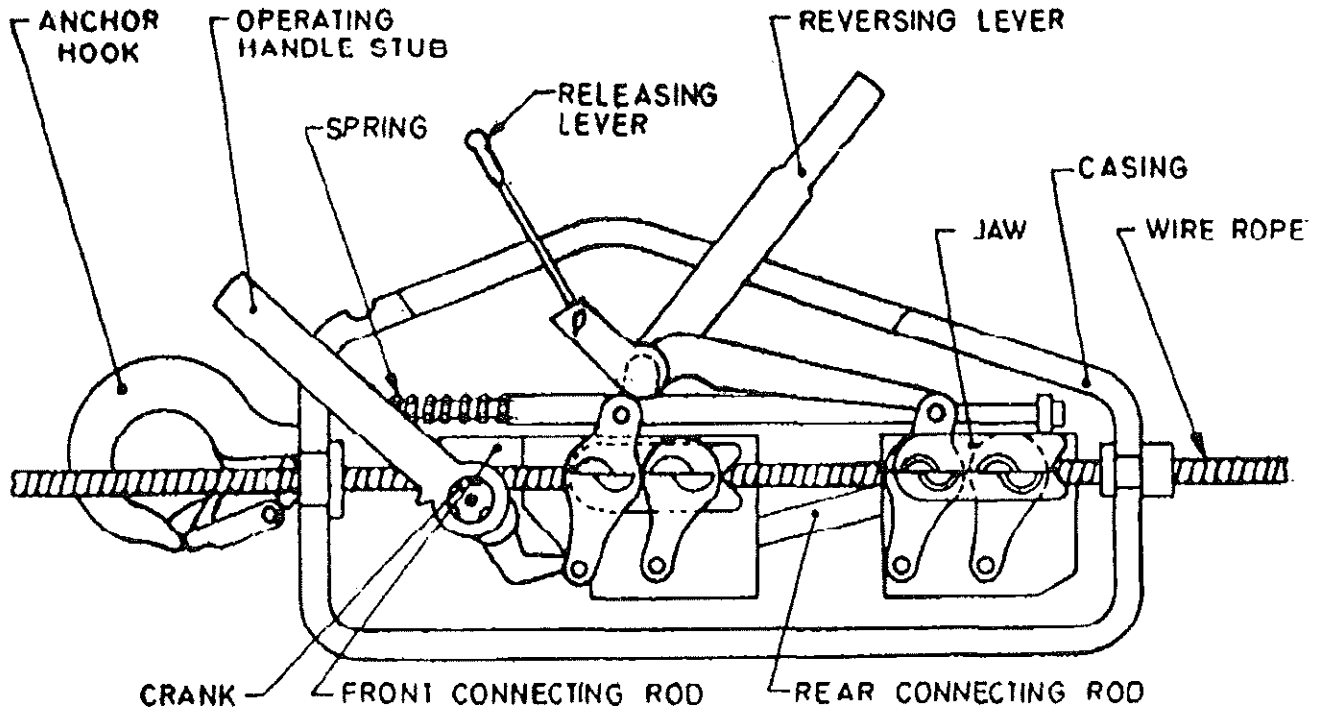


Fig. 2: Typical arrangement of Tirfor

**4.5. Hoisting Blocks (Pulleys) - Single Sheave**

**4.5.1. General Requirements**

This specification covers the requirements of single sheave pulley block of nominal sheave size from 160 to 320 mm for wire ropes of nominal size from 12 to 22 mm diameter for a maximum safe working load of 40kN on the single part. Typical arrangement shall be as shown in Fig. 4

**4.5.2. Design and Construction**

**4.5.2.1. Hooks**

The hooks shall be forged in 'one piece and shall be of special trapezoidal section point hook conforming to ISO 2766, grade T. The shank of the end fitting shall have thread as specified in ISO 724:1993 and shall not be clinched after fixing the cross head and nut.

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**4.5.2.2. Cross Head**

The cross head shall be neatly and cleanly dressed. The holes for shank of the hook and through pins shall be in correct alignment and at right angle to each other.

**4.5.2.3. Sheave**

The sheave shall be cast smooth, free from burrs, sharp-edges and other harmful defects.

**4.5.2.4. Bottom through Pin and Bottom Distance Pieces**

These shall be forged and machined. The end of bottom through pin shall be peened over the nut.

**4.5.2.5. Axle Pin**

The axle pin shall be machined from a bar not less than 3 mm larger in diameter than the diameter of the head portion -of the axle pin.

**4.5.2.6. Beckets**

The beckets shall be forged in one piece.

**4.5.2.7. Side or Partition Plate**

They shall be free from sharp edges, burrs and fins.

**4.5.2.8. Side Strap**

It shall be free from sharp edges, burrs and fins.

**4.5.2.9. Head Fitting**

It shall be in accordance with BS 4429:1987

**4.5.2.10. Top Head Gear**

The top head gear shall be free to swivel in the loaded condition without twisting the loaded rope. The hook shall rotate on ball thrust bearing housed in the cross head.

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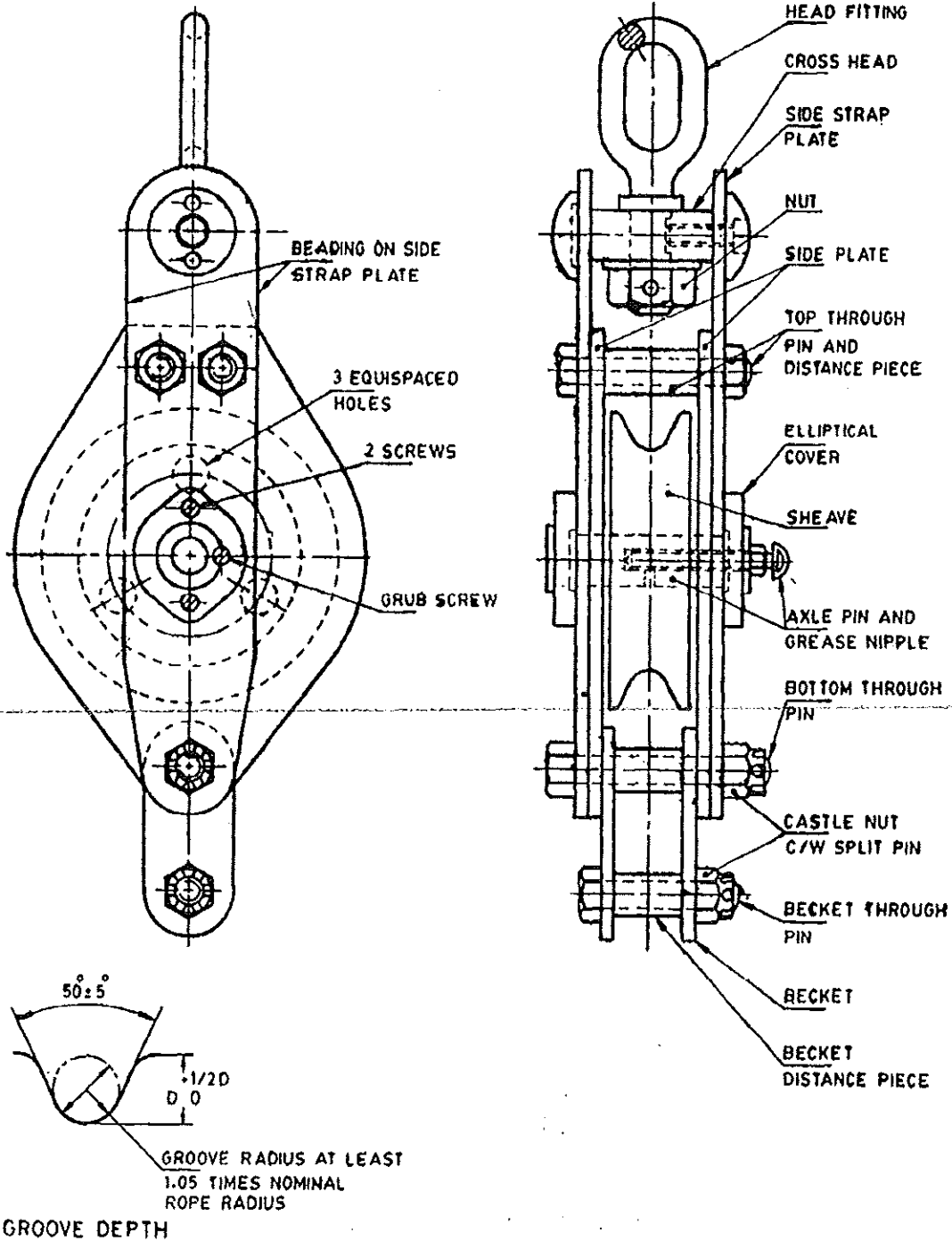


Fig. 4: Typical arrangement of Single Sheave Pulley Block

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**4.5.3. Load Capacity**

The complete block including head fittings shall be designed to withstand without visible distortion, a proof load equal to at least twice the load imposed by the safe working load (SWL) as given in Table 2 when the block is rigged as top block of 1 to 1 rig. The safe working loads of rig in kN shall be as given in Table 3.

**Table 3: Safe Working Loads for Single Pulley Blocks**

Designation of Pulley Block	Safe Working Load for single Part of Rope, kN
S 160 x 12	10
S 200 x 14	15
S 250 x 16	20
S 300 x 20	30
S 320 x 22	40

**4.5.4. Material requirements**

The material requirements of individual parts shall be as per Table 4 below;

**Table 4: Material components**

Component	Material specifications
Hook	Steel forgings conforming to reference symbol P, steel grade designation 080M20 of PD 970:2005 standard
Bottom distance piece	
Top distance washer	
Round nut	Steel forgings conforming to reference symbol P, steel grade designation 070M20 of PD 970:2005 standard
Cross head	
Axle pin	
Sheaves	Grey iron casting conforming to grade FG 200 of ISO 185:2005
Bottom through pin	Steel forgings conforming to reference symbol P, steel grade designation 150M36 of PD 970:2005 standard
Beckets	
Top through pin	
Spilt pin	Conforming to ISO 1234:1997
Side strap	Steel plate conforming to grade 17 of BS 1449-1.1:1991
Side or partition plate	

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PULLING AND LIFTING  
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Part 2: Ratchet Hoist (Pull Lift),  
Tirfor and Hoisting Blocks

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#### 4.6. QUALITY MANAGEMENT SYSTEM

- 4.6.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation of the ratchet hoist (pull lift), tirfor and hoisting blocks fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2008.
- 4.6.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.
- 4.6.3. The bidder shall indicate the delivery time of the ratchet hoist (pull lift), tirfor and hoisting blocks, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being offered.

#### 5.0. TESTS AND INSPECTION

- 5.1. The ratchet hoist (pull lift), tirfor and hoisting blocks shall be inspected and tested in accordance with ISO 724, ISO 185, ISO 8458-1, ISO 2766, ISO 15, ISO 1234, ISO 1461, ISO 898, ISO 606, BS EN 12385-4, BS 1449-1.1, BS EN 1706, BS EN 10250-3, BS 4429, PD 970 standards and all the provisions of this specification. It shall be the responsibility of the supplier to perform or to have performed the tests specified and whatever other tests he normally performs at works.
- 5.2. Copies of previous Type Tests Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. The accreditation certificate to ISO/IEC 17025 for the same third party testing laboratory used shall also be submitted with the tender document (all in English Language).
- 5.3. The copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be as stated below:
- Load Tests
  - Chemical composition of material parts.
- 5.4. The ratchet hoist (pull lift), tirfor and hoisting blocks shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers

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appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and Sample Test Reports for the pull lifts and hoisting blocks to be supplied shall be submitted to KPLC for approval before delivery of the goods.

5.5. Tests to be witnessed by KPLC Engineers at the factory before shipment shall be in accordance with ISO 724, ISO 185, ISO 8458-1, ISO 2766, ISO 15, ISO 1234, ISO 1461, ISO 898, ISO 606, BS EN 12385-4, BS 1449-1.1, BS EN 1706, BS EN 10250-3, BS 4429, PD 970 standards and provisions of specification and shall include:

- a) Proof Loading tests
- b) Operational tests
- c) Breaking load tests
- d) Physical Examinations

5.6. On receipt of the product, KPLC will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the ratchet hoist (pull lift), tirfor and hoisting blocks which upon examination, test or use; fail to meet any of the requirements in the specification.

**6.0. MARKING AND PACKING**

**6.1. MARKINGS**

**6.1.1. Ratchet Hoist (Pull Lift)**

Ratchet hoist after passing the proof test, shall be permanently and legibly be marked on a suitable part or on a name plate giving the following information:

- a) Manufacturer's name and trade-mark,
- b) Safe working load, and
- c) Size and grade of chain.
- d) **Certification Mark for the Standard body of the country of manufacture.**
- e) The words, "PROPERTY OF KPLC".

**6.1.2. Tirfor**

The following details shall be permanently and legibly marked on a universal pulling and lifting machine (pull lift) at a suitable place on the casing after the machine has passed the proof loading test:

- a) Manufacturer's name or trade-mark, if any;
- b) Safe working load (t); and

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- c) Maximum diameter (mm) of the wire rope for which it is used.
- d) Certification Mark for the Standard body of the country of manufacture.
- e) The words, "PROPERTY OF KPLC".

### 6.1.3. Hoisting Block

The following information shall be legibly and permanently marked on the block:

- a) Name of the manufacturer,
- b) Designation of the block,
- c) Maximum safe working load in kN; and
- d) Identification number of the block.
- e) The words, "PROPERTY OF KPLC".

## 6.2. PACKAGING

6.2.1. The ratchet hoist (pull lift), tirfor and hoisting blocks shall be packed in such a manner so as to avoid damage during transportation, handling and storage.

6.2.2. The following information shall be printed on a suitable label firmly attached to each packaging:

- a) Purchase order number/tender
- b) Manufacturer's name
- c) Year of manufacture
- d) Catalog number of the machine
- e) The words, "PROPERTY OF KENYA POWER & LIGHTING CO."

## 7. DOCUMENTATION

7.1 The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

- a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer;
- b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
- c) Sales records for the last five years and at least four customer reference letters;
- d) Details of manufacturing capacity and the manufacturer's experience;
- e) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
- f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;

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- g) Manufacturers letter of authorization, ISO 9001:2008 certificate and other technical documents required in the tender.
- h) Certificate of Test and Examination - Certificate of test and examination shall be issued with every consignment of Ratchet hoist (pull lifts), tirfor and hoisting blocks giving following information for each machine:
  - (i) Distinguishing mark,
  - (ii) Description,
  - (iii) Wire rope size and type or load chain size and type
  - (iv) Number tested,
  - (v) Proof load applied,
  - (vi) Operational test load applied,
  - (vii) Rating, and
  - (viii) Back-slippage of load per stroke in case of pull lifts.

7.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

- a) Guaranteed Technical Particulars signed by the manufacturer;
- b) Design Drawings with details of ratchet hoist (pull lift), tirfor and hoisting blocks to be manufactured for KPLC.
- c) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008
- d) Detailed test program to be used during factory testing;
- e) Marking details and method to be used in marking the ratchet hoist (pull lift), tirfor and hoisting blocks;
- f) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the ratchet hoist (pull lift), tirfor and hoisting blocks for The Kenya Power & Lighting Company;
- g) Packaging details (including packaging materials).

7.3 The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the ratchet hoist (pull lift), tirfor and hoisting blocks to KPLC stores.

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**ANNEX A: Guaranteed Technical Particulars** (to be filled and signed by the Supplier and submitted together with copies of manufacturer's catalogues, brochures, drawings, technical data, sales records, customer reference letters and copies of certificates/test reports for tender evaluation)

Tender No. ....

Clause number	Bidder's offer (indicate full details of the offered item for each requirement of the tender & specification)
Bidder's Name	
Manufacturer's Name, address and country	
Type reference/model number of item(s) offered	
Scope: 1.1	
1.2 Conductor tensioning and stringing devices	
a) Pull Lift 5 tons	
b) Hoisting Blocks (Pulleys) Single Sheave	
1.3.	
2.0 Applicable Standards (References)	
3.0 Terms & definitions	
4.0 Requirements	
4.1 Service conditions	
4.2 Particular requirements	
4.3 Ratchet Hoist (Pull lift)	
4.3.1 Design	
4.3.2 Construction	
4.3.2.1 Gears	
4.3.2.2 Load brake	
4.3.2.3.1 - 4.3.2.3.2	
4.3.2.4 Pawls	
4.3.2.4.1 - 4.3.2.4.4	
4.3.2.5 Suspension assembly	
4.3.2.5.1 - 4.3.2.5.2	
4.3.2.6 Load chain	
4.3.2.6.1 Type	
4.3.2.6.2 Length of chain	
4.3.2.6.3 Load chain wheel	
4.3.2.6.4 Guide	
4.3.2.6.5 Stripper	
4.3.2.6.6 Idler wheels	
4.3.2.7 Actuating ratchet wheel	
4.3.2.8 Operating lever	

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4.3.2.9 Reversing knob	
4.3.2.10 Hand wheel	
4.3.3 Material requirements	
4.3.4 Dimensions and rating	
4.4 Tirfor	
4.4.1 General requirements	
4.4.1.1 – 4.4.1.3	
4.4.2 Material	
(4.4.2.1 - 4.4.2.4)	
4.4.3 Capacity	
4.4.4 Construction and workmanship	
a. Casing	
b. Bearings	
(i) Ball and roller bearing	
(ii) Plain bearings	
c. Wire ropes	
4.4.5 Operation	
4.4.5.1 - 4.4.5.4	
4.5 Hoisting blocks	
4.5.1 General requirements	
4.5.2 Design and construction	
4.5.2.1 Hooks	
4.5.2.2 Cross Head	
4.5.2.3 Sheave	
4.5.2.4 Bottom through pin	
4.5.2.5 Axle pin	
4.5.2.6 Becketts	
4.5.2.7 Side or partition plate	
4.5.2.8 Side strap	
4.5.2.9 Head fitting	
4.5.2.10 Top head gear	
4.5.3 Load capacity	
4.5.4 Material components	
<b>Component</b>	<b>Material specifications</b>
Hook	Steel forgings conforming to reference symbol P, steel grade designation 080M20 of PD 970:2005 standard
Bottom distance piece	
Top distance washer	
Round nut	Steel forgings conforming to reference symbol P, steel grade designation 070M20 of PD 970:2005 standard
Cross head	
Axle pin	Grey iron casting conforming to grade FG 200 of ISO 185:2005
Sheaves	
Bottom through pin	Steel forgings conforming to reference

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Beckets	symbol P, steel grade designation 150M36	
Top through pin	of PD 970:2005 standard	
Spilt pin	Conforming to ISO 1234:1997	
Side strap	Steel plate conforming to grade 17 of BS	
Side or partition plate	1449-1.1:1991	
4.6 Quality Management System		
4.6.1 – 4.6.3		
5.0 Tests and Inspection		
5.1 – 5.4		
6.0 Marking and Packing		
6.1 Marking		
6.1.1 Pull lifts		
6.1.2 Hoisting block		
6.2 Packing		
6.2.1		
6.2.2		
7.0 Documentation		
7.1 Completed tender document		
7.2 Catalogues, brochures, drawings & technical data submitted with offer		
8.0. Manufacturer's Guarantee and Warranty		
9.0 List catalogues, brochures, technical data and drawings submitted to support the offer.		
10.0 List customer sales records and reference letters submitted to support the offer.		
11.0 List Test Certificates submitted with tender		
12.0 List test reports of pull lifts and hoisting blocks to be submitted to KPLC for approval before shipment		
13.0 Statement of compliance to specification (indicate deviations if any & supporting documents)		

.....  
**Supplier's Name, Signature, Stamp and Date**

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