

Primary lithium battery

LST 14250

3.6 V Primary lithium-thionyl chloride (Li-SOCl₂)
 High energy density
 1/2 AA-size bobbin cell



Benefits

- High voltage, stable during most of the application's lifetime
- Wide operating temperature range
- Low self-discharge rate
(less than 1% per year of storage at +20°C)
- Easy integration into compact systems

Key features

- Hermetic glass-to-metal sealing
- Non-flammable electrolyte
- Compliant with IEC 86-4 safety standard and EN 50020 intrinsic safety standard
- Underwriters Laboratories (UL) Component Recognition (File Number MH 12802)
- Non-restricted for transport

Main applications

- Utility metering
- Automatic meter reading
- Alarms and security devices
- Toll collection
- Memory back-up
- Computer real-time clocks
- Tracking systems
- Automotive electronics
- Professional electronics

Cell size references

1/2 UM3 - 1/2 R6 - 1/2 AA

Electrical characteristics

(typical values relative to cells stored for one year or less at +30°C max.)

Nominal capacity		1.10 Ah
<i>(at 1 mA +20°C 2.0 V cut off. The capacity restored by the cell varies according to current drain, temperature and cut off)</i>		
Open circuit voltage	(at +20°C)	3.67 V
Nominal voltage	(at 0.1 mA +20°C)	3.6 V

Pulse capability : Typically up to 100 mA (100 mA/0.1 second pulses, drained every 2 mn at +20°C from undischarged cells with 10 µA base current, yield voltage readings above 3.0 V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history. Fitting the cell with a capacitor may be recommended in severe conditions. Consult Saft)

Continuous current permitting 50% of the nominal capacity to be achieved at +20°C with 2.0 V cut off.	35 mA
<i>(Higher currents are possible, consult Saft)</i>	

Storage	(recommended) (for more severe conditions, consult Saft)	+30°C (+86°F) max
---------	---	-------------------

Operating temperature range	-60°C/+85°C (-76°F/+185°F)
<i>(Operation above ambient T may lead to reduced capacity and lower voltage readings at the beginning of pulses. Consult Saft)</i>	

Physical characteristics

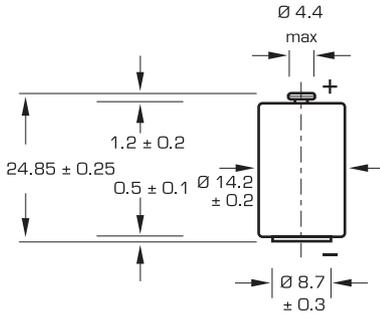
Diameter (max)	14.4 mm (0.57 in)
Height (max)	25.1 mm (0.99 in)
Typical weight	9.4 g (0.3 oz)
Li metal content	approx. 0.3 g

Available termination suffix

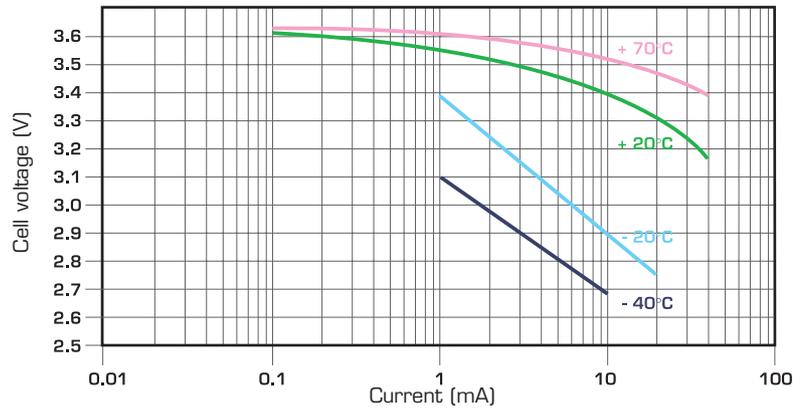
CN, CNR	radial tabs
2 PF, 3 PF, 3 PF RP, 4 PF	radial pins
CNA (AX)	axial leads
FL	flying leads ...etc.



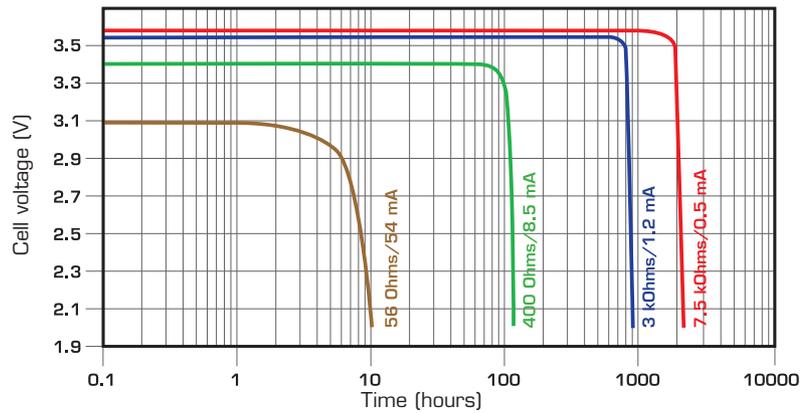
LST 14250



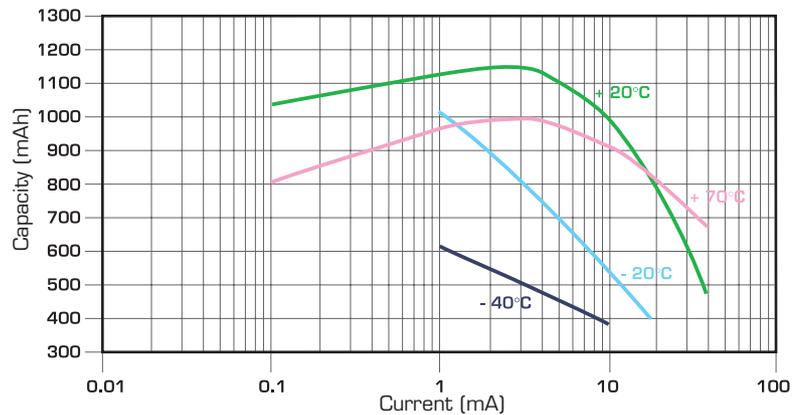
Dimensions in mm.



Voltage plateau versus Current and Temperature (at mid-discharge)



Typical discharge profiles at +20°C



Restored Capacity versus Current and Temperature (2.0 V cut off)

Storage

- The storage area should be clean, cool (not exceeding +30°C), dry and ventilated.

Warning

- Fire, explosion and severe burn hazard.
- Do not recharge, short circuit, crush, disassemble, heat above 100°C (212°F), incinerate, or expose contents to water.
- Do not solder directly to the cell (use tabbed cell versions instead).

Saft

Specialty Battery Group

12, rue Sadi Carnot

93170 Bagnolet - France

Tel +33 (0)1 49 93 19 18

Fax +33 (0)1 49 93 19 69

River Drive, South Shields

Tyne and Wear, NE33 2TR - UK

Tel +44 191 456 1451

Fax +44 191 456 6383

www.saftbatteries.com

Doc. N° 31073-2-0506

Information in this document is subject to change without notice and becomes contractual only after written confirmation by Saft.

For more details on primary lithium technologies please refer to Primary Lithium Batteries Selector Guide Doc N° 31048-2.

Published by the Communications Department

Photo credit: Saft

Société anonyme au capital de 31 944 000 €

RCS Bobigny B 383 703 873

Produced by Arthur Associates



SAFT



STANDARD SPECIFICATION

Non-rechargeable Li-SOCl₂ cell

LST 14250 Type

	Name	Position	Date	Signature
Written by	A. Kerouanton	Lithium Product Manager	04/06	
Checked by	O. Girard	Industrial & Technical Director	04/06	
Approved by	H. Drehmer	Lithium Sales Director	04/06	

Issued by	A. Kerouanton				
Date	12/02	10/03	11/04	02/05	04/06
Edition Nr	1	2	3	4	5

LST 14250

Page 1
April. 2006
N° 8800 Ed. 5



1. Subject

This specification presents typical and guaranteed ex-works values for the Lithium-Thionyl Chloride (Li-SOCl₂) cell type LST 14250 (IEC standard ½ R6, ANSI standard ½ AA).

This cell is intended for high energy applications, requesting good voltage response and operating life in - 60/+ 85°C environments.

2. Typical values

A. Designation

LST 14250

B. Nominal voltage

3.6 V (on 36 kΩ/0.1 mA at + 20°C).

C. Nominal capacity

1.1 Ah (on 3.6 kΩ/1 mA, at + 20°C, cut-off voltage 2 V).

(The capacity returned by the cell varies according to the current drain, the temperature and the voltage cut-off).

D. Maximum recommended continuous current

35 mA

(to get 50 % of the nominal capacity at + 20°C to a 2 V cut-off. Higher currents are possible. Consult Saft).

E. Pulse current capability

Typically up to 100 mA (100 mA/0.1 second pulses, drained every 2 mn at + 20°C from undischarged cells with 10 μA base current, yield voltage readings above 3.0 Volts). The cell voltage response varies according to pulse characteristics (frequency, duration), temperature, cell history (storage conditions prior to usage) and the application's acceptable minimum voltage. *Consult Saft for case by case study.*

The use of parallel capacitor to enhance the voltage during the first tens of millisecond of the pulses might be recommended. *Consult Saft.*



F. Operating temperature range

- 60/+ 85°C

(short excursions up to 120°C possible without leakage but external sleeve deterioration may occur above 100°C).

(Operation above ambient temperature may lead to reduced capacity and lower voltage readings at the beginning of pulses).

G. Typical weight

9.4 grams.

3. Construction and visual aspect

A. Construction

The LST 14250 cell is constructed according to the concentric electrodes "bobbin" technology.

A glass-to-metal seal ensures the hermeticity of the cell ($\leq 10^{-7}$ atm.cc/sec under 1 atm He).

B. Visual aspect

When inspected by eye, the LST 14250 cell should not show any trace of dents, swelling, corrosion or electrolyte leakage. Marking should be readable.

4. Environment and mechanical tests

A. Altitude simulation

The LST 14250 cell complies with the UN** and IEC*** tests which consist of storage at +20°C for at least 6 hours under an absolute pressure of 11.6 kPa ($\approx 15,240$ m altitude) without any leakage, fire, vent or explosion.

B. Free fall

The LST 14250 cell complies with the IEC*** test which consists of 2 drops/plane (6 in total, samples randomly oriented) onto a concrete floor from an height of 1.0 m without any leakage, vent, explosion or fire.



C. Vibration

The LST 14250 cell complies with the UL* and IEC*** tests which consist of the following:

- Frequency span : 10 to 55 Hz.
- Peak to peak amplitude : 1.6 mm.
- Test duration : 95 ± 5 mm per axis.

Test carried out on three perpendicular axes. The cell must retain its operational characteristics and normal visual aspect.

D. Mechanical shock

The LST 14250 cell complies with the UL* and IEC*** tests which consist of performing the following:

- Average acceleration : 75 g.
- Maximum acceleration : 125 - 175 g.

Shocks applied to each of the three perpendicular axes. The cell must retain its operational characteristics and normal visual aspect.

Safety standards mentioned:

- *UL Underwriters Laboratories Inc.
"Standard for Lithium Batteries" – UL 1642 – Third Edition – 1995
- **UN Secretariat of the United Nations
"Model Regulations on the Transport of Dangerous Goods"
Ref. ST/SG/AC.10/1 – Revision 13 – 2003
+ "Manual of Tests and Criteria"
Ref. ST/SG/AC.10/11 – Revision 4 – 2003
- ***IEC International Electrotechnical Commission
International safety standard for lithium batteries
"IEC-CEI 86-4" – Second Edition – 2000
- ATEX Intrinsic Safety Standard for use in explosive atmospheres
EN 50020 – Clause 10.9 – 2002



5. Storage

Before use the LST 14250 cell should be stored in dry and cool conditions, at a temperature preferably not exceeding + 30°C.

Storage at higher temperature is possible but it may affect later the cell capacity and its ability to show good start up voltage characteristics.

6. Safety

We advise, during use of the LST 14250 cell, the following precautions should be observed:

- a) Do not remove the cells from their original packing before use.
- b) Do not store the cells in bulk in order to avoid accidental short circuiting.
- c) Do not heat above 100°C or incinerate.
- d) Do not disassemble.
- e) Do not recharge.
- f) Do not solder directly on the cell. *(use tabbed cell finish versions instead).*
- g) Do not mix new and used cells or cells from different origins.
- h) Respect the polarities of the cell.

The LST 14250 cell is recognized as "Technician Replaceable" by the Underwriters Laboratories Inc. under the file number MH 12802.

The LST 14250 cell complies with the International Electrotechnical Commission (IEC) Safety Standard IEC-CEI 86-4.

The LST 14250 cell complies with the requirements of the clause 10.9 of the ATEX Safety Standard and is assigned to the class T6.

7. Transport

The LST 14250 cell has demonstrated an ability to pass the safety tests listed in the United Nations "Recommendations on the Transport of Dangerous Goods – Manual of Tests and Criteria" Reference ST/SG/AC.10/11 Revision 4 – 2003.

Hence, and in accordance with the United Nations "Model Regulations on the Transport of Dangerous Goods" Reference ST/SG/AC.10/1 – Revision 13 – 2003, the LST 14250 cell, which contains less than 1 gram of lithium metal, is declared as non-restricted to transport.



8. Guaranteed minimum values

	Initial [*]	Up to 12 months storage ^{**} in the recommended + 30°C max. conditions
Open Circuit Voltage (OCV)	3.640 V	3.640 V
On Load Voltage (after 5 seconds on 500 Ω ± 1 % at + 20°C) (I ≈ 6 mA)	3.30 V	3.10 V
Capacity (on 3600 Ω ± 1 % at + 20°C 2 V cut-off)	1.00 Ah	0.97 Ah

9. Incoming inspection

Prior to release from factory, the LST 14250 cell is 100 % inspected for Open Circuit Voltage (OCV) and On Load Voltage.

The capacity, visual aspect and dimensions are checked by sampling.

In case of incoming inspection, Saft recommends the following:

A. Sampling standards

French	British	German	American	ISO
NFX 06-022 NFX 06-023	BS 6001 BS 6002	DIN 40080 DIN ISO 3951	MIL STD 10 5D MIL STD 414	2859 3951

* Initial : Within one month following the date code printed on the sleeve.

** Following the date code printed on the sleeve.



B. Acceptable Quality Levels (AQL)

Cell lot size	Sampling size	AQL
1 – 3 200	32	0.4 %
3 201 – 10 000	50	0.25 %
> 10 000	80	0.15 %

10. Labelling

The external surface of the LST 14250 cell displays the following:

SAFT LITHIUM LST 14250 Made in U.K. 3.6V +/- polarities

UL logo Safety warning Crossed-out wheeled refusal bin logo

Cell finish date code with year/day.

Example:

05 097

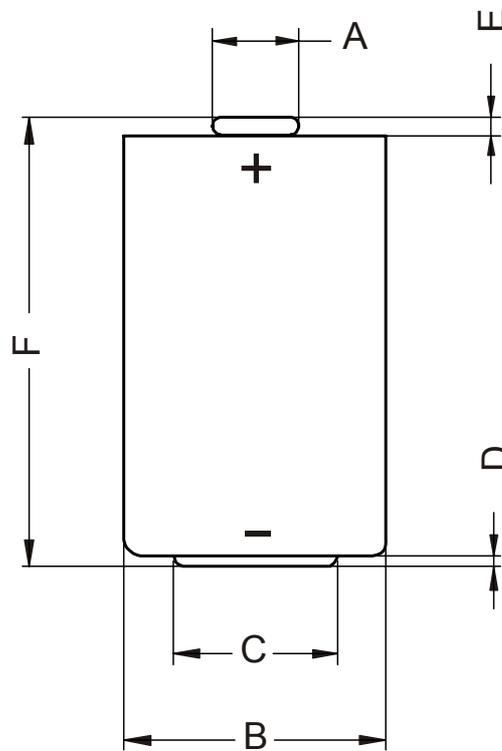
(cell finished the 97th day of year 2005)



11. Untabbed/sleeved cell external dimensions

(dimensions in mm)

P/N T04/8AA.1



	A	B	C	D	E	F
LST 14250	4.4 maxi	14.2 ± 0.2	8.7 ± 0.3	0.5 ± 0.1	1.2 ± 0.2	24.85 ± 0.25



12. Main cell finish versions

A. LST 14250 CNR

(version with 2 rectangular nickel-plated steel radial tabs running in the same direction) P/N T04/8AA.10

B. LST 14250 2PF

(version with 2 nickel-plated steel radial tabs featuring 1 prong on each side) P/N T04/8AA.6

C. LST 14250 3PF

(version with 2 nickel-plated steel radial tabs featuring 2 prongs on + side and 1 prong on – side) P/N T04/8AA.11

D. LST 14250 3PF RP

(version with 2 nickel-plated steel radial tabs featuring 2 prongs on – side and 1 prong on + side) P/N T04/8AA.9

E. LST 14250 CNA

(version with 2 tinned-copper axial leads) P/N T04/8AA.8

F. LST 14250 CNR OP

(version with 2 rectangular nickel-plated steel radial tabs running in opposite directions) P/N T04/8AA.2

See corresponding drawings on the following pages.

Other finish versions are available on request. Consult Saft

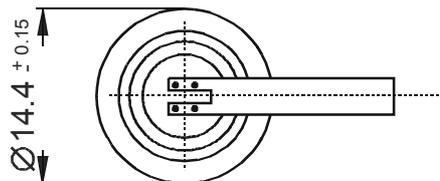
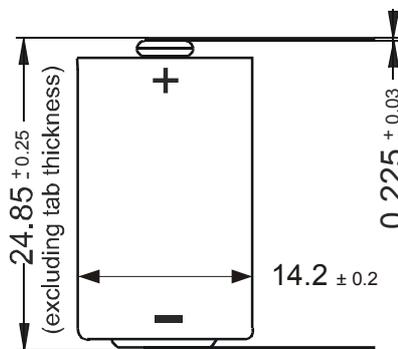
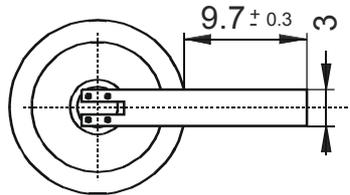


LST 14250 CNR

P/N T04/8AA.10

(dimensions in mm)

**Version with 2 rectangular nickel-plated steel radial tabs
running in the same direction**



LST 14250

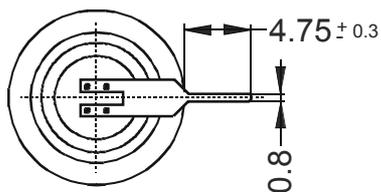
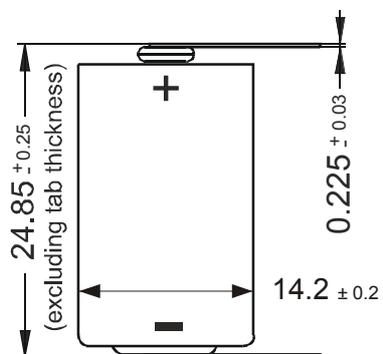
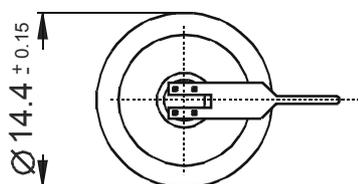


LST 14250 2PF

P/N T04/8AA.6

(dimensions in mm)

Version with 2 nickel-plated steel radial tabs
featuring 1 prong on each side



LST 14250

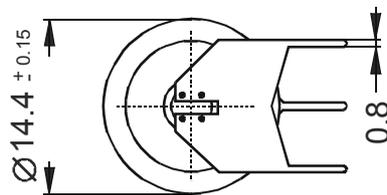


LST 14250 3PF

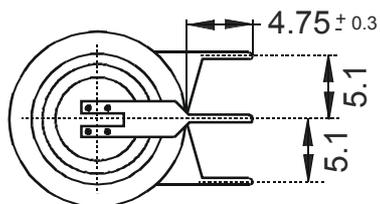
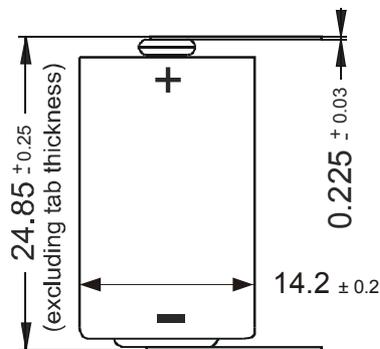
P/N T04/8AA.11

(dimensions in mm)

Version with 2 nickel-plated steel radial tabs
featuring 2 prongs on + side and 1 prong on - side



Positive end



Negative end

LST 14250

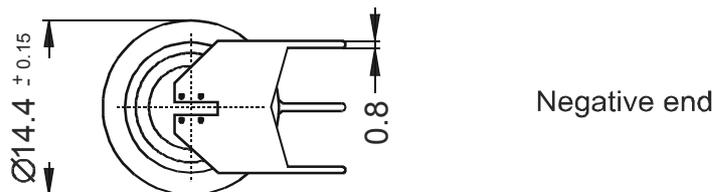
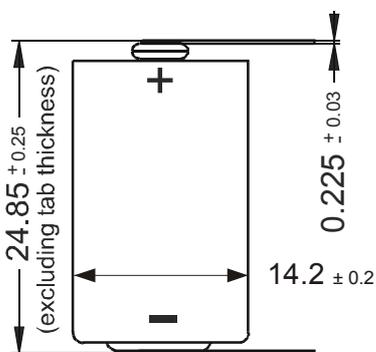
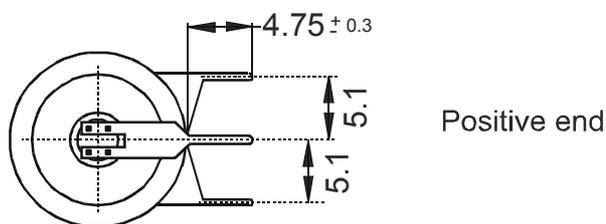


LST 14250 3PF RP

P/N T04/8AA.9

(dimensions in mm)

Version with 2 nickel-plated steel radial tabs
featuring 2 prongs on - side and 1 prong on + side



LST 14250

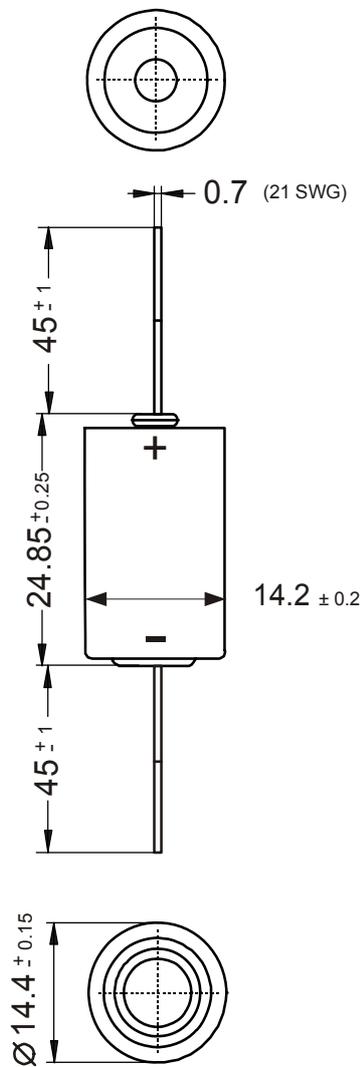


LST 14250 CNA

P/N T04/8AA.8

(dimensions in mm)

Version with 2 tinned-copper axial leads



LST 14250

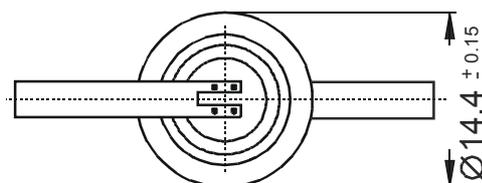
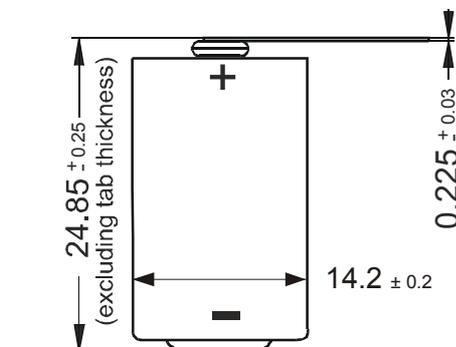
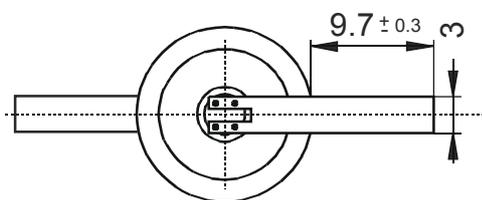


LST 14250 CNR OP

P/N T04/8AA.2

(dimensions in mm)

Version with 2 rectangular nickel-plated steel radial tabs
running in opposite directions



LST 14250