

Title: **INTALLATION OF PREPAID
SPLIT METERS**

Unique Identifier: **240-142000175**

Alternative Reference Number: **n/a**

Area of Applicability: **Engineering**

Documentation Type: **Task Manual**

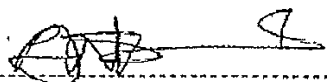
Revision: **1**

Total Pages: **14**

Next Review Date: **January 2024**

Disclosure Classification: **Controlled
Disclosure**

Compiled by

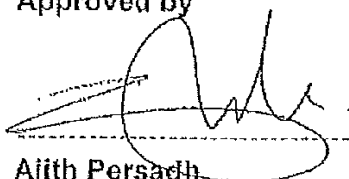


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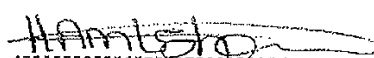


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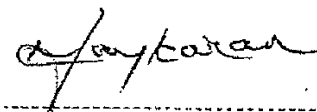


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Content

	Page
1. Introduction	3
2. Supporting clauses	3
2.1 Scope	3
2.1.1 Purpose	3
2.1.2 Applicability	3
2.2 Normative/informative references	3
2.2.1 Normative	3
2.2.2 Informative	4
2.3 Definitions	4
2.3.1 General	4
2.5 Roles and responsibilities	7
2.6 Process for monitoring	8
The risk assessment shall not be limited to the following:	8
2.7 Related/supporting documents	8
3. Safety Summery	8
3.1 Tools and equipment required	8
3.2 Roles and responsibilities	9
3.3 Installation Of 20A Split meter Overhead network	9
3.4 Installation Of 20A Split meter Underground network	10
3.5 Installation Of 60A Split meter Underground network	10
3.6 Installation Of 60A Split meter Overhead network	11
4. Authorization	12
5. Revisions	13
6. Development team	13
7. Acknowledgements	13
Annex A- Meter Movement form	14

1. Introduction

This document was developed to guide Maintenance/CNC staff on how to install Split prepaid meters. . It should be used in conjunction with Suppliers Installation and Maintenance Manual that is supplied by meter manufacturers with all meters that are supplied to Eskom.

2. Supporting clauses

2.1 Scope

2.1.1 Purpose

To set out the Task Manual for installing/replacing of Split meters

2.1.2 Applicability

This document shall apply throughout Eskom Holding Limited, its divisions, subsidiaries and entities wherein Eskom has a controlling interest

2.2 Normative/informative references

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs

2.2.1 Normative

- [1] 32-727: Rev.1, Safety, Health, Environmental and Quality (SHEQ) policy
- [2] 240-124982934:Rev.1, Low voltage live working standard
- [3] 240-73413207 1: Rev. 1, LV Training standard
- [4] 209-0001: Rev .1, Certification of Engineering Learning Facilitators
- [5] 34-1131: Rev. 0, Standard for Fall Arrest System
- [6] 34-1402: Rev. 0, Procedure for Fall Arrest System
- [7] 34-1150: Rev 0, Lifting machine operators training
- [8] 34-408: Rev 0, Distribution driver and operator assessment and training
- [9] 34-961: Rev 3, Legal appointments and authorizations
- [10] 34-332: Rev 2, First Aid Standard
- [11] 34-380: Rev 0, Identifying, Analysing, Documenting and Observing Dangerous/Hazardous tasks
- [12] 34-227: Rev 1, Pre-task planning and feedback process
- [13] 240-61523882: Low Voltage Operating Regulation
- [14] 240-88478369 Training Manual for the Operation and Maintenance of Solar PV Plants
- [15] 240-72597722: Environmental Impact Assessment for Distribution Activities
- [16] DMN_34-101: Usage of Extension, Single, "A" Frame Ladders or Two Step Platform
- [17] 240-44175132: Eskom Personal Protective Equipment (PPE)
- [18] 240-62196227: Life Saving Rules
- [19] 240-76628631: Standard for sealing metering equipment
- [20] 240-117125363: Application of Prepayment Split Meters in the Operating Units

- [21] 240-76619475: Prepayment Meters Repair Process
- [22] 240-Prepament Metering RACI Initiative
- [23] 06TI-020: Meter Movement Form for Conventional and Prepaid meters
- [24] 240-142025299 CoC Test equipment specification

2.2.2 Informative

- [25] IEC 60743: Terminology for tools and equipment to be used in live working
- [26] IEC 60903: Gloves and mitts of insulating material for live working
- [27] IEC 60900: Hand Tools for live working up to 1000V A.C. and 1500V D.C
- [28] OHS Act: Occupation Health and Safety Act 85 of 1993 and Regulations
- [29] Suppliers' Maintenance Manual
- [30] ISO 9001: Quality Management System

2.3 Definitions

2.3.1 General

Definition	Description
Alive	'Alive' means electrically connected to the power system and/or electrically charged
Apparatus	Any generator, transformer, motor, switchgear, isolator, feeder, and any other low-voltage plant
Barricade	It's a device used to restrict an approach to Electrical Network
Connection and Disconnection Service Providers	A Person authorised to perform connection and disconnection of customers
Dead	Any apparatus so described is at or about zero potential and disconnected or isolated from any live power system.
Distribution pillar box	A junction box installed on an underground LV cable network, which is part of the infrastructure from which services connections originate to the respective customers
Distribution transformer	The high-voltage terminations, isolators or fuses and bushings on the high and low-voltage sides of the transformer installed on a pole or in a ground-mounted unit
Earthing	The connecting of apparatus electrically to the general mass of earth in such a manner as will ensure at all times an immediate safe discharge of electrical energy
Electrical Circuits	Electrical circuit is the complete path of an electric current, including the generating apparatus, intervening resistors, or capacitors.
Electricity Dispenser	Is a tariff meter that dispenses pre-paid electricity to a 60 Amp Conventional Customer Installation and is controlled by either a key-pad or a token mechanism

Definition	Description
Embedded Generators	One or more energy generation sources that includes the energy conversion device, static power converters, if applicable, and the control and protection gear within a customer network that operate in synchronism with the utility supply.
Energy control unit	Is 20 A Tariff meter with earth leakage build into it and socket outlet is prewired base
Fault finding	The process of testing and inspecting the LV network to locate a fault.
Identification of LV circuits	Labelling and testing before and after switching out the circuit. The inspection of circuit or cable identification labels, visually tracing a circuit from its origin to the load and physically verifying the circuit voltage changed from dead to alive or vice versa after operating took place to ensure it is the correct circuit intended to be worked on.
Isolator	Device used to break or make an LV circuit. This will include fuses. Miniature Circuit breaker and Moulded Case Circuit breakers
Line	An exposed overhead feeder that includes supports and terminal equipment.
Linking	The Opening or closing of isolators on the LV
Lock off sign and tagging	The application or removal of approved notices prohibiting the interference with the infrastructure or service connection identifying the person or authority that prepared the plant.
Lockout	A precautionary measure taken to prevent the unauthorized operation of a breaker, fuse and/or isolator, which could include locking off of isolators and/or cabinets, by means of sealing or locking; also removal of fuse holders and retention on the person.
Low Voltage	Voltage that does not exceed 1 000 V alternating current (AC) or 1500 V direct current (DC)
Low Voltage Worker	Any worker doing work on the LV Network. This includes authorised and unauthorised workers
LV live compartment	Any compartment, enclosure or any situation in which inadvertent human contact with conductors or live parts of electrical apparatus working at low voltage is possible.
LV operating	Performing identification of circuit switching, linking, locking out, safety testing, (Earthing/bonding shall be done on bare conductors)and tagging of isolation points.
LV Operator	A person suitably selected, trained, assessed and authorized to perform circuit identification, isolating, locking out, tagging and testing activities on either or both overhead and underground up to 1000 V networks or 1500DC.
LV Operator in training	A person suitably trained and authorized to perform LV operating in terms of these regulations under the supervision of a person authorized to do so.
LV overhead infrastructure	The LV network supplied from a pole-mounted transformer, which shall include the terminations of the LV bushing of the transformer to the busbar in the stubby/pillar box or Miniature Circuit-breaker (MCB) in the pole top box that is supplied from the transformer.
LV Responsible Person	A person who has been authorized to be responsible for ensuring that the work on the LV Infrastructure and Service Connections covered by a permit can be carried out safely and in accordance with this regulations

Definition	Description
LV Specific Authorisation	Is the giving of permission in writing to perform specific duties and responsibilities in term of the LV Regulations
LV Switching	Connecting/disconnecting a circuit from all possible sources of supply by means of opening/closing isolators,
LV underground infrastructure	The LV network supplied from a mini-substation, which shall include the 400 V busbars in such mini-substation to the busbar in the stubby/pillar box that is supplied from the mini-substation.
LV Work Permit	A printed form containing permit and clearance for work to be done on LV infrastructure.
Meter Reader	A Person authorised to access metering cabinet for the purpose of meter reading
Meter Technician	A Person suitable trained and authorised to perform verification, maintenance of metering, installation, commissioning of Low Voltage metering and monitoring equipment and live method of non- intrusive CT ratio verification.
Mini-substation	The cable terminations, transformer, switches, fuses and busbars on the high and low-voltage sides of the transformer contained in an enclosed and integrated substation.
Point of consumption	Means any point of the outlet or supply terminals of machinery which is not connected to a point of outlet and which converts electrical energy to another form of energy: Provided that in the case of machinery which has been insulated for any specific purpose as a complete unit, the point of consumption shall be the supply terminals which have been provided on the unit of machinery for that purpose
Point of control	Means the point at which an electrical installation on or in any premises can be switched off by a user or lessor of the electricity supplied from the point of supply Or the point at which particular part of an electrical installation on or in any premises can be switched off where different users occupy different parts of such premises.
Point of outlet	Means any termination of an electric installation which has been provided for connecting any electrical machinery without the use of tools
Point of Supply	Means the point at which the electricity is supplied to any premise by a supplier
Pole-mounted service distribution box	A junction box installed on overhead LV infrastructure from which services connections originates to the respective customers.
Risk Assessment	A risk assessment is a process to identify potential hazards and analyze what could happen if a hazard occurs and mitigate for the hazards identified.
Safety testing	The testing of LV infrastructure or service connection with an approved device to determine whether it is energized (alive) or de-energized (dead) at the point of work.
Service connection	The part of the LV circuit that connects a customer point of supply (prepaid or billed) to the busbar or MCB in a pole top box, stubby or pillar box.
Service Providers	Any Person providing service on the Eskom LV network.(Including Eskom employees)
Shared structure	A power line route where LV, MV and/or Telecommunication circuits share the same structure.

Definition	Description
Shared structure	A power line route where LV, MV and/or Telecommunication circuits share the same structure
Split meters	Is the prepaid meter which has the keypad separated from the measuring unit
Street-light circuits	Streetlight circuits include the luminaries and fixtures, and each supply cable or feeder thereto.
Streetlight Worker	A person trained and assess to access and work on street lights
Supervision or supervise	This refers to the overseeing of the actions of a person or persons so as to prevent any act that could be dangerous or in contravention of these regulations.
Tariff meter	The whole current, Electro-magnetic or Solid State device to measure a customer's electricity utilization
Testing	Performing tests while circuits are alive to confirm the circuit meets specification in terms of load balancing, phase rotation, polarity, earth leakage trip values, meter functionality, and performance and voltage regulation.
Work	Work refers to all physical activities in connection with LV infrastructure and service connections, including LV live work.

2.3.2 Disclosure classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 Abbreviations

Abbreviation	Description
ABC	Aerial Bundled Conductor
CAP	Committee for Accepted Products
CoC	Certificate of Compliance
CB	Circuit breaker
CNC	Customer Network Centre
LV	Low Voltage
MCB	Miniature Circuit-breaker
PPE	Personal Protective Equipment
SANS	South African National Standards

2.5 Roles and responsibilities

The Designated Person, or his delegate, shall ensure that this Task manual is implemented and adhered to.

An Authorized LV Operator / LV Responsible Person shall ensure that the Installation of Split Metering is done safely in accordance with this manual

Pre Task Planning and Risk Assessment shall be done on site for each task according to 34-227. Risk identified shall be listed together with the steps to be taken to minimize the risk

2.6 Process for monitoring

The risk assessment shall not be limited to the following:

- a) Work in close proximity
- b) Work in water environment
- c) Roadside work
- d) Noise levels and effectiveness of communication
- e) Work in elevated positions
- f) Condition of poles, structure, hardware and conductors
- g) Rating of equipment
- h) Public
- i) Weather condition
- j) Equipment and tools
- k) Materials and spares
- l) Confined spaces
- m) Back feed or interconnection with other sources
- n) Illegal connections

Note: The workers retain the right to refuse to work on grounds of health, safety and environmental concerns according to DPC_ DST 34-1710.

Note: Risk assessment shall be done continuously and the document updated.

2.7 Related/supporting documents

Not applicable

3. Safety Summery

The safety inspection shall not be limited to the following:

- a) Approved rubber gloves [class 0], protector and a face shield shall be worn at all times when live working is done
- b) All LV Live workers must wear approved long sleeve jackets and pants
- c) Inspect the structure for damage
- d) Inspect the climbing equipment
- e) The operator of the pedestal mounted ladder or aerial device must be authorised

3.1 Tools and equipment required

The following are the basic safety tools and equipment required for the task:

- a) Wear an approved face shield and rubber gloves
- b) FAS/Climbing equipment
- c) Operating stick
- d) Prohibitory signs

3.2 Roles and responsibilities

The Designated Person, or his delegate, shall ensure:

- a) that this document is implemented and adhered to.
- b) the LV Worker is authorised to do the work

3.3 Installation Of 20A Split meter Overhead network

The following are the steps to guide worker/s on the installation of Split meter

- a) Do the risk assessment and document your steps
- b) Identify the customer and the pole top box number
- c) Inform the customer that a meter is going to be installed and discuss where the ready board should be installed
- d) Ensure that the meter to be installed is programmed for 20A
- e) Ensure that the Pole top box circuit breaker is according to Electrification Standard
- f) Ensure that there is enough space to install an extra meter (if not replace box)
- g) Also ensure that the box is wired already
- h) Switch the circuit breaker to off position
- i) Test for dead (Ensure to test for both AC and DC)
- j) Install the meter
- k) Connect the conductors according to L and N marking on the meter
- l) Install the service cable inside the pole top box or pillar box
- m) Ensure that there is drip loop into entry of cable to the house
- n) Mount the ready board as discussed with the customer
- o) Ensure that the Earth Leakage and the circuit breaker are in the off position
- p) Connect service cable to the connection point
- q) Ensure that the keypad and the meter are of the same communication media (Green RF and Grey PLC)
- r) Plug in the keypad to the socket out
- s) Switch on the pole top box circuit breaker and test for supply voltage
- t) Switch on customers Earth leakage unit and test for voltage
- u) Commissioning the meter as per manufacture's manual
- v) Test for polarity and earth leakage as required by the CoC
- w) Train the customer on the meter with regards to:
 - Basic functionality of the meter
 - Purpose of the Meter Card
 - Where the customer will buy electricity to top meter when the meter runs out of units/credit
 - Important symbols on the keypad like credit low, Meter full, Rate indicator etc
- x) Complete the meter movement form Annex A and submit to relevant department/s

3.4 Installation Of 20A Split meter Underground network

The following are the steps to guide worker/s on the installation of Split meter

- a) Do the risk assessment and document your steps
- b) Identify the customer and the pillar box number
- c) Inform the customer that a meter is going to be installed and discuss where the ready board should be installed
- d) Ensure that the meter to be installed is programmed for 20A
- e) Ensure that the circuit breaker in the pillar box is according to Electrification Standard
- f) Ensure that there is enough space to install an extra meter (if not replace box)
- g) Also ensure that the box is wired already
- h) Test for dead (Ensure to test for both AC and DC)
- i) Install the service Cable between the house and the pillar box
- j) Mount the ready board as discussed with the customer
- k) Ensure that the EARTH Leakage is in the off position
- l) Connect the Service Cable to the Ready board
- m) Ensure that the keypad and the meter are of the same communication media (Green RF and Grey PLC)
- n) Plug in the keypad to the socket out
- o) Tag the ready board so that no one operate the ELU
- p) Connect the service cable to the load side of the customer's meter
- q) Switch on the circuit breaker
- r) Commission the meter as per suppliers' specification.
- s) Test for polarity and earth leakage as required by the CoC
- t) Seal the meter with approved sealer
- y) Train the customer on the meter with regards to:
 - Basic functionality of the meter
 - Purpose of the Meter Card
 - Where the customer will buy electricity to top meter when the meter runs out of units/credit
 - Important symbols on the keypad like credit low, Meter full, Rate indicator etc
- u) Complete the meter movement form and submit to relevant department/s

3.5 Installation Of 60A Split meter Underground network

The following are the steps to guide worker/s on the installation of Split meter

- a) Do the risk assessment and document your steps
- b) Identify the customer and the pillar box number
- c) Inform the customer that a meter is going to be installed and discuss where the ready board should be installed
- d) Ensure that the meter to be installed is programmed for 60A
- e) Ensure that the Pillar box circuit breakers is according to Electrification Standard

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- f) Note: Each 60A Split Meter inside the pillar box has its own circuit breaker which is 63A and 120A for 4 meters inside a pole top box
- g) Also ensure that the box is wired already
- h) Test for dead (Ensure to test for both AC and DC)
- i) Install the service cable from the pillar box to the customer's connection point (Junction box)
- j) Connect the service cable to the /connection point/junction box (provided by the customer)
- k) Connect the conductors according to L and N marking on the isolator
- l) Ensure the isolator in the junction box is in the off position
- m) Close the junction box and tag it
- n) Install the meter (with circuit breaker off Position)
- o) Connect the service cable to the meter as per the marking of L N (if BS Footprint meter the markings will on the terminal cover and normally it is L N N L)
- p) Ensure that the keypad and the meter are of the same communication media (Green RF and Grey PLC)
- q) Plug in the keypad to the socket out
- r) Install the keypad inside the house (where necessary)
- s) Switch on the pillar circuit breaker
- t) Allow the Customer's Electrician to complete the CoC. (Voltage, Earth Leakage test and polarity)
- u) Switch off the Circuit breaker thereafter.
- v) Wait for instructions from customer services
- w) Commissioning the meter as per manufacture's manual
- x) Seal the meter with approved sealer
- z) Train the customer on the meter with regards to:
- Basic functionality of the meter
 - Purpose of the Meter Card
 - Where the customer will buy electricity to top meter when the meter runs out of units/credit
 - Important symbols on the keypad like credit low, Meter full, Rate indicator etc
- y) Complete the meter movement form Annex A and submit to relevant department/s

3.6 Installation Of 60A Split meter Overhead network

The following are the steps to guide worker/s on the installation of Split meter

- a) Do the risk assessment and document your steps
- b) Identify the customer and the pole top box number
- c) Inform the customer that a meter is going to be installed and discuss where the ready board should be installed
- d) Ensure that the meter to be installed is programmed for 60A
- e) Ensure that the Pole top box circuit breaker is according to Electrification Standard
- f) Ensure that there is enough space to install an extra meter (if not replace box)
- g) Also ensure that the box is wired already
- h) Ensure that the keypad and the meter are of the same communication media (Green RF and Grey PLC)

-
- i) Plug in the keypad to the socket out
- j) Test for dead (Ensure to test for both AC and DC)
- k) Install the service cable from the pole top box to the customer's connection point (Junction box)
- l) Ensure that there is drip loop into entry of cable to the house
- m) Connect the service cable to the /connection point/junction box (provided by the customer)
- n) Ensure the isolator in the junction box is in the off position
- o) Connect the conductors according to L and N marking on the isolator
- p) Close the junction box and tag it
- q) Install the meter (with circuit breaker off Position)
- r) Connect the service cable to the meter as per the marking of L N (if BS Footprint meter the markings will on the terminal cover and normally it is L N N L)
- s) Install the keypad inside the house (where necessary)
- t) Switch on the pillar circuit breaker
- u) Seal the meter with approved sealer
- v) Allow the Customer's Electrician to complete the CoC. If necessary
- w) Commissioning the meter as per manufacture's manual
- aa) Train the customer on the meter with regards to:
- Basic functionality of the meter
 - Purpose of the Meter Card
 - Where the customer will buy electricity to top meter when the meter runs out of units/credit
 - Important symbols on the keypad like credit low, Meter full, Rate indicator etc
- x) Complete the meter movement form Annex A and submit to relevant department/s

4. Authorization

This document has been seen and accepted by:

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Archie Jaykaran	PDE Maintenance SC Chairperson
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Edison Makwarela	Prepayment CG Chairperson
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Pieter Vink	FS OU

5. Revisions

Date	Rev	Compiler	Remarks
Jan 2019	1	N Kgomo	New Document

6. Development team

The following people were involved in the development of this document:

- Emma Rakgogo
- Eddie Mmatlwa

7. Acknowledgements

Not applicable.

Annex A- Meter Movement form

Eskom		Meter Movement Form Certificate of Compliance: ECU / ED Installation		-REF# 	
<input type="checkbox"/> Meter Changed Out:		<input type="checkbox"/> Install/Open		<input type="checkbox"/> Remove/Close	
<input type="checkbox"/> Conversion		<input type="checkbox"/> Bypassed		<input type="checkbox"/> Audit	
Work Order No: 		Prem. ID: 			
TSU reg / Contr: 		Proj No: 			
Done By: 		When: D M Y: 20 H M 			
Person/Org: 		Customer Name: 			
Customer ID No: 		Tel: 			
Rural/Urban: 		Street/Property Name: 		No: 	
Town/Area Name: 		Stand No: 			
Meter Type: OUT/Close		Conventional <input type="checkbox"/> Prepaid <input type="checkbox"/>		IN/Open	
Conventional <input type="checkbox"/> Prepaid <input type="checkbox"/>		Conventional <input type="checkbox"/> Prepaid <input type="checkbox"/>		Conventional <input type="checkbox"/> Prepaid <input type="checkbox"/>	
Supply Type: 1 Phase <input type="checkbox"/> 3 Phase <input checked="" type="checkbox"/>		Meters IN/Open: 1 Meter <input checked="" type="checkbox"/> 3 Meters <input checked="" type="checkbox"/>		Meters OUT/Close: 1 Meter <input checked="" type="checkbox"/> 3 Meters <input checked="" type="checkbox"/>	
Seal No: 		CNL: Trsfr: [Pole/Grnd/Bulk]: Pole Number: Geo ID: 			
CNL ID: 					
Meters Removed: or Closed: <input checked="" type="checkbox"/>		Meter Status: Faulty / Serviceable <input type="checkbox"/>		Meters Installed: or Opened: <input checked="" type="checkbox"/>	
Meter#1		Meter#1			
Manufacturer: 		Manufacturer: 			
Number: 		Number: 			
Rating/ Amp Limit: C-Dial: Reading KWH/ Units 		Rating/ Amp Limit: C-Dial: Reading KWH/ Units 			
Meter#2		Meter#2			
Manufacturer: 		Manufacturer: 			
Number: 		Number: 			
Rating/ Amp Limit: C-Dial: Reading KWH/ Units 		Rating/ Amp Limit: C-Dial: Reading KWH/ Units 			
Meter#3		Meter#3			
Manufacturer: 		Manufacturer: 			
Number: 		Number: 			
Rating/ Amp Limit: C-Dial: Reading KWH/ Units 		Rating/ Amp Limit: C-Dial: Reading KWH/ Units 			
Tamper: <input type="checkbox"/> RC: <input type="checkbox"/> Removal Note: 		Prepaid Cust Credit: kW			
Job Note: 					
ECU Tests performed in accordance with Eskom Distribution requirements					
PP: COC: Polarity Test Done: <input type="checkbox"/> Earth Leakage Test Done: <input type="checkbox"/> mA 		Supl Grp Code: 		Tariff Idx: 	
I herewith declare that I have replaced, inspected and tested the meter/s in accordance with Eskom Distribution requirements.		Please confirm that this information is correct, that installed meters are sealed and in good working order.		Initial: 	
Signature: Eskom Representative		Signature: Customer		Captured	

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