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Benefits from electronic 160A direct connect complex meters for utilities



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- Introduction
- Existing “Status Quo” for 75kVA to 100kVA metering installations
- New 160A electronic meters typical functionality
- Functional Analysis of new 160A electronic complex meters
- Application Benefit Analysis of 160A electronic complex meters
- Typical Security Benefits
- Conclusion

Introduction



- For customers with NMD of 75 kVA up to 100kVA, Utilities have used the two following metering installation options;
 - 1) **The direct connect 160A electro-mechanical meter.**
 - 2) **The CT connected electronic meter.**
- These metering options disadvantaged utilities by either limited tariff options, weak security or higher cost for the metering installation.
- The purpose of this paper is to highlight the benefits of utilising the new 160A electronic direct connect complex meters in such metering applications to improve customer service.

Existing “Status Quo” 75kVA to 100kVA metering installations



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1) Electro-mechanical meter installation

■ Advantages

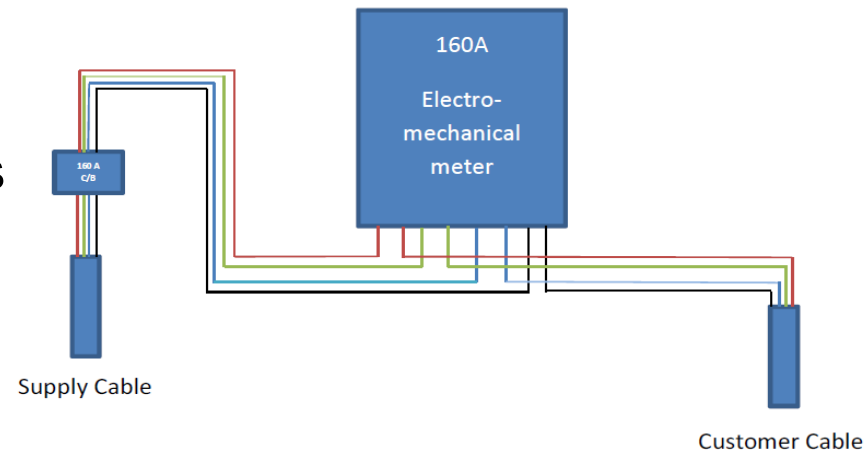
- ✓ Simple & Low installation cost

■ Disadvantages

- ✓ kWh energy measurement only
- ✓ Limited tariff & functionality options



160A Direct Connect



Existing “Status Quo” 75kVA to 100kVA metering installations

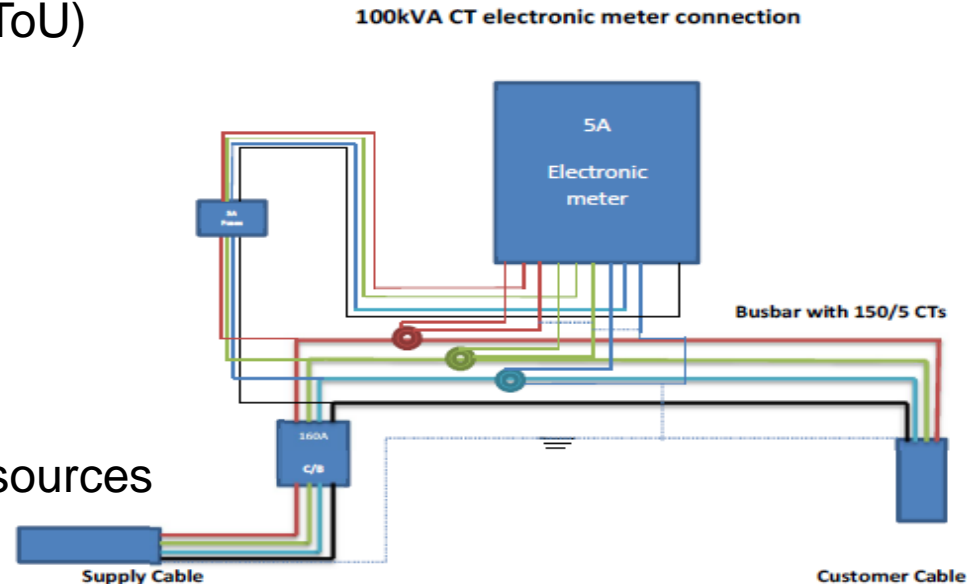
2) CT connected electronic meter installation

■ Advantages

- ✓ Can handle complex tariffs (e.g. ToU)
- ✓ Can be interrogated remotely
- ✓ Logs Billing and load profile data

■ Disadvantages

- ✓ Relatively Expensive
- ✓ Requires highly skilled human resources
- ✓ Highly susceptible to tampering



New 160A meters typical functionality



- **Compliance to International standards (e.g. IEC 62053-21&23 & IEC 17025 verification)**
- **Current range 20-160A Direct Connect**
- **Power Supply 230V (+/-20%)**
- **Accuracy class 1(kWh) & class 2(kVARh)**
- **kWh Import / Export, 4 Quad kvarh and kVA**
- **TOU Rate Registers**
- **Maximum Demand Registers**
- **Historic Billing Data sets**

New 160A meters typical functionality



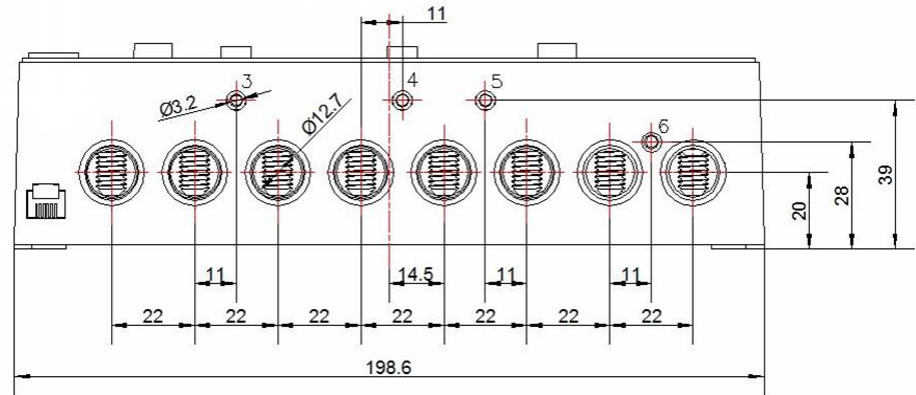
- **Load Profile Data (up to 300 days)**
- **Instrumentation Data profiling**
- **Installation with up to 70mm² cable**
- **Optical & RS232 Comms Interfaces as standard.**
- **6kV IEC Impulse Withstand**
- **Design Life up to 15 Years**
- **Automated Meter Reading Capable**

Typical electronic 160A direct connect complex meter



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Functional analysis of new 160A meter

Item	Functional description	E-Mech Direct 160A meter	CT Connected 150/5A meter	New Electronic 160A meter
1.	Import/Export 4 Quad measurement	X	✓✓✓	✓✓✓
2.	Monthly Billing & Load Profile Data	No	Yes	Yes
3.	Remote communications capability	No	Yes	Yes
4.	Complex tariff structure (ToU)	No	Yes	Yes
5.	Accuracy class (Active Energy – kWh)	1 or 2	0.5	1
6.	Tampering, Revenue protection & security features	✓	✓✓	✓✓✓
7.	Lowest Installation Cost	✓✓✓	✓	✓✓

Installation Cost Benefit for the new 160A electronic meter

Item	Description	E-Mech Direct 160A meter	CT Connected 150/5 meter	New Electronic 160A meter
1.	Meter kiosk	R450,00	R1000,00	R450,00
2.	Current Transformers	N/A	R300,00	N/A
3.	Test blocks	N/A	R1300,00	N/A
4.	MCBs	R350	R250,00	R350
5.	Commissioning cost	R650,00	R1800,00	R850,00
6.	Miscellaneous	R40,00	R120,00	R70,00
7.	Total	R1490,00	R4770,00	R1720,00
Potential Metering Application saving up to R3000 vs. CT installation				R3050,00

Note: Assumes similar electronic meter cost.

Typical Security Benefits for new electronic 160A meters



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- No Current Transformer related problems
- Reverse run, phase failure, watchdog count
- Tampering events recorded (Time & date stamped)
- Terminal & main cover removal detection
- Per phase measurement data
- Remote or automatic meter reading
- Installation guide & ad hoc remote verification

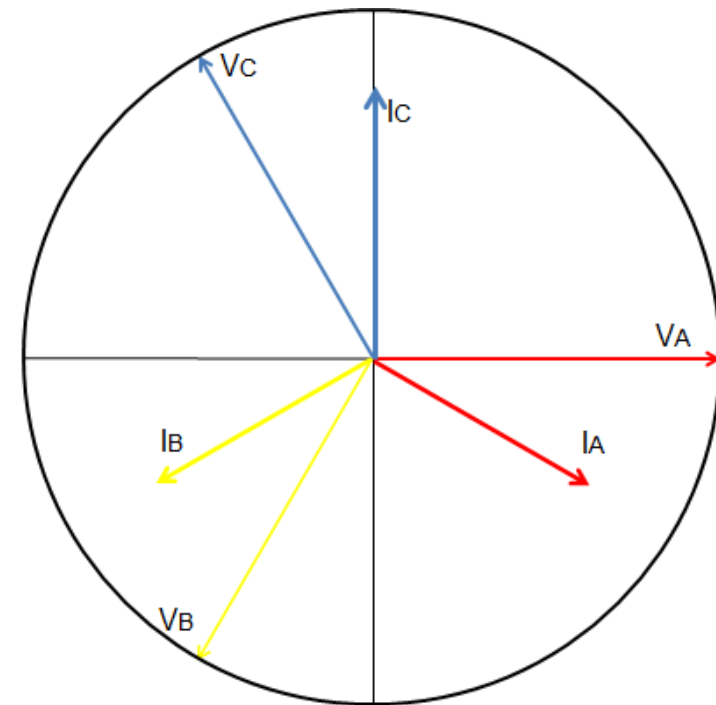


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Typical Installation guide

	Phase A	Phase B	Phase C	System	
Line Voltage <input checked="" type="checkbox"/>	230.98	230.35	229.71		Volts
Line Current <input checked="" type="checkbox"/>	100.33	101.59	99.73		Amps
Power Factor <input checked="" type="checkbox"/>	Q1 0.87	Q1 0.87	Q1 0.86	0.87	
Active Power <input checked="" type="checkbox"/>	20.14	20.35	19.83	60.34	KW
Reactive Power <input checked="" type="checkbox"/>	11.75	11.58	11.48	34.74	Kvar
Apparent Power <input checked="" type="checkbox"/>	23.61	23.42	22.93	69.68	KVA
Frequency <input checked="" type="checkbox"/>	49.95	50.01	50.01		Hz
Phase Angle <input checked="" type="checkbox"/>	-30.00	-30.00	-31.00		Degrees
Phase Rotation <input checked="" type="checkbox"/>	A-B-C			Apply CT/VT Factors <input checked="" type="checkbox"/>	



Summary



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- **New 160A electronic meter offers enhanced metering capabilities.**
- **Cheaper smaller installation for up to 70mm² cable 160A installations.**
- **Less chances of tampering.**
- **Improves customer service & CRM and ultimately provides a higher customer satisfaction index.**

Conclusion

This new meter offers the utilities the capability to have a 160A electronic direct connect installation that will:

- **Give increased security and functionality vs. the E-mech meter**
- **Provide a more secure and cheaper installation vs. CT connected meter installation.**

“It is the best of both worlds”

Thank you

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