



Science.
Applied to Life.™



Harnessing the power of **sensors** and cable accessories together.

Helping Our Customers Meet Their Modern Grid Demands with
Enhanced Visibility and Reliability Through High-Accuracy Sensors

Navigating the challenges of the evolving grid.

Power grid operators face significant challenges in improving reliability and efficiency due to complexity, partially driven by the integration of renewable energies and the deployment of electric vehicles (EVs). Some of the key challenges addressed by accurate medium voltage and current sensing include:



- **Grid visibility:** Many grid operators lack visibility of voltage and current measurements in their network. The lack of visibility can hinder proactive fault detection and outage mitigation. Instrumenting the grid with voltage and current sensors at important connections can provide visibility.
- **Grid capacity:** Increased power needs are being required to support additional demand requirements at customer facilities. Additionally, distributed energy resources and the scaling of EV charging infrastructure require expansions to the grid. Voltage and current sensing can provide the data needed to determine when and where to add capacity.
- **Power quality:** Power quality issues can cause difficulties for grid operators. Monitoring voltage fluctuations throughout the grid and detecting bi-directional power flow can help utilities/grid operators mitigate adverse impacts to power quality.
- **Budget:** Traditional sensing solutions require costly equipment and increased maintenance to improve visibility. New voltage and current measurement solutions now provide lower cost options to help utility/grid operators meet their budget needs.
- **Resources:** Limited resources for developing new specifications and a shortage of experienced personnel for installation pose additional hurdles helping grid operators reduce their potential resource challenges.
- **Carbon footprint and sustainability:** Grid operators are looking to extend the life of their existing equipment. Upgrading existing equipment with voltage and current sensing helps grid operators extend the life of their existing equipment, therefore helping them reduce their need for new equipment.



As the demand for energy increases, it's critical we rethink our grid architecture.

3M remains at the forefront of technologies helping enable electrical grid operators transition for a sustainable future.

Addressing these challenges requires improved grid visibility. 3M's sensed cable accessory platform provides the needed visibility to help grid operators optimize their operations and expansion planning—helping grid operations provide a resilient and sustainable energy infrastructure.

The benefits of transitioning to sensed cable accessories.

To help grid operators achieve seamless integration of renewable energy generation, effectively manage EV charger demand and enhance the reliability of medium voltage power systems, it's crucial to measure voltage and current in both primary and secondary substations.

3M™ Insulating Plug Voltage Sensor and 3M™ Current Sensors

3M Sensored Cable Accessories combine industry-standard medium voltage cable accessories with high-accuracy voltage and current sensors. The 3M™ Insulating Plug Voltage Sensor (3M IPVS) can interface with various monitoring and control devices. Additionally, the existing equipment can be retrofitted using 3M industry-standard retrofit components within the required cable accessory.

These solutions enable grid operators to upgrade medium voltage connections into monitoring points to align with the low power instrument transformer (LPIT) IEC 61869-10 and IEC 61869-11, and the intelligent electronic device (IED) or protection relays inputs that are compliant with LPIT standards.



Features and benefits:














































- **Economical:** Retrofit solution provides grid operators the option of upgrading without the need for time-consuming and expensive investments
- **High accuracy sensing:** Capacitive voltage divider technology provides high accuracy at higher frequencies
- **Lower cost:** Reduced installation cost compared to traditional instrumentation solutions
- **Broad compatibility:** The 3M IPVS output meets the IEC 61869-11 requirements for capacitive voltage divider sensors
- **Less cable:** Unique architecture combines signal and grounding technology within the 3M IPVS to enable voltage and current measurements so only one cable is needed to connect to the IED
- **Ease of installation:** Upgrading the network with the installation of a cable accessory versus a conventional voltage transformer
- **Capacitive design:** The 3M IPVS is based on a capacitive divider, that has a galvanic isolation, thus reducing the size of the 3M IPVS, helping to prevent height constraints in compact switchgears



Product Details

- 3M IPVS is compatible with IEEE 386 deadbreak connectors
- Compact design prevents height constraints into compact switchgears
- 15/25/28 kV voltage class
- Factory-calibrated, highly accurate, low-power passive voltage transformer based on a capacitive voltage divider
- Sensors offer precise measurement without calibration on site

Portfolio Offering

		Cable Length			Cable Connection		
3M™ Sensored Cable Accessories (SCA)		4 m	8 m	Other	2-Pin	4-Pin	RJ45
Deadfront	Voltage Sensor						
	3M™ Insulating Plug Voltage Sensor (3M IPVS) Family						
	15 kV, 1:4,400						
	25/28 kV, 1:8,600						
Livefront	3M™ Sensored Cable Termination QX 2.0 Family						
	12 kV, 1:3,400						
	24 kV, 1:6,200						
	12–24 kV, 1:10,000, 95–240 mm ²						
Current Sensor							
3M™ Current Coil Sensor (3M CCS) Family							
	500A/225 mV, Iron, 5P/10kA, 4-pin						
	500A/225 mV, Rogo, RJ45						
Accessories							
	RJ45 cable for 3M IPVS						
	2-pin cable for 3M IPVS						
	1 m grounding for 3M CCS						

   Standard  Optional

For more information visit [3M.com/ConnectedSolutions](https://www.3M.com/ConnectedSolutions)



Electrical Markets Division
13011 McCallen Pass, Bldg. C
Austin, TX 78753 USA
800/200-0265 Fax 877/601-1305
www.3M.com/energy

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