devolo
SMART GRID

Five reasons for broadband Powerline in the intelligent measuring system

Intelligent measuring systems are forming the basis of a new energy network in Germany. Secure networking and intelligent controlling of decentralised producers and consumers is becoming possible for the first time.

The communicative integration of intelligent measuring systems is thus moving into the focus of the operators of measuring points and networks.

devolo BPL Headend

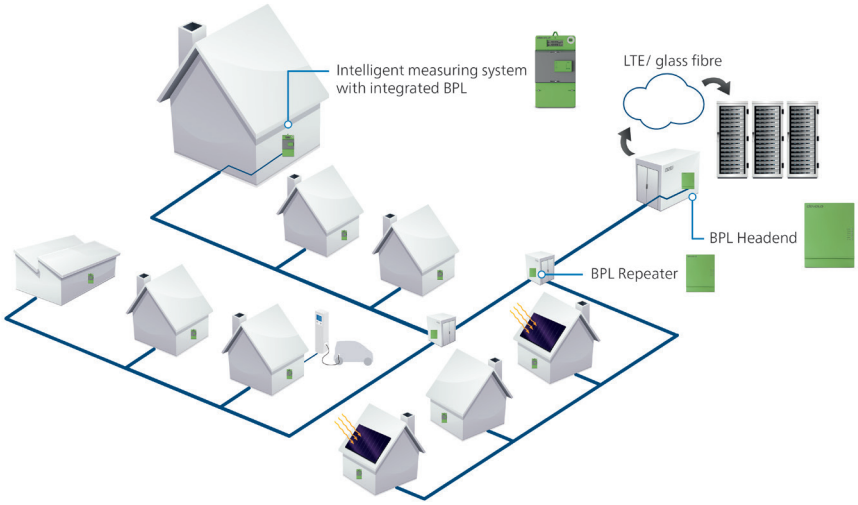
Background:
A wide variety of intelligent measuring systems (iMsys) must be connected communicatively. There is a choice between various types of communication.

Challenge:
The availability, cost and accessibility of the metering point are the decisive factors when selecting the WAN communication type in the respective network area.

Solution:
Broadband Powerline (BPL) lends itself well as a last mile technology that is scalable to any extent. Particularly if a high density of iMsys is rolled out.

The wide area network (WAN) connects the intelligent measuring systems with the smart meter gateway administrators and the external market participants.
In future, this communication is to be arranged in a star configuration. Robust communication infrastructure forms the foundation both for the operation of the measuring systems and for value-added services built on top of them. All the more important is the selection of the right form of communication.

The PLC technology uses the existing mains infrastructure for data communication. An additional signal is modulated onto the mains electrical wiring for this purpose. It does not impair the mains' original use. In the devolo SMGW^{plus} BPL, the Powerline modem comes already integrated. BPL Repeaters are installed in cable distribution boxes and BPL Headends are installed in local distribution stations for complete BPL infrastructure in the field.



Powerline performance for the roll-out

Aachen, Germany-based devolo AG has been focused on data communication over the electrical wiring (Powerline communication or PLC) since the company's founding in 2002. The global Powerline world market leader's developer team is intensively researching transmission technologies, possibilities for optimisation and sources of interference. As a result, broadband Powerline has been proven itself in practice for the IPv6-based WAN communication of the intelligent measuring system. Here are five reasons supporting this statement:

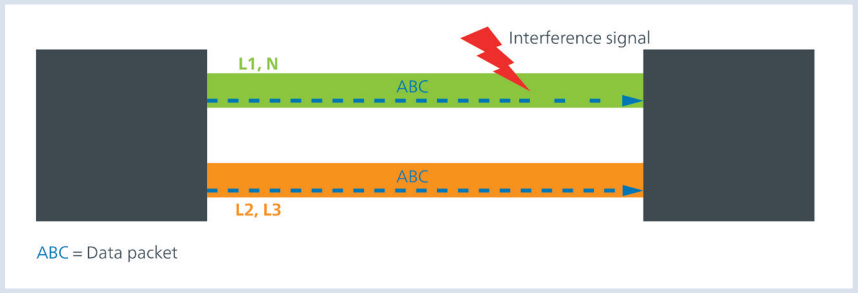
1. AVAILABILITY AND SELF-SUFFICIENCY
One central advantage of Powerline in comparison to wireless technologies is its 100% availability at any measuring point. Intelligent measuring systems installed in the basement are always reliably accessible. Building penetration using GPRS, GSM or LTE is significantly lower. Data transmission over Powerline is self-sufficient and not influenced by the performance of other networks such as LTE or GPRS.

2. LOW COSTS
Compared to wireless or comprehensive glass fibre networks, Powerline communication is substantially more cost-effective because it makes use of the existing infrastructure of the electricity distributing mains supply.

3. HIGH DATA RATE AND REAL-TIME CAPABILITY
At a data rate of 20 Mbps (net) suitable for project planning and a typical response time of 60 ms, broadband Powerline is ideally suited for smart metering and value-added services—especially for time-critical grid-conducive applications.

4. HIGH FREQUENCY UTILISATION
devolo embraces the international ITU-T G.9960 (G.hn) standard. This standard accounts for the difficult requirements for access BPL and optimally utilises the frequency band between 2 and 25 MHz.

5. ROBUST CONNECTIVITY
Compared to other BPL variants, G.hn ensures a significantly more stable PLC network. Significantly improved connectivity compared to existing BPL solutions is also achieved by using multiphase coupling. Multiphase coupling uses all three phases (L1, L2, L3) and the neutral conductor (N or PEN) for data communication. Two data transmission paths (L1/N and L2/L3) ensure that the data packets find the quickest way to their destination. If interference signals and attenuations decelerate a path or prevent a transmission, the data communication is maintained through the second channel.



Multiphase coupling makes use of two channels for data communication, significantly improving the robustness and performance of the connection between BPL devices.

The mix is the essence

WAN communication for intelligent measuring system is not an either/or decision. Both wireless and Powerline-based solutions are required and will be used depending on the roll-out scenario and network topology.
This is why devolo offers the SMGW^{plus} with three different WAN variants: LTE, Ethernet and broadband Powerline.

Find out for yourself which devolo solution suits your requirements.

www.devolo.com/smart

devolo BPL Headend & Repeater

The devolo BPL Headend and the devolo BPL Repeaters create a high-availability data network at the low-voltage level.

The devolo BPL Repeaters provide a reliable and stable data communication between end points, cable distribution boxes and local distribution stations. The BPL Headend is the link between mains supply and back-end. The changeover of data transmission technology from Powerline to LTE/glass fibre and vice versa takes place at the local distribution station. The integration of all intelligent measuring systems into the wide area network (WAN) works over the created communication infrastructure. In addition, the G.hn-BPL technology, with its very short response times, is ideal for grid-conducive applications and switching operations.

Technical data (preliminary)

Standards	G.hn-BPL (ITU-T G.9960), optimised for access communication
Functionality	ETH over PLC bridge
Protocols	IPv6, IPv4, IEEE 802.3
Transfer rates (gross)	200 Mbps
Modulation	4096/1024/256/64-QAM, QPSK, BPSK (OFDM)
Range	Headend: 400 m depending on the network properties and topology Repeater: an additional 400 m each depending on the network properties and topology
Security	AES 128-bit layer 2, higher level authentication based on 802.1X (RADIUS)
LEDs	Operation indicator, PLC connected/ data transmission, fault indicator
Frequency band	2 to 25 MHz
Management	SNMP v3
Response time	Typically 60 ms
Device port	Headend: RJ45 (Ethernet), RJ12 (external coupler), screw clamp (mains supply) Repeater: short-circuit safe line (mains supply + coupling)
Power consumption	Headend: max. 20 W | Repeater: max. 10 W
Voltage supply	230 V mains (L + N)
PLC coupling	Headend: 3-phase, capacitive or inductive, each with external coupler Repeater: 3-phase, capacitive internally
Dimensions (in mm)	Headend: 50 (width) x 195 (height) x 135 (depth) Repeater: 40 (width) x 195 (height) x 125 (depth)
Temperature (storage / operation)	-40 °C to 85 °C / -40 °C to 70 °C
Ambient conditions	10 - 90% humidity (non-condensing)
Protection class	Headend: IP 41 | Repeater: IP 65
Certifications	CE Class A (EU, CH, NO)

45464/0818

We'd be happy to serve as your consultant.
Contact us.

Phone: +49 241 18 279-150
smart@devolo.de
www.devolo.com/smart

devolo AG
Charlottenburger Allee 67, D-52068 Aachen, Germany

devolo
SMART GRID