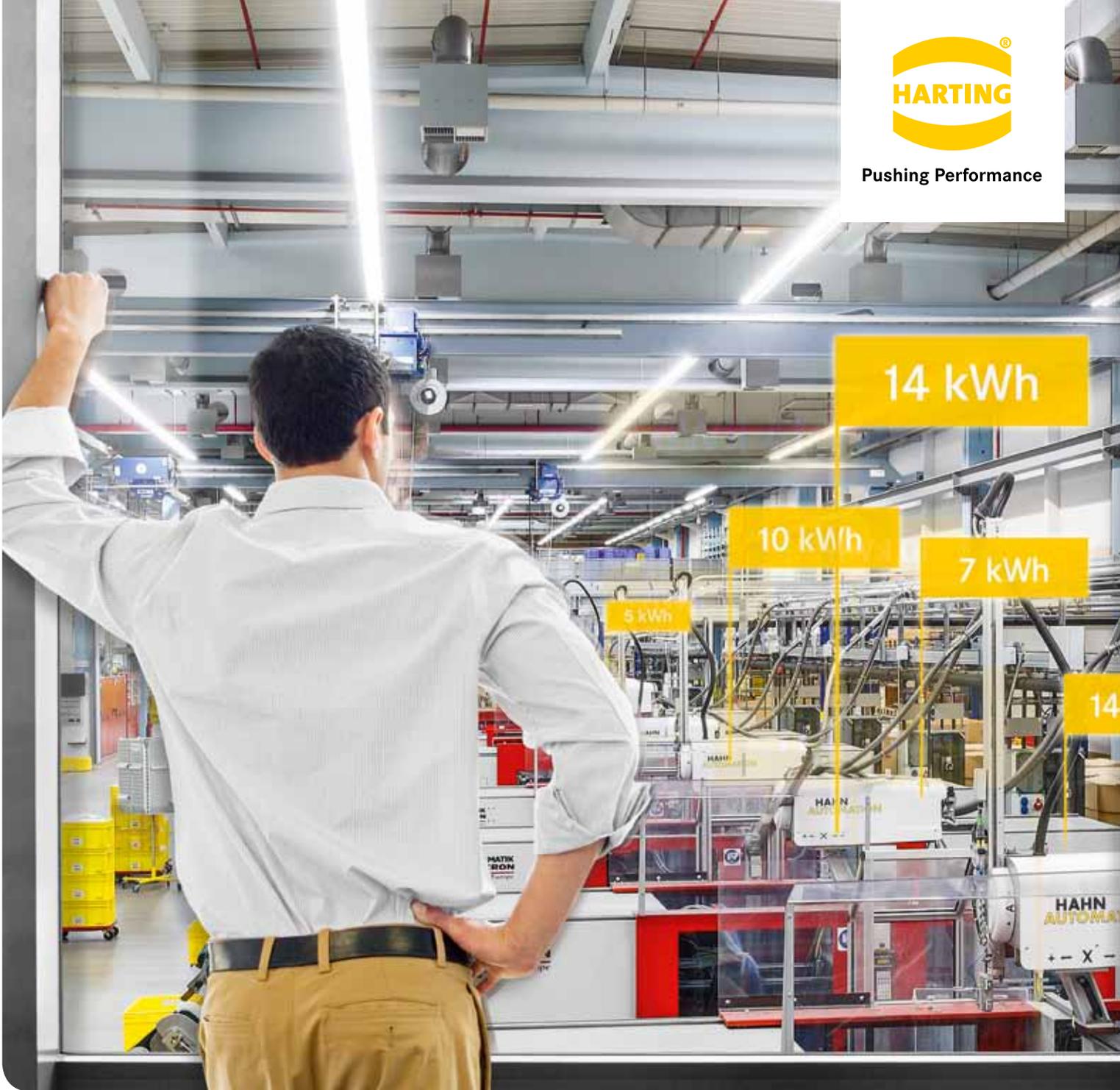




Pushing Performance



HARTING smart Power Networks Visualize your energy consumption.

Transparent. Intelligent. Efficient.

Dedicated by conviction: Energy efficiency at HARTING.



The HARTING Technology Group, headquartered in Espelkamp in East Westphalia, Germany is a world market leader in electrical and electronic connection technology.

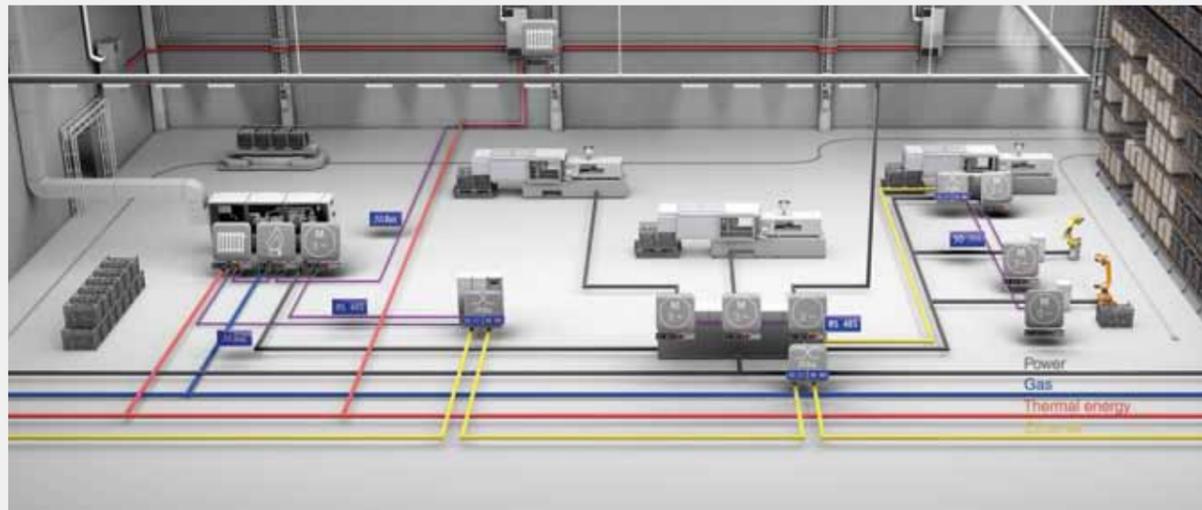
HARTING products, services and solutions connect and network devices, machines and systems with data, signals and power. In this way, solutions are created for the following markets: automation, energy, transportation, broadcast and entertainment, machinery and robotics, as well as medical and embedded computing systems. HARTING also produces electromagnetic components for the automotive industry and offers solutions for housing technology and shop systems. HARTING is a family-owned and managed company that currently employs more than 3,500 people in its 37 subsidiaries.

Increasing energy efficiency and sustainable economic activity have been firmly anchored in the company's day-to-day activities since 1996. In 2011 the Association of German Chambers of Commerce and Industry (Deutscher Industrie- und Handelskammertag, DIHK) honored HARTING as a „climate protection company“. The „climate protection companies“ have voluntarily committed to measurable and ambitious goals in climate protection and energy efficiency and have already attained outstanding achievements in this area. In 2012, the company received an additional significant award for its commitment to energy efficiency. The Deutsche Energie-Agentur GmbH (dena) awarded HARTING the first prize of the international Energy Efficiency Award.

We perceive energy efficiency as one of the most important requirements that our customers - and we ourselves - clearly focus on. We utilize resources efficiently and optimize our energy processes. The intelligent smart Power Networks energy management system developed by HARTING fulfills our customers' requirements as well as meeting our own stringent demands.



Energy intelligence: HARTING smart Power Networks.



Which energy flows enter into industrial systems, and when? And how can potential savings be recognized and utilized? HARTING smart Power Networks provides answers to these questions – with an intelligent energy management system.

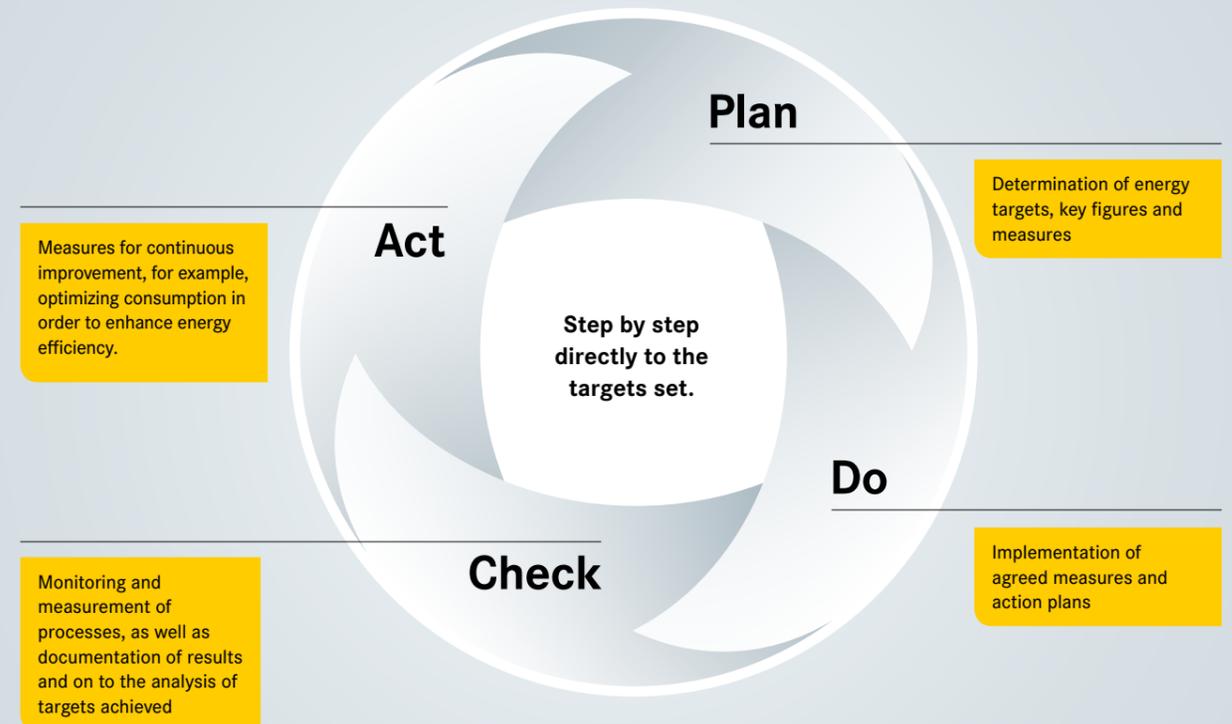
The smart Grid forms the basis of HARTING's smart Power Networks. The intelligent energy distribution network facilitates direct recording and analysis of energy flows. And it creates an information foundation for the targeted optimization of production processes and increased energy efficiency.

Thanks to the open architecture of HARTING smart Power Networks, the system is simple to integrate into existing Ethernet network infrastructures. It can be expanded smoothly according to requirements and scaled to suit the given application scenarios.

Convincingly efficient: The smart Power Networks advantages at a glance

- Complete transparency of energy flows and energy consumption.
- Simple integration thanks to the use of existing Ethernet structures.
- Future-proof basis for certification of energy management to ISO 50001.
- Detailed representation of the plant, facility and system structures and the consumption data.
- Long term documentation of consumption data and load profiles.
- Integrated switchable outputs allow direct load management.

The perfect match for your requirements: Our services.



HARTING smart Power Networks is the ideal solution for efficient energy management and is a perfect match for existing plant, facility and system structures. In order to ensure that the system also fully conforms to your requirements, HARTING supports users in the planning and implementation of the energy management system. After all, common goals can be reached much faster by joining forces.

Dialoging with you we jointly define the first steps on the path towards this goal. What is the system intended to achieve? In which company areas does it make sense to use particular components and in what way? And which data are relevant for you? Based on your goals and ideas we will work out a suitable design. Naturally we take the plant, facility and system structures as well as the current energy consumption into account.

This provides a solid foundation to underpin all further steps – from installing instrumentation and integrating existing instrumentation to setting up the software and all the way on to employee training. Many expedient and meaningful steps that ultimately lead towards the paramount goal: energy efficiency!

Three times the intelligence: The smart Power Networks system components.

In order to record, visualize and document energy flows effectively, smart Power Networks requires three system components:

■ smartPN-Units

The smartPN-Units are the heart of the „smart Power Networks“. Via standardized interfaces they capture measurement data values from multiple measurement points, such as heat meters, power measurement devices or gas or electric meters. The acquired data are temporarily stored and processed in the smartPN-Unit and then forwarded via the integrated Ethernet switch.

In addition to data acquisition, the smartPN-Unit can also intervene in processes. When limit values are exceeded, the integrated switchable outputs allow direct actions to be taken – from switching ancillary equipment to controlling the lighting system.

■ smartPN-Viewer

In order to identify potential savings in the data records generated, smart Power Networks employs an effective software visualization package: the smartPN-Viewer. The program displays the energy usage graphically and provides full transparency for the energy flows across the entire plant, facility and system structure. The resolution can be raised from the standard 15 min. up to a value in seconds.

In this way, for example, the energy consumption of machines and plants of the same type can be directly compared.

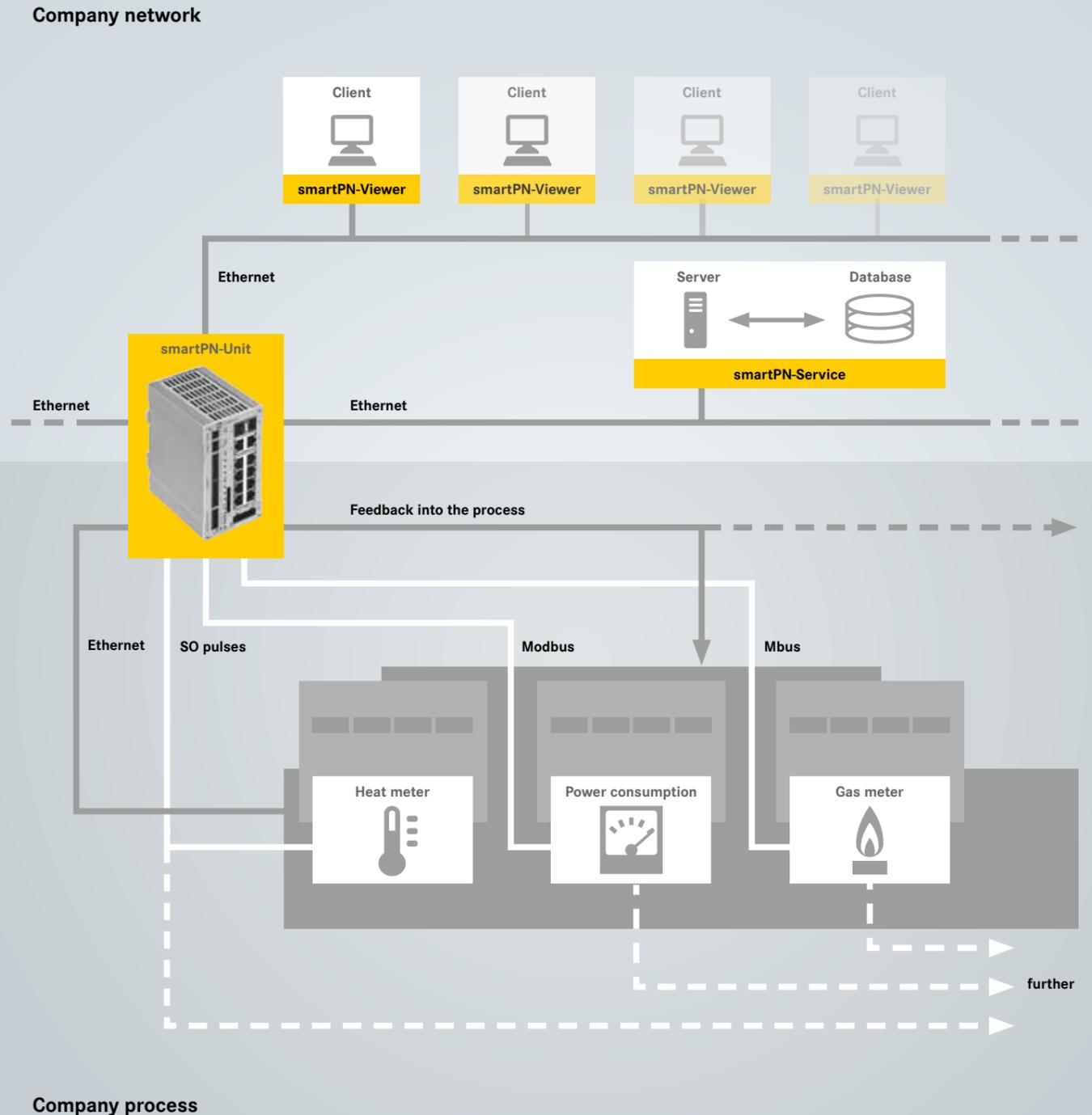
Naturally, the smartPN-Viewer can display energy consumption over freely definable periods of time in addition to the instantaneous values. This enables users to obtain an overview of varying consumption, generate load profiles and identify energy peaks in the production process.

■ smartPN-Service

The energy data collected by the smart Power Networks form a value information foundation for optimizing energy consumption. The third system component, „smartPN-Service“, is used to document such data reliably. The application stores the consumption values in a central database, thereby forming the information basis for reliable evaluation.

Besides helping optimize energy usage, the volume of generated data, consumption values and consumption documentation constitutes a prerequisite for certification to ISO 50001. And the foundation for future-oriented energy management.

The system smart Power Networks.



Theory meets practice: smart Power Networks deployed at HARTING.

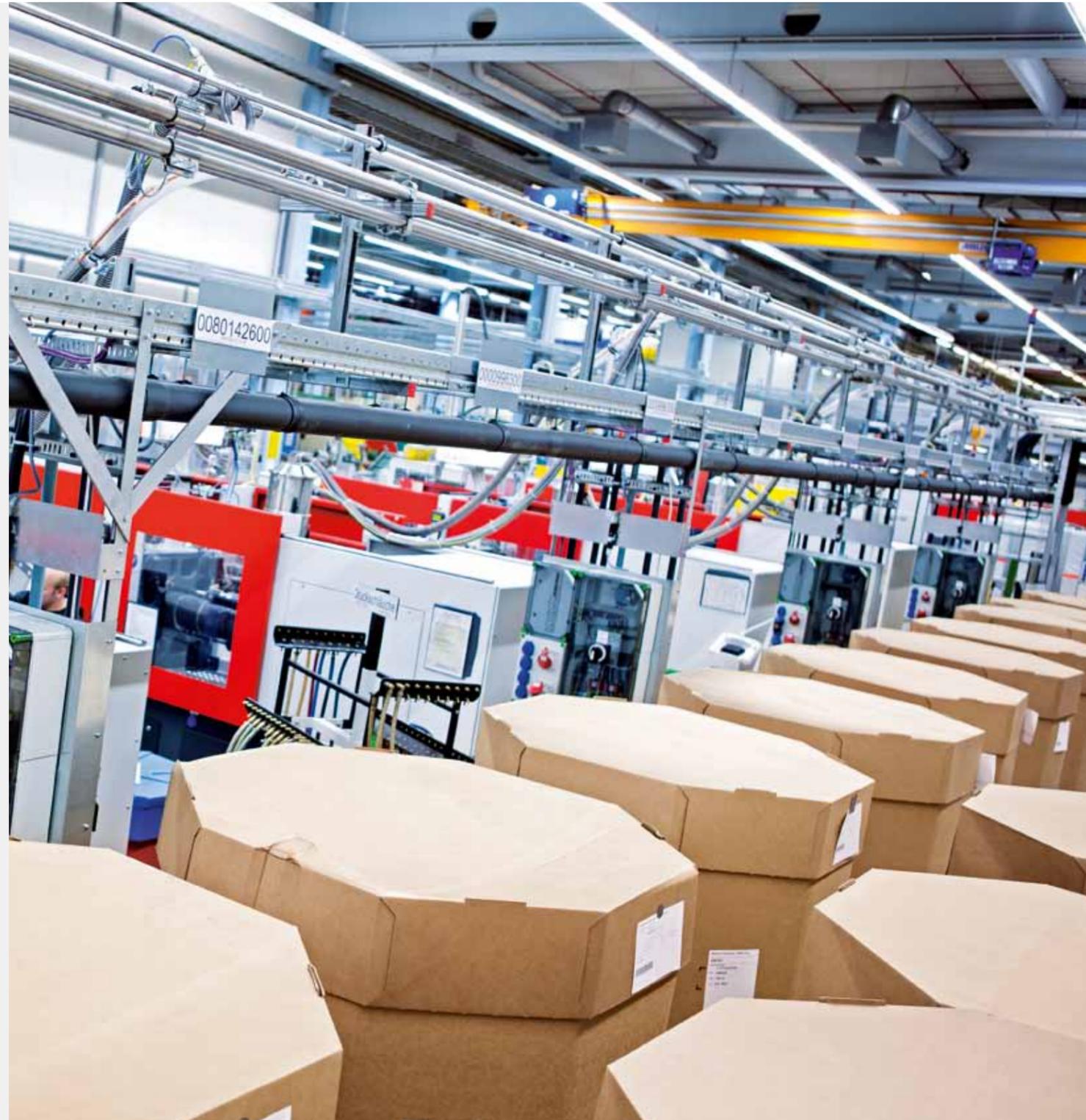
HARTING views energy efficiency from more than just the customer's perspective. As an industrial company, we also strive to use resources efficiently and optimize the energy consumed by our processes. Which is why we have developed smart Power Networks as an intelligent energy management system that satisfies your requirements - while also meeting our demands.

Implementing smart Power Networks in the HARTING factories allowed us to analyze and optimize the energy in production processes and consequently reduce energy costs.

Thanks to smart Power Networks, our production team knows exactly how much energy was consumed and where and when it was used. On this basis, plans for increasing energy efficiency were developed and implemented, achieving the targeted reduction of energy consumption on weekends, or comprising the installation of LED lighting technology, for example.

The decision was based on the following key factors:

- Lower installation costs by using the existing Ethernet infrastructure
- Easy integration of existing meters into the smart Power Networks
- Expansion of the energy data acquisition by simple addition of further measuring devices or smart Power Networks Units
- Individual depiction of the process or the plant, facility and system structures by virtual meters freely defined by users



Reaching the target in six steps: Implementation of smart Power Networks.

Thanks to smart Power Networks' flexible architecture, the system can be integrated into existing infrastructures in only six steps.

- 1

Definition
The first step is to define the relevant consumers and measurement points.
- 2

Integration
Existing instrumentation is included and integrated into the smart Power Network.
- 3

Hardware installation
The smartPN-Units are connected by way of the Ethernet structures already in place.
- 4

Software installation
smartPN-Viewer and smartPN-Service are set up and adjusted for the individual structures.
- 5

Commissioning
smart Power Networks can be put into service – without additional investments in infrastructure or software.
- 6

Certification
There is consequently a technical basis for certification to ISO 50001. Analyses of the evaluations bring transparency to energy consumption.



Program overview

Technical data

HA-VIS smartPN-Unit

Article number	20741124611	
Housing dimensions	Length: 145 mm; width: 69 mm; depth: 100 mm	
Weight	< 800 g	
Type of mounting	35-mm top hat rail according to EN 60 715; Wall installation, upright	
Operating temperature range	- 25 ... + 55° C (-15... + 130° F)	
Storage /transport	- 40 ... + 85° C (-40 ... + 185° F)	
Protection class according to DIN 60 529	IP 20	

Ethernet interface RJ45	
Number of ports	8x 10/100Base-T(X) 2x Combo ports with SFP slot
Cable types according to IEEE 802.3	Shielded Twisted Pair (STP) or Unshielded Twisted Pair (UTP), Category 5
Data rate	Port 3-10 :10 Mbit/s, 100 Mbit/s Port 1 + 2 1 Gbit/s (RJ45 alternatively SFP)
Maximum cable length	100 m (Twisted Pair; with cable category 5 according to DIN EN 50 173-1)
Topology	Ring/line/star structure can be executed

Ethernet interface SFP (mini-GBIC) fiber optic cable	
Number of ports	2x /1000 Base (Combo ports with SFP slot)
Data rate	1000 Mbit/s

Power supply	
Nominal input voltage	24 VDC (also for M-Bus, RS485 and S0)
SD card slot	Storing and loading configuration files; Energy data backup

Management functions	
Basis functions	Store and forward switching mode IEEE 802.3 Manual and dynamic IP address assignment
Network discovery	Link Layer Discovery Protocol (LLDP) 802.1AB, 2005
Rate control	Rate control per port (Broadcast, Multicast, Unicast)
Time settings	Manual time setting Simple Network Time Protocol (SNTP) RFC 1305, RFC 4330
User management	Admin, Guest and Service level
QoS	Quality of Service (QoS) IEEE 802.1p Differentiated services (DiffServ) RFC 2474, 2475
VLAN	Port protocol based VLANs
VLAN ID	Range: 1 - 4094 Max. number of active VLANs: IEEE 802.1Q Rev D5.0, 2005
Redundancy	Spanning Tree (STP) IEEE 802.1D (2004) Rapid Spanning Tree (RSTP) IEEE 802.1D (2004) media redundancy protocol DIN EN 62 439-2

Security	Port-based network access control Port-based authentication with EAP 802.1X (2004) RADIUS Client RFC 2138 IP authorized manager
Link aggregation	Link aggregation (LACP) IEEE 802.3ad (2005)
Multicast	IGMP Snooping (v1, v2, v3) with support for Querier RFC 1112, 2236, 3376
DHCP	DHCP Client RFC 2131 DHCP relay agent RFC 2131 DHCP Option 82 RFC 3046

Management functions	
Alarm	Alarm via E-Mail (SMTP) and SNMP traps
Management	Password-protected Web management interface SNMP (v1, v2c, v3) agent & MIB support RFC 1155, 1157, 1212, 1213, 1215, 2089, 2578, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3584

For more details see data sheets mCon.

M-Bus	
Internally supplied via 24 V DC (integrated level converter)	
Galvanically isolated	
Maximal 20 users	
EN 1434	
- EN 13757-2 (physical and link layer)	
- EN 13757-3 (application layer)	
- Transfer rate 300/2400/9600 baud	

RS485 (EIA485 Modbus RTU)	
2-wire termination / half-duplex transmission	
Number of poles in connector 3	
Internally supplied via 24 V DC	
Galvanically isolated	
Transfer rate 2400/9600/38400/115000 baud	

S0 input (8 units) according to DIN 43864	
Internally supplied via 24 V DC	
Galvanically isolated	

Digital outputs (4 units)	
Power supply (external) 24 V, DC -15 +20 % with reverse voltage protection	
Up to 2 A load	

Program overview

Technical data

HA-VIS smartPN-Service

1-14 measuring instruments, article number	20740002658
15-100 measuring instruments, article number	20740002675
101-500 measuring instruments, article number	20740002667

- This service is installed on a server to save the energy data in an external MSSQL Express database
- Data aggregation
- Requires Windows® Server 2008 operating system

Accessory

SD card

Article number:	20899001000
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HA-VIS smartPN Viewer

1 user, article number	20740001555
1-3 users, article number	20740001556
1-5 users, article number	20740001557

- Locally installed user software
- Administration of the user access authorization
- Configuration of the measuring instrumentation
- Visualization of energy flows
- Documentation of energy flows
- Export function (csv)
- Requires Windows 7 operating system



System functions

Organization

- Extensive user administration
- Individual building views with measuring point information that can be shown in multiple levels
- Allocation to cost center possible

Data acquisition

- Measured data also output as csv or Excel file
- Physical and virtual measuring instruments available

Visualization of the data

- Display and store live consumption data as Excel file
- Analysis of database values individually by measurement position or accumulative
- Variable sampling rate of the measured values between seconds and 15-minute values

Monitoring function, outputs can be set

- Min./max. monitoring
- 6 timers can be adjusted per output
- Manual setting of outputs

Alarm functions when limit values are reached

- Alarm messages as E-Mail
- Outputs can activate PLC
- Signal lamps can be switched
- Alarm message also visible in smartPN-Viewer as system message



Pushing Performance