

IP-Bridge

Module for establishing IP connections in 2-wire-networks



Third-party
integration

Compact
size

Flexible
integration

Ethernet for 2-wire networks

The IP-Bridge provides an ideal, cost-efficient solution for all applications requiring a reliable IP network connection within 2-wire infrastructures. The module can connect one transmitter with up to four different receivers. To ensure transmission security, the IP-Bridge comes equipped with AES-128 to encrypt 2-wire connections. The power for the up to four Intercom stations and other client devices such as loudspeakers, cameras etc. is provided via the 2-wire line using "Power over Ethernet" (PoE).

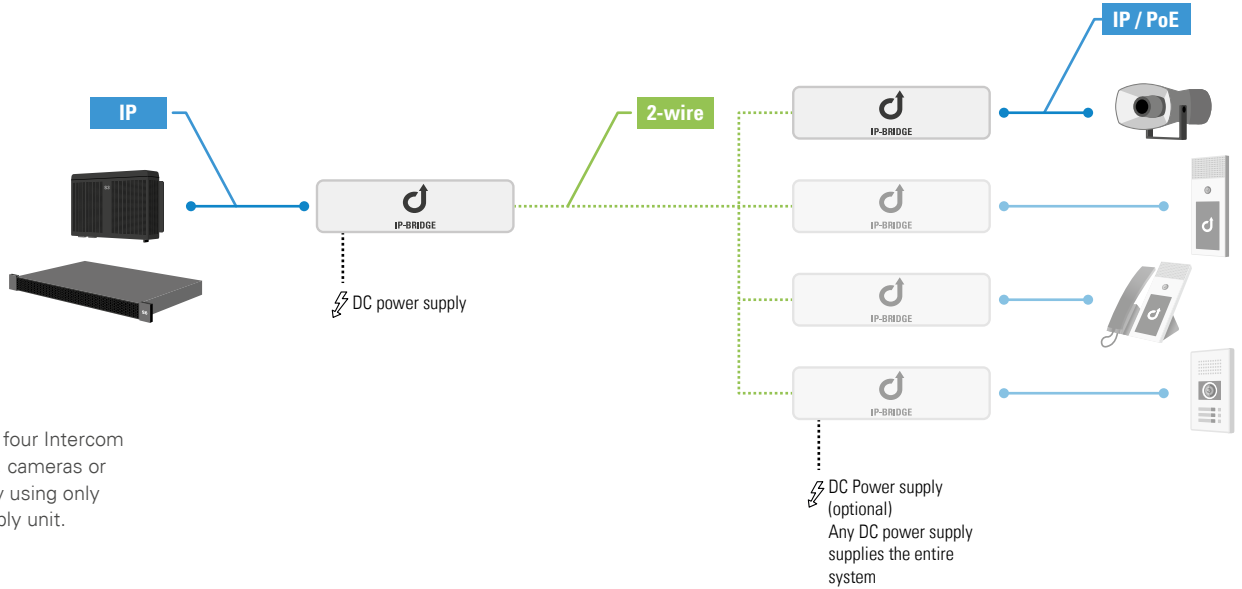
Features and highlights

- Reliable and fast IP network connection over 2-wire cables
- Power connection for up to four Intercom stations, cameras or other clients over a 2-wire cable via PoE
- Easy integration into existing systems without Cat. 5 cabling
- Easy extension of LAN networks
- Secured transmission over encrypted network connection (AES-128)
- Plug-and-play installation without additional configuration
- 2-wire-based systems can be replaced by a state-of-the-art IP-based system without changing the existing infrastructure
- Mounting in any flush and surface mount kit of the Series WS possible

System overview

Possible applications

Example 1: IP network connection over a 2-wire cable with one transmitter (Intercom Server) and four receivers (Intercom stations).



Connecting IP devices

Power supply for up to four Intercom stations, loudspeakers, cameras or other clients via PoE by using only one shared power supply unit.



Connecting servers

Establishing connection via 2-wire cable like in NET-W/NET-E1 networks.

Note:
Please note that there may be bandwidth restrictions depending on the cable length, see page TE | 2.

IP-Bridge

Technical specifications



Technical data

Transmission bandwidth:	1.8 – 30 MHz
Operating temperature range:	–40 °C to +70 °C (–40 °F to +158 °F)
Storage temperature range:	–40 °C to +70 °C (–40 °F to +158 °F)
Connection:	RJ45 jack for Ethernet and PoE (Auto MDI-X), 2-wire jack for data transfer, 2-wire jack for external power supply
External power supply:	48 – 56 VDC, power consumption max. 60 W ³⁾
Idle power consumption:	3.5 W (2 IP-Bridge modules with Ethernet link)
PoE (Power over Ethernet):	PoE output of the receiver modules meets the standards IEEE 802.3af and IEEE 802.3at ¹⁾
Cabling 2-wire:	2-wire, 18 AWG, shielded 2-wire, 18 AWG, unshielded J-Y(ST)Y Ethernet: 1-pair, Cat. 5 4-pair, Cat. 5 1-pair, Cat. 6 4-pair, Cat. 6
Cabling Ethernet:	min. Cat. 5
Data rate:	10/100 MBit/s (Full/Half Duplex)
Transmission range:	up to 720 m / 0.44 mi, for details see page TE 2 ²⁾
Encryption:	128-bit AES encryption over 2-wire connection
Mounting:	wall mounting, top hat rail mounting or mount in flush and surface mount kit of Series WS
Dimensions (W x H x D):	39 x 156.2 x 26 mm (1.53 x 6.15 x 1.02 in)
Weight incl. package:	155 g (0.34 lbs)
Optional accessories:	top hat rail mounting kit (ET901-HSH35) power supply unit (PA65W48V)

Line length in LAN

The maximum line length of Cat. 5 cabling in a LAN is 100 m (328 ft) – e.g. from IP-Bridge to Intercom station.

Extent of supply

- IP-Bridge module
- Short reference

¹⁾ The module must be protected against transient overvoltage (equivalent to SELV circuit defined in standard EN 60950-1)!

²⁾ This is equal to the maximum transmission range over a 2-wire cable when using PoE! The values may vary widely depending on the condition of the cable and external influences!

³⁾ The following minimum voltage must be supplied to the receiver:

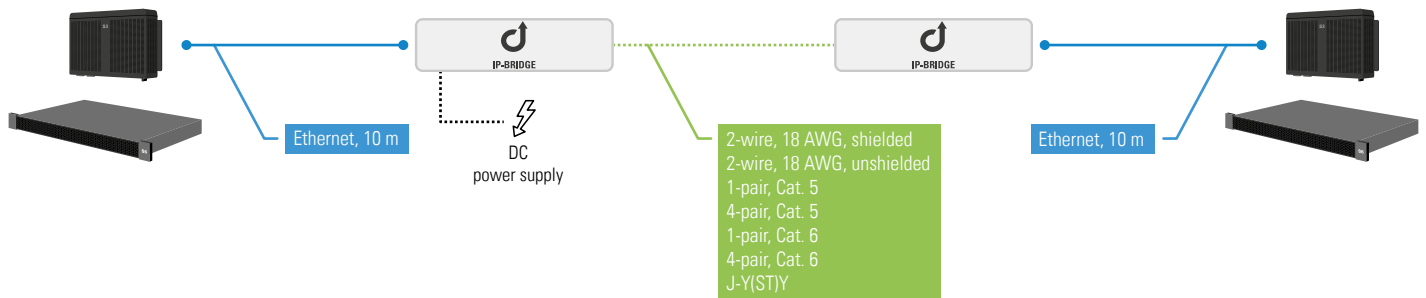
- PoE-PD at the receiver (e.g. ID5): min. 40 V
- Ethernet communication only: min. 5 V

IP-Bridge

Technical specifications

Test setup

The transmission ranges measured refer to the following test setup. Deviations from this setup may lead to different values.



Transmission ranges

In the following diagram, the maximum transmission ranges are listed for cables of type **Cat. 5**, **Cat. 6**, **J-Y(STY)** and **18 AWG** in various versions, as required for proper communication over a 2-wire connection:

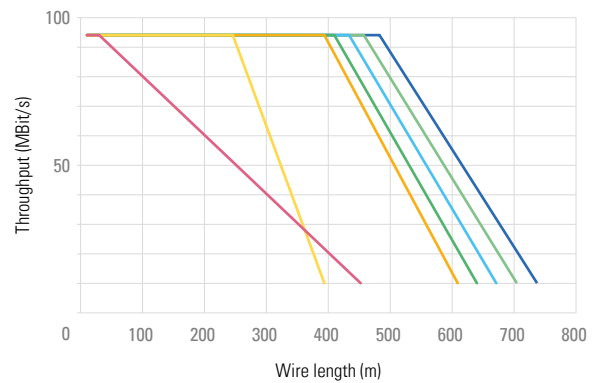
Please note the following guidelines¹⁾ for the required bandwidth:

Audio	3,5 kHz	7 kHz	16 kHz
Bandwidth (speech and data) ²⁾	96 kBit/s	96 kBit/s	143 kBit/s
Speech is compressed to	1 x G.711 standard	1 x G.722 standard	2 x G.722 standard

Video	Minimum quality	Maximum quality
H.264 compression	128 kBit/s	2.048 kBit/s

¹⁾ 1000 kBit/s = 1 MBit/s

²⁾ The required bandwidth depends on the required number of speech channels. The value specifies the smallest permitted bandwidth, including protocol overhead, for upload and download.

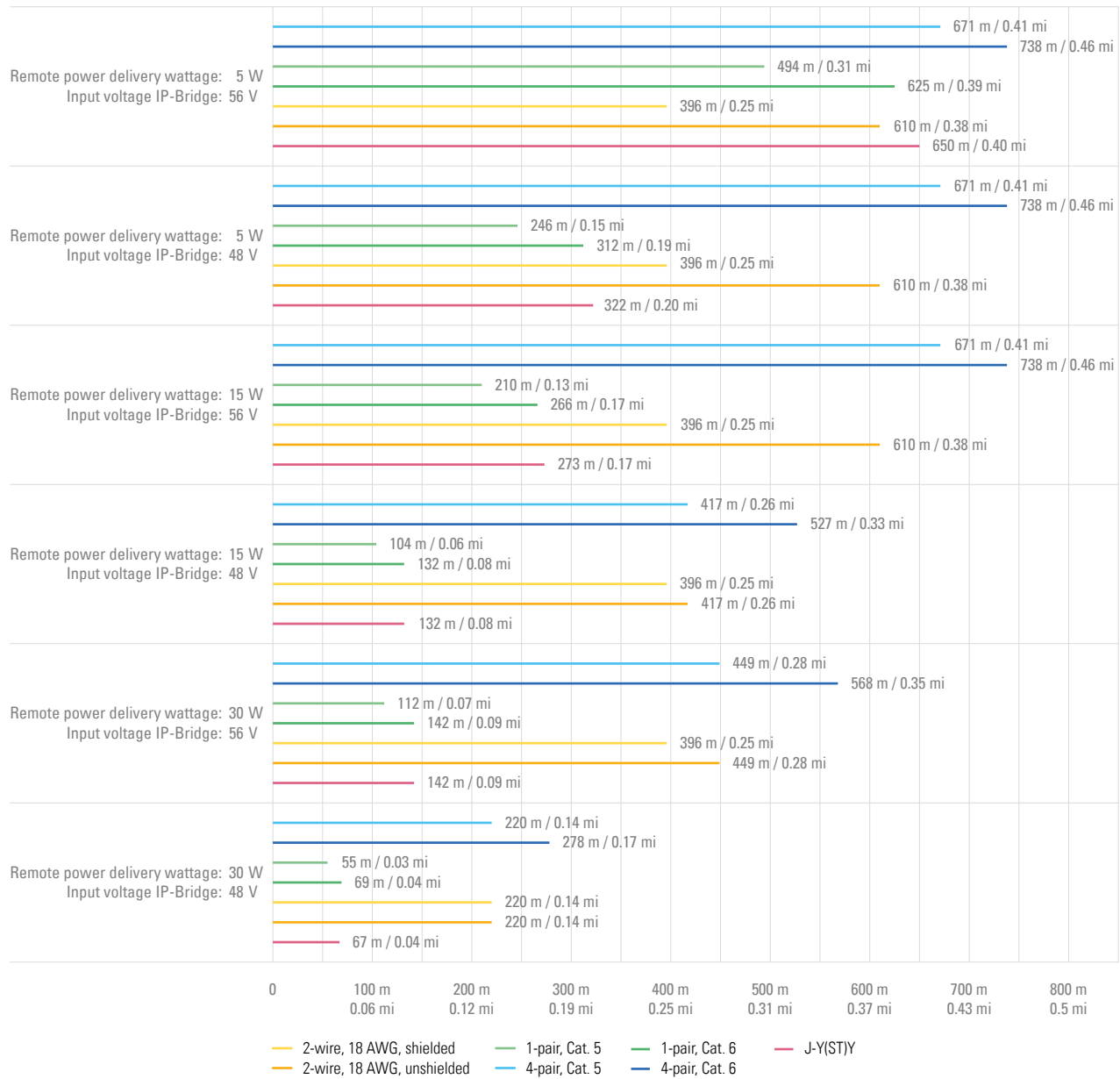


- 2-wire, 18 AWG, shielded
- 1-pair, Cat. 5
- 1-pair, Cat. 6
- 2-wire, 18 AWG, unshielded
- 4-pair, Cat. 5
- 4-pair, Cat. 6
- J-Y(STY)

IP-Bridge

Technical specifications

Cable power distance chart of an IP-Bridge system

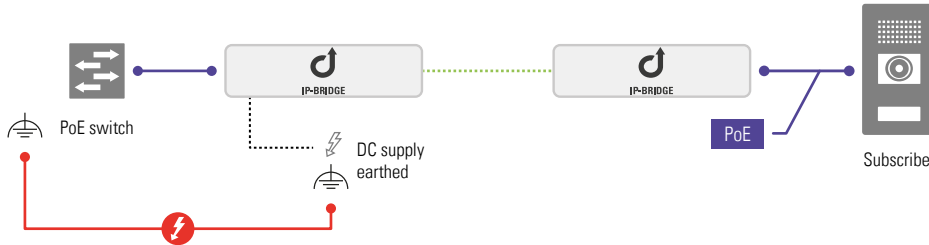


IP-Bridge

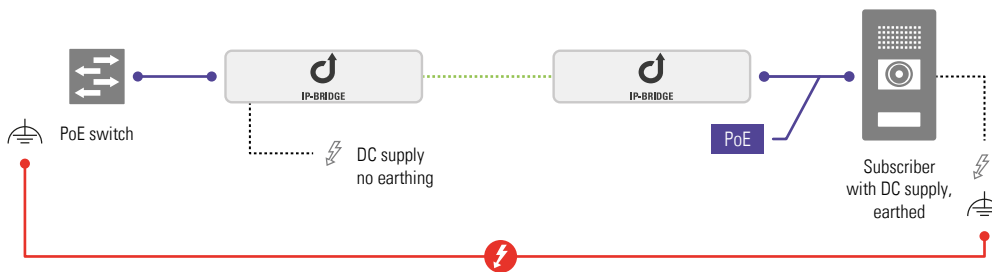
Technical specifications

Grounding of the IP-Bridge system

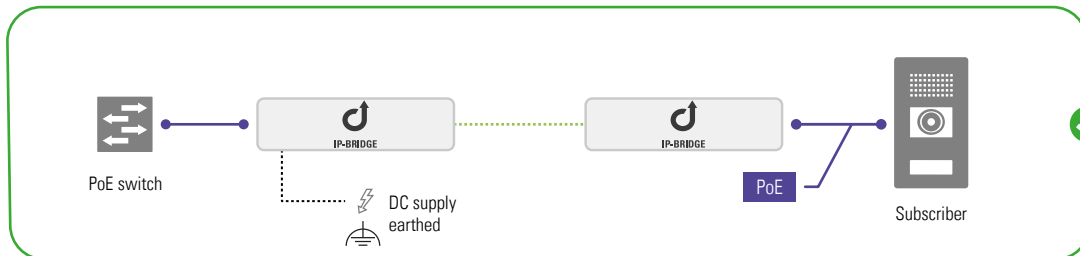
It is essential to ensure that there is no more than one grounding point within the entire system.



Two earthing points between **PoE switch and IP-Bridge power supply** will form a grounding loop, which may damage system components.



Two earthing points between **PoE switch and the PoE-powered device** will lead to a grounding loop, which may damage system components.



There is only **one grounding point** at the IP-Bridge's power supply terminal.

Note: Only PoE switches with complete galvanic isolation from the power grid (including ground wire) are permitted.

Note: Do not connect DC-minus of PoE-powered devices to earth at any point at the power supply or the I/Os.

Legend



The earthing wire is connected to the minus pole of the PoE supply (no galvanic isolation at the grounding wire).

Note on Ethernet insulators

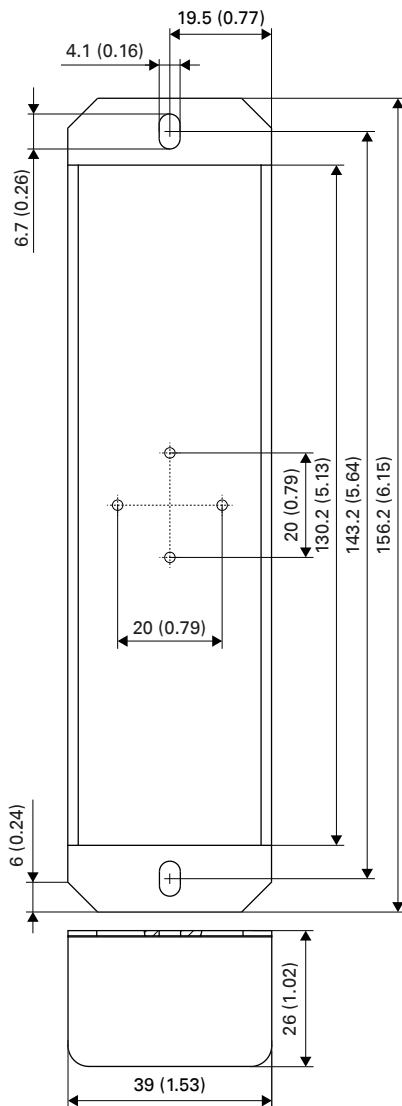
Ethernet insulators can be helpful to avoid grounding loops. Note, however, that this will disable the PoE functionality.

IP-Bridge

Installation instructions

Dimensions

Measuring units in mm (in), not to scale!



Mounting instructions

- Only use recommended tools when installing the device.
- Do not place the device in areas where it may become wet or damp, and avoid dusty, humid and high temperature environments.
- Use shielded Ethernet cables only.
- Before using the device, ensure all cables are connected correctly and are not damaged.

Mounting in flush or surface mount kit of Series WS

The module can be mounted in any surface and flush mount kit of the Series WS, as needed without module housing.

LED states

LED "POWER"

- **Permanently off:** IP-Bridge module is disconnected from power supply.
- **Permanently on:** IP-Bridge module is connected to an active power supply.

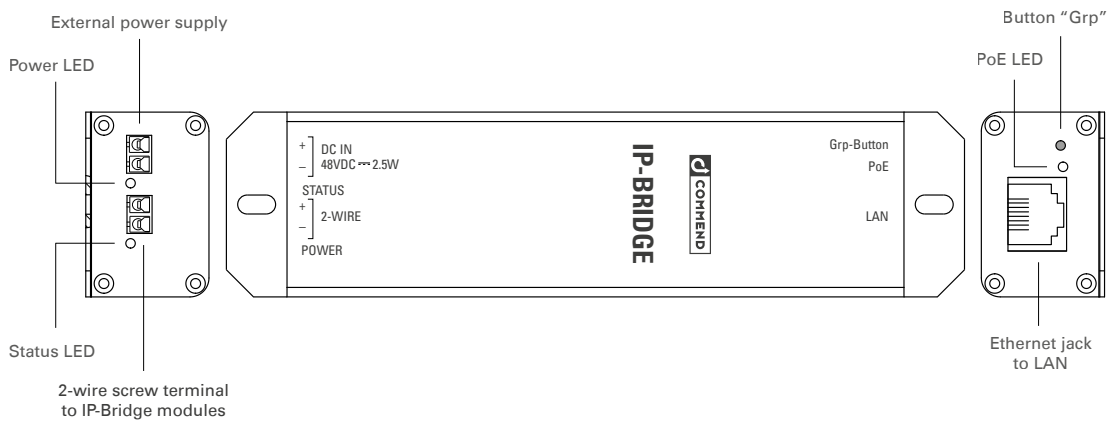
LED "STATUS"

- **Permanently off:** IP-Bridge module is not connected to another IP-Bridge module.
- **Permanently on/flickering:** IP-Bridge module is connected to another IP-Bridge module.

LED "PoE"

- **Permanently off:** No device is connected to the IP-Bridge module via the Ethernet jack.
- **Blinking:** IP-Bridge module is ready for pairing.
- **Permanently on/flickering:** IP-Bridge module is connected to a device via the Ethernet jack.

Connection



Installation

Connecting the IP-Bridge module

1. Connect the LAN Ethernet cable to the IP-Bridge module (transmitter).
Heed the safety instructions.
2. Connect the IP-Bridge modules using a 2-wire cable. One transmitter and up to four receivers may share the same 2-wire connection.
Note: Make sure the polarity of the 2-wire connections is correct, i.e. that the "+" and "-" terminals are connected properly.
3. Connect the external power supply (48–56 VDC, max. 60 W consumed power) to the desired IP-Bridge modules. Once the external power supply is connected to the transmitter, the power for the receiver is supplied via the 2-wire cable. Additional IP-Bridge modules can be connected in parallel via a 2-wire cable.
Note: By default, the IP-Bridge modules are set to connection mode (factory setting). When the IP-Bridge modules are connected via a 2-wire cable, an unencrypted connection is established automatically.

Establishing an AES-128 encrypted connection

4. Press button **Grp** on all IP-Bridge modules on the 2-wire network for approx. 15 seconds, starting with the transmitter. All LEDs will light up briefly and go off shortly afterwards. The IP-Bridge modules are now reset and in "not connected" mode.
5. Press button **Grp** on the transmitter for approx. 1 second. The LED "PoE" should start flashing in one-second intervals, indicating that the transmitter is ready for pairing.
6. Press button **Grp** on the receiver to be assigned to the respective transmitter for approx. 1 second. The LED "PoE" blinks for a few seconds and the IP-Bridge modules will start pairing. The receiver is now assigned to the transmitter. Once the LED "STATUS" comes on (possibly with a flicker), this means that an encrypted connection has been established.
Note: To pair further receivers (max. 4), put the device to be paired into "not connected" mode and repeat steps 5 and 6.

Attention:

It is recommended to set up encrypted data transmission to avoid interference (e.g. crosstalk).

Safety instructions

- **Make sure the requirements for galvanic isolation also for the grounding line are met when using a PoE switch (see „Grounding the IP Bridge System).**
- **No devices belonging to another earthing network may be connected to the device in question.**
- **IP-Bridge devices may be installed or replaced by trained and qualified personnel only.**
- **This is a Class A product. In a domestic environment this product may cause radio interference in which case further action/countermeasures may be required on the part of the user.**
- All connected electric circuits must meet the safety requirements for Safety Extra-Low Voltage (SELV) and limited power supply (LPC) according to IEC/EN 60950-1.
- Any accessories used with the device must comply with the device's technical specifications.
- Disconnect the power cable and the 2-wire cable from the device before performing maintenance work on the device.
- PoE over 2-wire is not the same as Commend 2-wire technology.
- Allow the device to cool down completely before touching it.
- Do not apply any unauthorised modifications to the device.

Quality tested. Reliable. Smart.

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The development and manufacturing processes are certified in accordance with **EN ISO 9001:2015**.



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