

Everything On One Bus

Integrated Automation Of Hybrid Plants

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PROFIBUS is the only field bus that can be used in all areas of hybrid process plants, where discrete applications and process control are combined. All sectors of the manufacturing and process industries and all applications from inbound to outbound quality check were taken into account from the beginning, allowing it to be used universally. PROFIBUS enjoys this unique position thanks to its modular design, combining uniform communication technology with the relevant application profiles and appropriately adapted physical transmission media to form integrated solutions. This universality, combined with modern technologies and the support of

solution - suitable for powering devices over the bus - is used for the connection to PROFIBUS DP. The communications protocol remains unchanged. The transition from PROFIBUS DP to PROFIBUS PA is thus seamless, with neither a system break nor a protocol conversion, as would be required by other fieldbus systems.

Intrinsic Safety Made Easy

Intrinsically safe devices are an indispensable prerequisite for plant operation in electrically hazardous explosive zones, and PROFIBUS supports these in two different ways with:

- the MBP-IS interface
- the combination of PROFIBUS DP and PROFIBUS PA

This solution conforms to the IEC 61158 standard.

Particularly when remote I/O stations are involved, however, interest is also being shown toward using the RS485 interface in hazardous areas because of its high data rate. PROFIBUS has specified the RS485-IS version with EEx i protection, which also allows easy replacement. Significant savings in the time needed by the user for planning and implementing intrinsically safe segments are made possible thanks to models with

definitions of device data. Adherence to these models guarantees the intrinsic safety of an installation (in its initial configuration as well as in the event of later modifications) without expensive, time-consuming calculations and approval procedures. For MBP-IS it is the FISCO model, which is based on the assumption, as far as intrinsic safety is concerned, that there is only one active source (the supply unit) per segment. For RS485-IS, the corresponding marginal conditions are stipulated in PI's Guideline 2.262. In contrast to FISCO, all bus nodes represent active sources in this guideline.

PROFIBUS makes the implementation of intrinsically safe fieldbus segments easy and time-efficient for the user. The choice between two interfaces provides flexibility in problem-solving, and makes everything from the planning to the commissioning of intrinsically safe installations much easier.

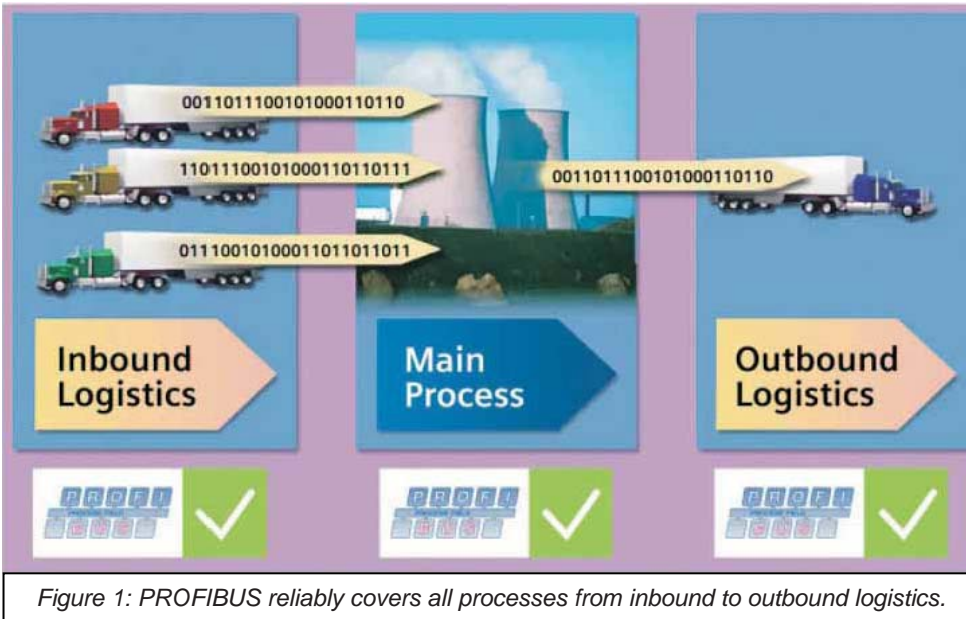


Figure 1: PROFIBUS reliably covers all processes from inbound to outbound logistics.

hundreds of device manufacturers, has made PROFIBUS the clear market leader in industrial communication!

Seamless Transition

PROFIBUS DP serves as a uniform high-speed backbone with a transmission rate of up to 12,000kbits/sec to which all device types, from inbound logistics over the main process to outbound logistics, are connected. The intrinsically safe field devices are combined into segments, fulfilling the special demands of process engineering for an intrinsically safe power supply over the bus and hot swapping. This adapted physical transmission medium and the supporting profile is referred to as PROFIBUS PA (Process Automation).

Media conversion couplers having a transmission speed of 31.5kbits/sec, handle the physical conversion of PROFIBUS DP to the intrinsically safe 'MBP' (Manchester Coded, Bus Powered) interface. This

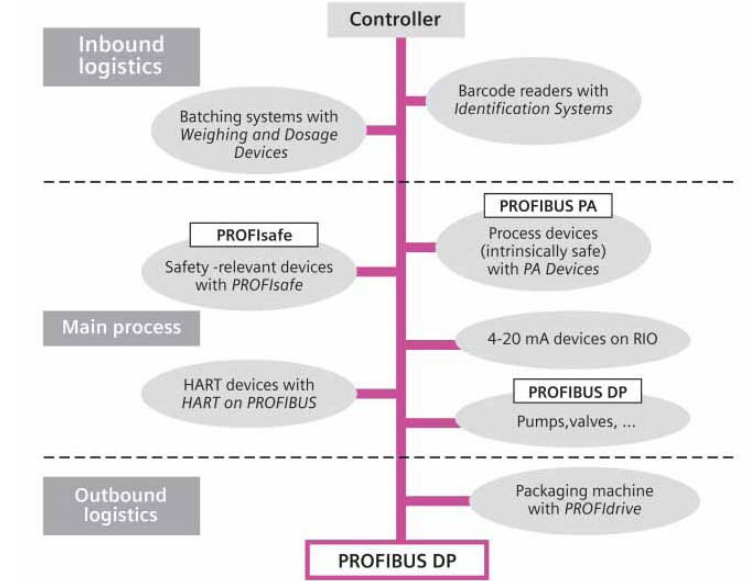


Figure 2: Controllers used for Inbound Logistics, Main Process and Outbound Logistics

Larger Numbers of Devices

PROFIBUS, resolves the dilemma of device counts using the field barrier technique. This makes use of a hybrid concept that is somewhere between increased safety and intrinsic safety and which takes into consideration the fact that intrinsic safety in a plant serves a practical purpose only where modifications need to be made or maintenance done while the plant is in operation. The field barrier is therefore supplied with a high supply current, e.g., 400 mA in EEx e, which is then distributed by the barrier to the EEx i connection cables for field devices with 40 mA. The use of several such barriers on the same supply device makes it possible to use the maximum number of devices allowed per segment.

Safety Without Using A Special Bus

In the past, safety-relevant solutions were hardware-based, with separate wiring and special components. PROFIBUS signaled a decisive turning point with the integration of safety functions into the devices themselves. The software-based PROFISAFE application profile is implemented in otherwise-unchanged standard devices, thus enabling the operation of standard and fail-safe applications up to SIL 2 on the same bus - a separate safety bus is not necessary! With

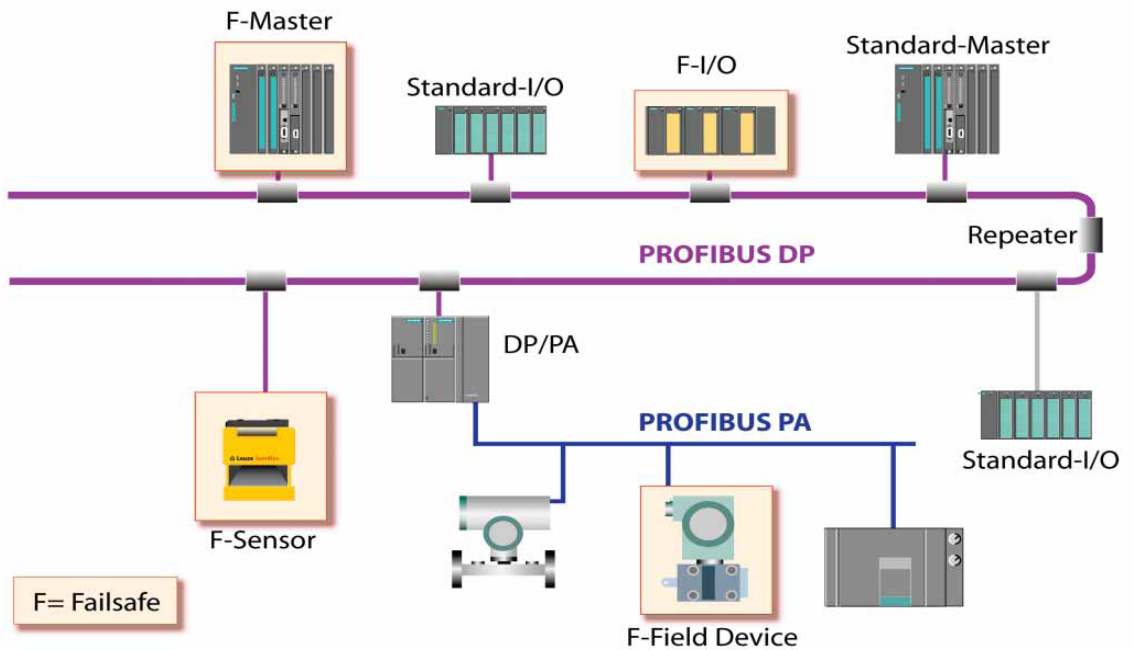


Figure 3: Coexistence of standard and failsafe communications

additional hardware fail-safe technology implemented in the devices, SIL 3 can be attained. It is easier to install and can be more easily modified, expanded and documented. PROFISAFE is available for PROFIBUS DP and PROFIBUS PA.

The Future Is Well Provided For

Innovations in the process industry are often incorporated into the modernization of existing installations stage by stage. The reasons for this are the long service life of an industrial plant and the size of the investment involved in its creation, which normally rule out any complete overhaul in the short-term. An adage of plant operators which PROFIBUS has taken to heart is "don't discard the proven, and introduce the new with care". The large majority of industrial plants are still equipped with 4 - 20 mA devices, including HART functionality. The development of remote I/O technology as well as the 'HART on PROFIBUS' and 'RIO for PA' PROFIBUS application profiles have created the prerequisites for using these devices in PROFIBUS systems and thus for introducing fieldbus technology without endangering existing investments. User benefits consist of the cost optimized, step-by-step modernization or expansion of existing plants with fieldbus technology. Plant sections that are still operational can remain unchanged, while new plant sections can be equipped with fieldbus technology. No system barriers arise as a result.

PROFIBUS DP, with a total of 15 million installed nodes to date, is today's world leader among fieldbus systems. In process, PROFIBUS PA has approaching 2 million nodes. The universality of PROFIBUS, being adaptable to all automation tasks installation-wide, has made it the clear market leader in industrial communications with more than 12 million installed devices.

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