Surge protection for PROFIBUS FMS, DP and PA
PROFIBUS requires high availability since it is used as communication system in process-oriented applications and as instrumentation and control medium between cells and objects. However, PROFIBUS is highly susceptible to surges since high inductive/capacitive coupling may occur due to its large spatial dimensions.

PROFIBUS is a product designation by Siemens for communication products (hardware and software) according to the standardised PROFIBUS standard (ProcessFieldBus). Alternative designations for PROFIBUS FMS and PROFIBUS DP are the Siemens product designations SINEC L2 and SINEC L2-DP. While PROFIBUS FMS is only designed for data transmission rates up to 500 kBit/s, PROFIBUS DP is capable of transmitting data with a transmission rate up to 12 MBit/s. PROFIBUS FMS (SINEC L2) is mainly used to handle large data volumes of the process and group control level. The fast PROFIBUS DP is designed for applications in the decentralised programmable logic controller I/O.

The latest development in the PROFIBUS segment is the intrinsically safe PROFIBUS PA which can also be used in potentially explosive atmospheres of process plants. A two-wire bus cable is typically used as a transmission medium. The physical properties of the bus system mainly comply with the RS 485 standard.

The bus devices can be connected as follows:
- Connection via 9-pin D-Sub miniature plug (typically 3/8 pin assignment)
- Connection via screw terminals
- Connection via bus terminals

Figure 9.13.1 PROFIBUS FMS or DP extending beyond a building with external lightning protection system

Figure 9.13.2 Intrinsically safe PROFIBUS PA in a building with external lightning protection system
Building with external lightning protection system

If a building is equipped with an external lightning protection system, lightning equipotential bonding is required. To this end, the earth-termination system is connected to pipes, metal installations and earthed parts of the power supply and information technology systems. In addition, all power supply and information technology cables entering and leaving the structure are connected to the earth-termination system via lightning current arresters (Figures 9.13.1 and 9.13.2).

In addition to lightning equipotential bonding, surge protection measures must be taken to protect electrical installations and systems.

If lightning equipotential bonding, surge protection and external lightning protection measures are properly implemented, they reduce failure in case of direct lightning strikes to a minimum.

Building without external lightning protection system

If no external lightning protection system is installed, the bus devices must be protected by surge arresters. In this case, lightning current arresters for power supply and information technology lines do not have to be installed (arresters 1 and 4 are not required).

<table>
<thead>
<tr>
<th>No. in Fig. 9.13.1 and 2</th>
<th>Protection for...</th>
<th>Surge protective device</th>
<th>Part No.</th>
</tr>
</thead>
</table>
| 1                       | Three-phase TN-S system  
                          Three-phase TT system | DEHNventil DV M TNS 255  
                         DEHNventil DV M TT 255 | 951 400  
                         951 310 |
| 2                       | Three-phase TN-S system  
                          Three-phase TT system | DEHNguard DG M TNS 275  
                         DEHNguard DG M TT 275 | 952 400  
                         952 310 |
| 3                       | 230 V supply  
                          24 V d.c. supply | DEHNrail DR M 2P 255  
                         DEHNrail DR M 2P 30 | 953 200  
                         953 201 |
| 4                       | PROFIBUS | BLITZDUCTOR XT BXT ML2 B 180  
                          + BXT BAS base part | 920 211  
                         920 300 |
| 5                       | PROFIBUS | BLITZDUCTOR XT BXT ML2 BE HFS 5  
                          + BXT BAS base part | 920 270  
                         920 300 |
| 6                       | PROFIBUS in hazardous area | BLITZDUCTOR XT BXT ML4 BD EX 24  
                          + BXT BAS EX base part  
                           or DEHNpipe DPI MD EX 24 M 2 | 920 381  
                         920 301  
                         929 960 |

Table 9.13.1 Lightning current and surge arresters for intrinsically safe PROFIBUS PA, PROFIBUS FMS and DP