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Term	Meaning	ID	WG	Scope
Accredited Testlaboratory	PROFIBUS Certification Tests in accordance with the related PROFIBUS Test specifications are executed in authorised PROFIBUS Test Laboratories. Meanwhile, 7 Test Laboratories world-wide are authorised to execute these tests. The (positive) test reports are basis for a PNO certificate. The test laboratories systematically are audited by PNO (accreditation). The procedures are defined within the following document: "How to become and to run an accredited PROFIBUS test laboratory". It is downloadable from the PNO web server.	405	PA-Devices	TopLevel
Acknowledgement	(1) IEC 61158-6: Alarms are diagnosis events to be acknowledged by the master class 1 via an acyclic (MS1) Alarm_Ack telegram. (2) PROFIsafe: After the tripping of a safety function a machine in general shall not restart automatically unless an explicit consent signal via an "operator acknowledge" is released. Prior to this signal the (manual) checking of the function is required.	55	Drives	TechGeneral
Active Control Connection Object (ACCO)	This software part is responsible for the mapping between properties from two components in the same device or different devices.	558	PROFINET	TopLevel
Actual Position	(1) Encoder: A preset function enables the user to set the actual position of the encoder to a preset value. (2) Variable speed drives: The profile defines the following status information: - The dynamic setpoint/actual position comparison is within the defined contouring error window - The actual position value is located at the end of a drive task in the positioning window (3) PROFIdrive: This profile deals with closed loop controlled drives across the network using the isochronous mode. Thus it defines a special "position feedback interface". (4) PA Devices: This profile defines in its actuator transducer block parameter descriptions a "Feedback value": The actual position of the final control element in units of OUT_SCALE.	56	Drives	TechGeneral
Actual Values (IsoM)	IEC 6118-5: In isochronous mode the following applies: The acquisition and update of the value of the input data of all involved DP-slaves should be done at the end of each isochronous DP cycle as close as possible to ensure to provide the most actual values of the input data. The output of the value of the output data of all involved DP-slaves should be done at the end of the cyclic part (Dx) of each isochronous DP cycle as close as possible to ensure to provide the actual values for the output data as soon as possible.	58	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
Actuator	Device directly affecting the automated process (e.g., drive, valve, heater) based on data received. In form of a field device an actuator may not only receive its I/O data (e.g. setpoints) but support different parameterization for variable operational modes or provide diagnosis information for predictive maintenance, etc. See "Final element" for terms especially in use within process automation.	1	PROFINET	TechGeneral
Acyclic Services (MSG)	IEC 61158-5: The isochronous DP cycle consists of the following parts: - SYNCH-Event (global control telegram) - cyclic services (MS0 I/O data exchange; elapsed time for DX) - acyclic services (delayed diagnosis, MS1 and MS2 access; elapsed time for MSG) - spare time (elapsed time for RES) The acyclic services shall be executed after the cyclic services. To ensure an isochronous DP cycle this part shall be fixed and limited.	173	Drives	TechGeneral
Address (Station)	IEC 61158-2: Medium attachment unit identification - unique number of a station connected to a segment (participant)	59	Drives	TechGeneral
Address Space	Within PROFIBUS DP the maximum possible number of addressable network nodes per segment, e.g. 127.	335	PA-Devices	TechGeneral
Advisory Board	The advisory board of PNO Germany supervises the development and maintenance issues of the PROFIBUS technology. It acts on behalf of PROFIBUS International.	340	TC3	TopLevel
Alarm	In general: Notification of an abnormal or unexpected event within a system. (1) Alarms in PROFIBUS DP require in addition to the standard diagnosis event mechanism within the cyclic data exchange a separate acyclic acknowledgment procedure between a host and a slave application. Since DP-V1, "Device related diagnosis" is the basis for the "Alarm" and "Status" types of diagnosis events (GSD: "DPV1"=1). PROFIBUS DP defines the following alarm types: Diagnosis, Status, Process, Update, Pull , and Plug Alarm. See "Device Related Diagnosis". The PNO maintains a Profile Guideline, Part3: Diagnosis, Alarms and Time Stamping , order no. 3.522. (2) Within PROFINET IO an alarm is defined as an abnormal or unexpected event within an IO-Device. The associated information is transfered to the IO-Controller via an acyclic communication channel. The following alarm types are defined: Diagnosis, Process, Redundancy, Pull, and Plug Alarm.	269	TimeStamp	TopLevel

Term	Meaning	ID	WG	Scope
Alert	Alert is a generic term for two different types of notifications within a PROFIBUS DP/PA network especially arranged but not exclusively for the process automation: - Alarm - Event Both alert types may be used with or without a user acknowledgement mechanism. The PNO maintains a PROFIBUS guideline "Time Stamp", order no. 2.192.	270	TimeStamp	TechGeneral
Analog Input (AI)	A type of interface between a control system and field instrumentation which allows variable values to be transmitted, as opposed to digital input/output.	511	DLL-AL	TechGeneral
Analog Output (AO)	(1) Transducer output in which the amplitude is continuously proportional to a function of the stimulus. (2) A type of interface between a control system and field instrumentation which allows variable values to be transmitted, as opposed to digital input/output.	512	DLL-AL	TechGeneral
Application	A complete, self-contained software program that performs a specific function directly for the user. This is in contrast to system software such as operating system kernels, communication server processes, etc. which exist to support application programs. From a communications point of view the application level is the highest level of the OSI model no matter whether this level consists of system and/or application software. See - Application program, - Application layer, - Application relationship, - Application process object, - Application profile, - Application classes, - Function block application	60	Drives	TopLevel
Application Pogram	A complete, self-contained software program that performs a specific function directly for the user. An application process is an application program while in actual operation. Within programmable controllers (PLC) an application program is a set of function blocks and functions written in an IEC 61131-3 language. See "Application".	230	Comm-FB	TopLevel
Application Process (AP)	IEC 61158-5: Fieldbus application processes (AP) may be unambiguously addressed by at least one individual data link layer service access point (SAP) address. For example, interactions may be based on request/response messages (telegrams) sent directly between APs (master - slave), or on data/events sent by one application for use by others (slave to slaves). These two models of interactions between APs are referred to as client/server and publisher/subscriber interactions. An application process object (APO) is a component of an application process (AP) that is identifiable and accessible through an application relationship (AR). See "Application Relationship (AR)" and "Service Access Points".	633	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Application Profile	Within PROFIBUS a spezified agreement within families of field devices on how to use the general PROFIBUS communication platform and its subsystems (e.g. device integration via GSD, EDD, FDT/DTM and Communication Function Blocks). Communication profiles are not a part of the PROFIBUS DP application profiles. See "Profile".	372	TC3	TopLevel
Application Relationship (AR)	IEC 61158-5: ARs represent communication channels, and they define how information is communicated between application processes (AP). The DP application layer offers the following AR types (connectionless = cl; connection-oriented = co): MS0: (cl) - one DPM1 and all related slaves - one or several DPM2 and all related slaves and optional - one or several DP-slaves with all related slaves (publisher/subscriber) MS1: (co) - one DPM1 and one related slave MS2: (co) - one DPM2 and one related slave MS3: (cl) - one DPM1 or 2 and a set of related slaves (used for clock time synchronisation) MM1: (cl) - one configuration device DPM2 and one related controlling device DPM1 MM2: (cl) - one configuration device DPM2 and a set of related controlling devices DPM1 The communication inside an AR is using "Data Link Services", "Service Access Points", and "Telegram Types".	409	PA-Devices	TechGeneral
Array	General: A collection of identically typed data items distinguished by their indices (or "subscripts"). A reference to an array element is written something like A[i,j,k] where A is the array name and i, j and k are the indices. IEC 61131-3: An aggregate that consists of data objects, with identical attributes, each of which may be uniquely referenced by subscripting (ISO).	231	Comm-FB	TechGeneral
ASIC	Application Specific Integrated Circuit: A Custom chip designed for a specific application. It is designed by integrating standard cells from a library. For PROFIBUS DP several ASIC solutions are available. --> www.profibus.com	515	DLL-AL	TopLevel
Asset Management	Deliberate handling of all material and immaterial values (assets) within an organization comprising resources and processes. Asset management as used by PROFIBUS focuses on master and slave devices, maintenance planning, stocking of spare parts. PROFIBUS provides corresponding technologies such as FDT, EDD, etc.	331	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
Association of Engineers (VDI)	VDI The Association of Engineers is a financially independent and politically unaffiliated, non-profit organization of 126,000 engineers and natural scientists. More than 12,000 of these members work for the VDI in an honorary capacity. Established in 1856, the VDI is today the largest engineering association in Western Europe. VDI is providing a series of guidelines for PROFIBUS relevant industrial fields: - Logistics - Information technology - Measurement and automation technology - Production technology - Process and chemical engineering - Safety technology	199	Drives	TopLevel
Availability	Availability is the probability that an item, under the combined influence of its reliability, maintainability and maintenance support, will be able to fulfil its required function over a stated period of time, or at a given point in time. The operating context of a piece of equipment will determine its performance requirements. An airliner will be expected to reach its destination once it has taken off. To guarantee this it will spend a relatively large amount of its time being serviced. In this case the reliability must be 100% but it's availability may be relatively low. In process industries which run continuously the availability is of prime importance. The definition of availability is: Availability = Uptime / (Downtime + Uptime) or Availability = MTBF / (MDT + MTBF) with MTBF = MeanTime Between Failure MDT = Mean DownTime (as the sum of meantime to repair = MTTR and possibly mean logistic delay times = MLDT)	645	TC3	TopLevel
Axis	PROFIdrive profile drive technology: A drive unit is a modular device and consists of the drive device itself and one or several drive axis (electric motors).	64	Drives	TechGeneral
Backplane Bus	A backplane is an electronic circuit board containing circuitry and several connectors into which additional electronic devices on other circuit boards or cards can be plugged. The collection of wires from one connector to the next, through which data is transmitted from one slot to another is called a backplane bus with tendency from parallel such as VME to serial bus systems such as Ethernet.	508	RIO	TechGeneral
Barrier	For intrinsic safety: a component containing an electrical circuit that is designed to limit the energy (voltage and current) available to the protected network in the hazardous (classified) location under specified fault conditions.	311	Ex-i	TopLevel

Term	Meaning	ID	WG	Scope
Basic Safety Publication ("A-Norm")	IEC guide 104: "The preparation of safety publications and the use of basic safety publications and group safety publications". This guide defines a hierarchical structure of safety standards. Basic safety publications being publications on a specific safety-related matter, applicable to many electrotechnical products. See "International Electrotechnical Commission (IEC)".	487	ZVEI-Safe	TopLevel
Bit	Shorthand Term for Binary DigiT. There are only two possible binary digits: 0 and 1. Bits are represented in computers by different voltage or current levels.	516	DLL-AL	TopLevel
Bit Time (Tbit)	IEC 61158-2: The bit time Tbit is the time, which elapses during the transmission of one bit measured in ns (nanoseconds). It depends on the Baudrate and is calculated as follows Tbit = 1 (bit) / Baudrate (bit/s). Examples: 12 Mbit/s --> Tbit = 83 ns 1,5 Mbit/s --> Tbit = 667 ns The unit Tbit is the base for fieldbus parameters such as Tsl, Tid1, etc.	201	Drives	TechGeneral
Black Channel	The PROFIsafe application profile establishes its safety measures on top of the PROFIBUS application layer (FAL) without using any data integrity features of PROFIBUS DP like parity or frame checking sequence. The underlying communication "channel" is treated like a "black box". Thus it is called a "Black Channel" in contrast to "Gray Channel" where those features are taken into account.	399	Safety	TopLevel
Block (EDDL)	According to the application profile "PA Devices", a field device (slave) is composed of the following functional units: - Administration (Device/Physical Block) - Transformation of physical quantities (signals) into digital data (Transducer Block) - Signal processing, e.g. linearization (Function Block)	37	EDD	TechGeneral
Block Model	In principle a programming language concept specifically for automation systems that allows related declarations and statements to be grouped together similar to the object oriented approach. It is used to partition a large program into smaller and more manageable blocks. The device model of the PROFIBUS application profile "PA Devices" decomposes the software part of the devices into - Transducer Block (mainly physical / electrical quantities converter) - Function Block (mainly signal processing) - Physical Block (administration). See "Function Block", "IEC 61131-3", "IEC 61804", and "Device Management".	462	TC3	TopLevel
Branch Profile	See "Profile"	551	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Brandlabel Device	Brandlabel means the licensed unchanged reproduction and / or sale of a device in the name of the licensee. It is possible for different companies to brandlabel PROFIBUS devices with the same Ident Number. A manufacturer declaration of the already registered manufacturer is required, which confirms the functional identity of the device and allowance to use the registered ID number. Additionally the name of the GSD file must contain a different manufacturer code. The GSD files should only differ in the key words "Vendor_Name" und "Model_Name".	288	GSD	TopLevel
Bridge	A device which forwards traffic between network segments based on data link layer information. These segments would have a common network layer address.	284	PROFINET	TopLevel
Broadcast	An unacknowledged transmission to multiple, unspecified recipients on a bus segment at one single point in time.	517	PROFINET	TopLevel
Bus Analyzer (Monitor)	Software tool to observe the protocol traffic on a serial bus line such as PROFIBUS. Other term: Bus Monitor.	433	PA-Devices	TechGeneral
Bus Cycle	The period of time the busmaster needs to poll every participant (slave) once. More busmasters can be activated by using the token principle which consequently prolongate the bus cycle.	411	PA-Devices	TechGeneral
Bus Powering	Type of power supply whereby field devices obtain their required auxiliary power via the fieldbus communication lines.	23	Ex-i	TechGeneral
Byte	The common unit of computer storage. It usually is made up of eight binary digits (bits) but may have different size also. To ensure correct definitions "octets" shall be used instead.	518	DLL-AL	TopLevel
Byte Ordering	Type "Big Endian": The order of bytes in a word in which the most significant byte is first. For example, the number 23041, which is 5A01 in hex, would also be stored as 5A01 in a big endian Motorola CPU. PROFIBUS is using the "Motorola" format. Type "Little Endian": The Intel x86 architecture uses Little Endian, and 015A would be stored instead. The PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512.	519	DLL-AL	TopLevel
Cable Type (MBP, MBP-IS)	- Wave impedance: 100 Ohm ± 20% at 31.25 kHz - Asymmetrical capacitance: 2 nF/km - Cross section: >= 0.8 qmm (AWG 18) - Cable type: Twisted pair, shielded - Resistance: 44 Ohm/km - Wave attenuation: 3 dB/km at 39 kHz - Wire colors: green: A-wire (-), red: B-wire (+) (highly recommended) - Cladding color: blue for MBP-IS, black or black/blue striped for MBP The PNO maintains a guideline "PROFIBUS Interconnection Technology", order no. 2.142	659	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Cable Types (RS485)	Cable Type A: - Wave impedance: 135 -165 Ohm; f = 3 - 20 MHz - Capacitance: Typical < 30 pF/m - Cross section: >= 0.34 qmm (AWG 22) - Cable type: Twisted pair (1x2; 2x2; 1x4), shielded - Resistance: < 110 Ohm/m - Wave attenuation: 0.75 dB/100m at f = 100 kHz - Wire colors: green: A-wire (-), red: B-wire (+) (recommended) - Cladding color: purple Other cable types are specified. However, PNO and PI are highly recommending cable type A. The PNO maintains a guideline "PROFIBUS Interconnection Technology", order no. 2.142	538	DLL-AL	TechGeneral
Calculated Isochronous Cycle Time (Tct)	IEC 61158-5: This parameter specifies the time (in units of tBIT) that is necessary to handle a complete isochronous DP cycle. It corresponds to the isochronous DP cycle time (Tdp). Allowed values: 1 to 2^24-1. This is a master parameter. See "Master parameter".	663	TC3	TechGeneral
Call Service (Action)	IEC 61158-5: Stateless function invocations, referred to as actions, run to completion when invoked and cannot be interrupted. In addition, some atomic actions return a value in response to being invoked, while others do not. Those that do may be used to model software FUNCTIONS, and those that do not may be used to model software PROCEDURES. The confirmed CALL service is used to invoke the execution of an action object. This service shall only be used in conjunction with the MS1 or MS2 application relationship. The PNO maintains a "PROFILE Guideline, Part1 Identification & Maintenance Functions", order no. 3.502. Within this profile the stateless function invocation or "CALL service" is used.	630	DLL-AL	TopLevel
Category (acc. EN 954-1)	The risk reduction provided by the operation of a safety system can be assessed in different manners. While EN 954-1 is using a qualitative scale of different categories IEC 61508 makes use of the safety integrity level (SIL) as a quantitative measure. The categories of the EN 954-1 are ranging from B to 1,2,3, and 4. These are: - B: Safety related parts of control systems and/or their safety devices and their components must be designed, constructed, selected, assembled and combined in accordance with the relevant standards such that they can withstand the expected influence. System behavior (SB): The occurence of a fault can lead to the loss of the safety function. - 1: The requirements of B shall apply. Well-tried components and well-tried safety principles shall be used. SB: The occurrence of a fault can lead to the loss of the safety function, but the probability of occurence is lower than in category B. - 2: The requirements of B and the use of well-tried safety principles shall apply. The safety function	479	ZVEI-Safe	TopLevel

Term	Meaning	ID	WG	Scope
CENELEC	CENELEC, the European Committee for Electrotechnical Standardization, was created in 1973 as a result of the merger of two previous European organizations: CENELCOM and CENEL. Nowadays, CENELEC is a non-profit technical organization set up under Belgian law and composed of the National Electrotechnical Committees of 27 European countries. In addition, 8 National Committees from Central and Eastern Europe are participating in CENELEC work with an Affiliate status. Their ultimate goal as affiliates is gaining full membership to CENELEC Standardization activities. EN's (EN - European Standard) are the most important deliverables published by CENELEC. EN means, there is a normative document available, in principle, in the three official languages of CENELEC (English, French and German) that cannot be in conflict with any other CENELEC standard. --> www.cenelec.org See "EN 50170".	557	TC3	TopLevel
Certificate	A document issued by the PNO business office. It states that a specified product type in a certain hard and software version of a named manufacturer conforms to the specified PROFIBUS standards. These standards may comprise communication profiles as well as application profiles as required. Prior to the certificate an accredited PROFIBUS laboratory must have tested and verified the conformance of the product.	328	PA-Devices	TopLevel
Channel Vector	An I/O module may comprise one or more I/O channels. In case a channel is conveying more than one I/O value that is uncorrelated to the other it is called a multi variable channel. In cases where these values are correlated to each other the set is called a channel vector of a process quantity. Example: the quantity "rotation" is defined by speed and direction.	510	RIO	TechGeneral
Clock	A clock manages the synchronized or unsynchronized time of a device. Usually it is a hardware or software mechanism within a master or slave device that counts time ticks (smallest time units out of e.g. a quartz oscillator) and builds up clock time information in individual formats. For PROFIBUS DP standardized formats are defined. The PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512	271	TimeStamp	TechGeneral

Term	Meaning	ID	WG	Scope
Clock Time Synchronization (CS)	IEC 61158-3: A sequence of interactions to synchronize the clock times of all receivers by a time master. The methodology in use is called "backwards time based correction". Time master and receiver are using the "CS" data link service as follows: a) As part of the service sequence the time master - after a time event request trigger - transmits a "time event" message to all the time receivers first. b) Upon the trigger the local data link entity (DLE) of the time master measures the "send delay time" between the trigger and the transmission of the appropriate telegram c) while the remote DLEs in the time receivers start the measurement of the receiving delay after reception of this telegram. d) Upon reception of a positive time event confirmation the data link service user in the time master passes a "clock time value" request to the local DLE as second part of the service sequence to distribute the telegram to all remote time receivers. The clock time value takes into account the measured "send delay time".	272	TimeStamp	TopLevel
Coexistent	IEC 62390: Two or more devices coexist on the same communications network if they can operate independently of one another in a physical communication network or can operate together using some or all of the same communication protocols, without interfering with the application of other devices on the network. See "IEC 62390".	365	TC3	TechGeneral
Commissioning	The systematic process of putting a fieldbus network, the connected devices and the appended equipment of a machine or plant into operation. The steps include configuration, parameterization, programming, debugging on the many system levels such as PROFIBUS DP diagnosis, system diagnosis, programm monitoring and alike. Engineering tools (software) or engingineering systems are leading through these steps. Commissioning is finished when the system performs according to the documented design intent and the owner's operational needs, and when specified system documentation and training are provided to the facility staff.	166	Drives	TopLevel
Common Cause Failure	Failures of different items, resulting from a single event, where these failures are not consequences of each other. NOTE: Common cause failures should not be confused with common mode failures. (IEC dictionary, 191-04-23)	552	Safety	TechGeneral
Communication	In case of PROFIBUS the electronic transfer of digital data from one network node to another	334	PA-Devices	TopLevel
Communication Function Block (Comm FB)	A basic function block defined for PROFIBUS DP and supplied by the PLC manufacturer for the standardized access of user programs to field devices. The standardization is based on IEC 61131-3. The PNO maintains a guideline "PROFIBUS Communication and Proxy Function Blocks acc. to IEC 61131-3", order no. 2.182.	233	Comm-FB	TopLevel

Term	Meaning	ID	WG	Scope
Communication Parameter	Communication parameters are parameters, which adjust the communication protocol function to the actual net configuration. Communication parameter exist for all phases of the communication protocols. Examples are bus address, token rotation time, idle time. See "Slave parameterization" and "Device parameterization".	425	PA-Devices	TechGeneral
Communication Profile	IEC 61158 comprises a summary of layer stacks of several different fieldbusses. IEC 61784 defines the usefull combinations of these stacks via communication profiles CPF3/1 up to CPF3/3 (PROFINET). One of these is PROFIBUS DP. Within this communication profile three different physical profiles are defined: - RS 485 (RS 485-IS) - MBP-IS (MBP-LP, MBP) - Fiber Optics	371	DLL-AL	TopLevel
Compact Slave	A slave with a fixed structure and length of input and output data. These data shall be described as a single module in the GSD. During the configuration of the device there is no opportunity of selecting from the defined input and output data.	294	GSD	TopLevel
Compliance Check	Proof of the correspondence (compliance) of a specification with certain accepted standards or other binding requirement documents.	427	Comm-FB	TopLevel
Component	Software-Representation of a technological module with defined functionality. An automation solution consists of several PROFINET-Components. A PROFINET-Component contains in general one technological function and the assigned hardware device.	562	PROFINET	TopLevel
Component Generator	A Component Generator (normally integrated in an engineering tool) creates a component out of a technical data sheet i.e. PCD-file in XML format (PROFINET Component Description)	563	PROFINET	TopLevel
Component Object Model (COM)	Component Object Model (COM) is Microsoft's framework for developing and supporting component objects inside resident programs. Whereas Microsoft's Object Linking and Embedding provides services for the compound document that users see on their display, COM provides the underlying services of interface negotiation, life cycle management (determining when an object can be removed from a system), licensing, and event services (putting one object into service as the result of an event that has happened to another object). See "Distributed Component Object Model (DCOM)"	560	PROFINET	TopLevel
Configuration	Configuration is one of the phases during commissioning of a fieldbus based automation system. In an engineering tool this phase begins with the network configuration whereby fieldbus segments are selected and individual master and slave devices are "attached" from a catalog library. The individual devices then are configured by selecting modules from the GSD file information (communication part of a device configuration). The complete device configuration may be more complex regarding the technology part of the field device (application). PROFIBUS provides means such as EDD and FDT/DTM to support this task in a standardized manner. In addition see "Parameterization", "EDD", "DTM".	296	GSD	TopLevel

Term	Meaning	ID	WG	Scope
Configuration Data	A sequence of configuration identifiers (string) compiled during the configuration process of a slave. It can represent one or more modules of a slave in an ascending manner (slot 1...n). It is stored in a master class 1 together with the other slave's configuration data. This string will be sent from the master to the slave to check the presence of the corresponding modules of the slave during run-up time (configuration telegrams). See "State machine" and "Configuration identifier".	297	GSD	TechGeneral
Configuration Identifier (Cfg)	An octet string describing the structure and length of the I/O data of a module. Configuration identifiers may appear in the following formats: - Identifier octet (GIF), - Special identifier format (SIF) or - Extended special identifier format (EIF) Note: This term must be differentiated from the ident number of a PROFIBUS device! See "Configuration" and "Configuration data".	298	GSD	TechGeneral
Configuration Tool	In the context of PROFIBUS DP a software tool to store GSD files in a library and to configure PROFIBUS DP networks. The compiled configuration data for each and every slave device can be downloaded and stored within a master class 1 for further check-ups during run-up of a PROFIBUS DP system. See "Configuration" and "Configuration data".	417	PA-Devices	TopLevel
Conformance Test	Test to determine the correspondence (conformity) of an implementation (software) or realization (hardware) with the corresponding specification.	426	PA-Devices	TopLevel
Connection	Link between two PROFINET components during plant wide engineering by means of a connection editor that graphically forms an automation application. The connection editor is a vendor-independent engineering tool to configure components from different suppliers. The connections can only be established between equal data types. See "Connection View".	347	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
Connection Establishment (Initiate)	IEC 61158-5: The cyclic data exchange (e.g. MS0) between a DPM1 and its slaves takes place in a connectionless manner, i.e. after a correct start-up procedure it is running continuously. For the temporary purpose of changing parameters or reading diagnosis information it is not appropriate to use the same type of communication between a DPM2 and a slave. For these cases the connection-oriented mode is provided: A logical connection is established between application processes of a connection-oriented application relationship. Three different phases are identified in connection-oriented application relationships: - connection establishment phase - data transfer phase (e.g. read or write records) and - connection release phase. A successful connection establishment is needed prior to exchanging data. In this phase a request to establish the connection is announced at the remote application process (e.g. Initiate service). A connection-oriented application relationship can be monitored. It is dissolved by its release (e.g. Abort service).	457	PA-Devices	TechGeneral
Connection View	Part of the PROFINET engineering. Shows components with their technological interfaces and their interconnections.	361	PROFINET	TechGeneral
Connector Type (MBP)	- M12 circular connector according to IEC 947-5-2 - Ingress protection shall be IP 65 or higher - Designed for a corrosive atmosphere, e.g. chemical environment - IEC 60947-5-2 A coding. Pin 5 to be left open due to possible creepage distances and clearances in potentially explosive atmospheres. The PNO maintains a guideline "PROFIBUS Interconnection Technology", order no. 2.142	660	TC3	TechGeneral
Connector Types (RS485)	PNO specified four connector types for RS485 communication. They differ in the ingress protection rating and possible power supply feeding. (1) Primarily recommended is the 9 pin Sub-D connector (IP20) with its direct connection of the incoming and the outgoing cables thus eliminating the need for spur lines. This type can be connected or disconnected to the device without disrupting the remaining part of the bus segment. (2) For IP65/67 the M12 circular connector according to IEC 947-5-2 is recommended. After disconnection from a device the connectors of the incoming and the outgoing cables may be connected to each other thus forming again a complete segment without disruption. (3) Another alternative for IP65/67 is the so-called Han-Brid connector according to the DESINA recommendations. It allows to contact hybrid cables that share data lines and power supply. Data lines may be fiber optics also. (4) Another alternative for IP65/67 is the Siemens hybrid connector. It allows to contact hybrid cables that share data lines and power supply. Data lines may be fiber optics also. The PNO maintains a guideline "PROFIBUS Interconnection Technology", order no. 2.142	658	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Consumer ID	A consumer represents the sink of a data communication relationship in PROFINET.	564	PROFINET	TechGeneral
Continuous Manufacturing	Continuous manufacturing is characterized by manufacturing plants for chemical or pharmaceutical substances and for food and beverages. Analog signals are dominant. A synonym is process automation. See "Distributed control system".	374	TC3	TopLevel
Controlled Hold Function (Standstill)	IEC 61800-5-2: In contrast to "Uncontrolled stopping by removal of power", standstill is the state of a stopped motor where all controlling functions (torque, speed, position, etc.) between the basic or complete drive module and the motor remain active. The motor is kept in position and resists external forces (e.g. load of hanging (z) axis). This description of an operational stop function is based on implementation by means of an adjustable speed electrical power drive system without external (e.g. mechanical) brakes. Standstill is appropropriate wherever manual intervention into a process is needed but removal of power is not practical. Typical applications are test operations and adjustment of CNC programs.	490	ZVEI-Safe	TechGeneral
Controlled Stopping (Stop Category 1)	IEC 61800-5-2: In case of "Controlled stopping by control of braking torque" the (safe) adjustable speed electrical power drive system shall control the braking torque within specified limits to bring the motor to the stopped condition. This braking torque (and its limits) should be determined by the installation designer to safely achieve the stopped condition within a required time. This safety function corresponds to a controlled stop in accordance with category 1 of IEC 60204-1 when power is removed after the motor has attained the stop condition.	492	ZVEI-Safe	TechGeneral
Controller	A PROFINET controlling device for IO-Devices that supports the component communication of PROFINET also.	610	PROFINET	TopLevel
Coupler	IEC 61158-2: Physical interface between trunk and spur or trunk and device. Within PROFIBUS DP this term is used in a special context. See "Segment coupler".	285	DLL-AL	TopLevel
CSMA/CD	Carrier Sense Multiple Access with Collision Detection. That includes the following steps: Listen on the bus to find out if the line is free.Then send telegram to remote station(s). When other stations also send at the same time a collision is detected. Then the message is cancelled. Retry after an allocated random time.	565	PROFINET	TechGeneral
Cycle Time Calculation	See "System Reaction Time (Tsr)", "Isochronous DP Cycle Time (Tdp)", and "Calculated Isochronous Cycle Time (Tct)".	327	PA-Devices	TechGeneral
Cyclic Data Exchange	IEC 61158-3: Term used to describe events which repeat in a regular and repetitive manner. The MS0 services of PROFIBUS DP are based on cyclic data exchange. See "state machine".	232	Comm-FB	TopLevel
Cyclic Redundancy Check (CRC)	Error-checking technique in which the frame recipient calculates a remainder by dividing frame contents by a prime binary divisor and compares the calculated remainder to a value stored in the frame by the sending node.	458	Safety	TechGeneral

Term	Meaning	ID	WG	Scope
Cyclic Self-Monitoring	A fault will be detected automatically before or during the demand of a safety function, i.e. at each and every start-up cycle of the safety control device.	504	ZVEI-Safe	TechGeneral
Data	IEC vocabularies: Reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or automated processing.	413	PA-Devices	TopLevel
Data Exchange Broadcast (DxB)	IEC 61158-6: service for the conveyance of information between the DP-master (Class 1) and the assigned DP slaves initiating the publisher and subscriber functionality in the DP-slaves. Version DP-V2 of PROFIBUS DP supports direct data exchange from a publishing slave to its assigned subscribing slaves. This technology uses the normal cyclic data exchange of a master class 1. However, the response telegram from a publishing slave cannot only be received from the master but from the subscribing slaves also, just like a broadcast (multicast) telegram.	45	Drives	TopLevel
Data Exchange Time (Tdx)	IEC 61158-5: The data exchange time (Tdx) may elapse (isochronous mode) to handle all MS0 (cyclic) communication of one DPM1 on PROFIBUS DP. It is part of the over all isochronous DP cycle time (Tdp). See "Isochronous DP Cycle Time (Tdp)".	202	Drives	TechGeneral
Data Link Layer (ISO/OSI)	See "OSI Reference Model" and "Fieldbus data link layer".	414	PA-Devices	TopLevel
Data Link Services	IEC 61158-3: The data link layer provides the following services to its layer above. - Send Data with Acknowledge (SDA; not for PROFIBUS DP) - Send Data with No Acknowledge (SDN; e.g. broadcast) - Send and Request Data with Reply (SRD; normal two-way data exchange) - Send and Request Data with Multicast Reply (MSRD) - Clock time Synchronization (CS; broadcast) These services permit a user in a master station to send data or time information to a user at either a single remote station (SDN, SDA, SRD, MSRD) or at all remote stations (SDN, CS). The data link layer provides additional management services for initialisation, configuration, event and error handling.	545	DLL-AL	TechGeneral
Data Rate (Baud rate)	Other common terms are "data transfer rate" and "transmission rate". Within PROFIBUS DP this is the amount of data transferred across a fieldbus segment per second. A data rate is measured in units of bits per second ("b/s" or "bps"), or baud. See "RS485", "MBP", and "Fiber Optics".	390	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Data Type	General: A set of well defined binary structures (classification) from which a variable, constant, function, or other expression may take one as carrier for values. A data type tells the compiler or interpreter how the programmer intends to use it. For example, the process and result of adding two variables differs greatly according to whether they are integers, floating point numbers, or strings. IEC 61158-5: Fieldbus data types specify the machine independent syntax for application data conveyed by FAL services. The fieldbus application layer supports the definition and transfer of both basic and constructed data types. Basic types are atomic types that cannot be decomposed into more elemental types. Constructed types are types composed of basic types and other constructed types. See "Data type numeric identifier". IEC 61131-3: Set of values together with a set of permitted operations (ISO). The PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512	234	Comm-FB	TopLevel
Data Type Numeric Identifier	IEC 61158-5: Fieldbus data types specify the machine independent syntax for application data conveyed by FAL services. A certain set of common data types is standardized for PROFIBUS DP and has an assigned data type numeric identifier. Following some frequently occurring data types and IDs: 1 Boolean 6 Unsigned16 2 Integer8 7 Unsigned32 3 Integer16 8 Floating point 4 Integer32 9 Visible String 5 Unsigned8 10 Octet String The PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512. It contains recommendations for the usage and actual definitions and assignments. See "Extended special format identifier"	635	TC3	TechGeneral
Deadman Switch	A "deadman" switch is a manually activatable control device that allows to disable a safety function of a safety system for the time being activated. The switch normally has three positions, a middle position being the "overwrite state", the upper and the lower being the "safe state" position. A deadman switch alone shall not enable an unsafe state. It is necessary to launch a separate second intentional command prior to this action.	498	ZVEI-Safe	TechGeneral
Decentralized Peripherals (DP)	The term "Decentralized Peripherals" and the acronym "DP" stands for the simple, fast, cyclic and deterministic I/O data exchange between a bus master and its assigned slave devices. The corresponding PROFIBUS communication protocol is called PROFIBUS DP.	152	Drives	TopLevel
Declaration (of Variables)	IEC 61131-3: The mechanism for establishing the definition of a language element. A dec-laration normally involves attaching an identifier to the language element, and allocating attri-butes such as data types and algorithms to it.	235	Comm-FB	TechGeneral

Term	Meaning	ID	WG	Scope
Default	The current setting or action taken by hardware or software if the user has not specified otherwise.	520	DLL-AL	TopLevel
Destination Service Access Point (DSAP)	IEC 61158-3: One out of several data link service acces points designates the point of communication with a data link service user. The range of usable indexes is limited from 0 to 63 and CS and NIL. The index 63 is used for broadcast messages. If CS or NIL are used in a data link service request, then the corresponding data link PDU contains no address extensions (DSAP and SSAP) for efficiency reasons. See "NIL, CS". Following a list of DSAPs (IEC 61158-5, table 398) for MS0: NIL Data exchange and DxB 53 Ext Prm (check extended user parameter) 55 Rem Para (set slave address) 56 Read Input (read input) 57 Read Output (read output) 58 Global Control (broadcast, sync, freeze) 59 Read Cfg (get configuration) 60 Read Diag (read slave diagnosis) 61 Prm (check parameter) 62 Cfg (set and check configuration) for MS1: 50 Alarm Ack (alarm acknowledgement) 51 Process Data Alarm Ack (....) 60 Alarm (alarm notification) for MS2: 0...48 Process Data (read write records; DSAPs established via "handles")	420	PA-Devices	TechGeneral
Deterministic	Describes a system whose time evolution can be predicted exactly. This only is possible, if the correct next step within the system only depends on the current state.	377	PA-Devices	TopLevel
Device Description Language (DDL)	DDL is the Device Description Language for devices following the HART Communication Foundation and Fieldbus Foundation specifications. It is defining the syntax and semantics of device parameters, user interfaces and routing communications. DDL and EDDL only differ in about 5% of the communication dependent parts. The DDL is standardized in IEC61804-2.	29	EDD	TechGeneral

Term	Meaning	ID	WG	Scope
Device Identifier	Ident number: The primary device identification is an ident number of data type Unsigned16. This number is unique and assigned by the PNO business office upon application. It is stored within the device and defined in the corresponding GSD file via keyword. In addition it is part of the GSD file name. At runtime the ident number is used within the - set slave address procedure - parameterization telegram (octet 5 + 6) - standard part of a diagnosis message (octet 5 + 6) The ident number explicitly cannot be retrieved from a device. Its main purpose is to make sure that a GSD file and configuration/parameterization data between master class 1 and its slave are matching. The PNO maintains a technical guideline "Specification for PROFIBUS device description and device integration, Volume 1: GSD", Version 5.0, order no. 2.122 For a secondary identification possibility see the identification & maintenance functions (I&M). See "Ident Number".	81	Drives	TopLevel
Device Management	The management functions of a complete PA field device (device management) are contained within one block called "Physical Block" according to the block model. Every PA device may contain several transducer and function blocks but only one physical block. The access to the functions is enabled via a table of content, the so-called directory. For example it provides information on how the various blocks may be linked together to perform a certain functionality. See "Block Model".	380	PA-Devices	TechGeneral
Device Parameterization	The device parameterization within PROFIBUS DP consists of 3 phases. The first phase takes place during start-up of the communication system and provides basic communication parameterization and simple additional device parameters. Both are defined within the GSD file of a device, stored within a master class 1 after configuration in an engineering tool, and transmitted to the slave at start-up time. Most of the automation cases in factory automation are covered by this method. More complex devices such as drives, laser scanners, scales, robots, transmitters, etc. require further individual parameterization before final production start. This is done in a second phase. In process automation certain device parameters such as value limits, value range, gain, etc. need to be adjusted even at run-time. For this second and third phase PROFIBUS DP provides two ways to accomplish the task: DTM/FDT and EDD. See "Slave parameterization"and "Communication parameter".	640	TC3	TopLevel
Device Profile	See "Profile"	529	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Device Related Diagnosis	IEC 61158-5: This diagnosis information is related to the whole slave. It is limited to 62 octets. For DP-V0 slaves the coding of the diagnosis data was not structured and specified and therefore is no more recommended. Since DP-V1, "Device related diagnosis" is the basis for the "Alarm" and "Status" types of diagnosis events (GSD: "DPV1"=1). The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522.	406	PA-Devices	TechGeneral
Device Type Manager (DTM)	A device type manager is a piece of software for a field devices's parameterization and diagnosis that supports the standard set of interfaces to an FDT frame application, e.g. on a standard PC platform. The DTM can be developed directly from a device description such as a DD or EDD, if available. The DTM encapsulates all the device-specific data, functions and business rules such as the device structure, its communication capabilities, internal dependencies, and the graphical user interface. The DTMs provide functions for accessing device parameters, configuring and operating the devices, and for diagnosis. DTMs can range from a simple software for setting-up device parameters up to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes. Three types of DTMs exist: - DeviceDTM: a DTM for a field device - CommDTM: a DTM for a communication device such as a fieldbus adapter or gateway - GatewayDTM: a DTM that uses a communication channel to communicate with its device	379	PA-Devices	TopLevel
Diagnosis	Identification of the nature or cause of some abnormal or unexpected phenomenon, here from a PROFIBUS DP device. Most of the diagnosis scenarios require intervention through service personal. PROFIBUS DP provides means to associate machine usable information to human usable information with helpful instruction texts or graphics. This shortens repair latency times and thus improves the uptime of automation systems. Preventive diagnosis via "warnings" avoids surprising down-times as it allows predictive maintenance. For specific use of PROFIBUS diagnosis features for process automation devices (PA devices): see profile specification "PA Devices, Amendment 2".	330	PA-Devices	TopLevel
Diagnosis Alarm	IEC 61158-5: One of the alarm types. A diagnosis alarm signals an event within a module, for instance overtemperature, short circuit, etc. See "Device Related Diagnosis" and "Alarm". The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522.	273	TimeStamp	TechGeneral
Diagnosis Information	This term is used to identify the whole diagnosis data of a DP master or DP slave. The main parts of the diagnosis information consist of the standard diagnosis information and device specific extensions if available.	555	DLL-AL	TechGeneral

Term	Meaning	ID	WG	Scope
Digital Input (DI)	A type of interface between a control system and field instrumentation which allows values of only two states (for instance on/off or open/closed) to be transmitted, as opposed to analogue input/output.	513	DLL-AL	TechGeneral
Digital Output (DO)	(1) An output signal consisting of a sequence of discrete quantities coded in an appropriate manner for driving e.g. relais coils, lamps, etc. (2) A type of interface between a control system and field instrumentation which allows values of only two states (for instance on/off or open/closed) to be tranmitted, as opposed to analogue input/output.	514	DLL-AL	TechGeneral
DIN	German Institute for Standardization (www.din.de)	151	Drives	TopLevel
DIN 19245	Initially PROFIBUS was published as a standard in the German Standard DIN 19245. Part 1 was defining the physical and data link layer, part 2 the application layer of FMS (Field Message Specification), and part 3 the application layer of DP (Decentralized Peripherals). In 1996 the CENELEC standard EN 50170 replaced the DIN 19245. Today the technology is integrated in the international standard IEC 61158/61784.	415	PA-Devices	TopLevel
Discrete Manufacturing	Discrete manufacturing is characterized by manufacturing plants for discrete components such as mechanical parts for cars, machines, furniture, etc. Binary signals are dominant. A synonym is factory automation.	373	TC3	TopLevel
Distributed Component Object Model (DCOM)	Distributed Component Object Model Protocol that enables software components to communicate directly over a network. Developed by Microsoft and previously called Network OLE, DCOM is designed for use across multiple network transports, including Internet protocols such as HTTP. DCOM plays a role in FDT/DTM and in the PROFINET component model.	312	PROFINET	TopLevel
Distributed Computing Environment (DCE)	An architecture consisting of standard programming interfaces, conventions and server functionalities (e.g. naming, distributed file system, remote procedure call) for distributing applications transparently across networks of heterogeneous computers. DCE is promoted and controlled by the Open Software Foundation (OSF).	566	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
Distributed Control System (DCS)	IEC: A network of computerized stations whose purpose is the control of an industrial process or plant. Before the introduction of DCSs separate closed loop controls and instruments have been in use for the control of mainly chemical processes. The first distributed control systems were developed in the mid-1970s with the advent of mini computers and workstations. Since then DCSs are continuosly changing and integrating standards and de facto standards like microprocessors, operating systems, bus communications (fieldbus, LAN, Internet), database systems, PLCs, etc. However, despite this change in appliances some major characteristics can be defined: - a DCS is process oriented and thus is focusing on complex controling and monitoring of many process quantities/variables (temperature, pressure, flow, level, etc.). - a DCS consists of field devices, remote terminal units (e.g. PLC), database systems and operator stations. It is highly integrated to meet the performance requirements. - a DCS usually is designed for redundant operations to meet the availability requirements. - a DCS is process state driven. It is primarily interested in the process flow and its potential corrections.	309	EDD	TopLevel
Diversity	IEC 61508-4: Different means of performing a required safety function. Diversity may be achieved by different physical methods or different design approaches such as microprocessors of different architecture or software diversity (e.g. coded processing).	473	ZVEI-Safe	TopLevel
Domain	1) In a hierarchy, a named group that has control over the groups under it, which may be domains themselves. 2) In communications, all resources under control of a single computer system. In a LAN, a domain is a subnetwork comprised of a group of clients and servers under the control of one security database. Dividing LANs into domains (via switches) improves performance and security.	521	DLL-AL	TopLevel
Domain Name Service (DNS)	Every IP node receives a name. A table of names for each network is existing. The name of each domain are stored using a DNS. A network information center (NIC) assigns names. I.e. profibus.com (.de= Germany, .com=commercial, .gov= government, .net= network, .edu= education).	567	PROFINET	TechGeneral
DP Master	IEC 61158-5: Within PROFIBUS DP a fieldbus node that can be either master class 1 or master class 2. A master class 1 is a controlling device which controls several DP slaves (field devices). NOTE: This is usually hosted by a programmable controller or a process controller. A master class 2 is a controlling device which manages configuration data (parameter sets) and diagnosis data of a DP master class 1, and that additionally can perform all communication capabilities of a DP master class 1.	236	PA-Devices	TopLevel
DP Master Class1 (DPM1)	IEC 61158-5: A controlling device which controls several DP-Slaves (field devices). Usually programmable (logic) controllers or process control systems are hosts for master class 1.	153	Drives	TopLevel

Term	Meaning	ID	WG	Scope
DP Master Class2 (DPM2)	IEC 61158-5: A controlling device which manages configuration data (parameter sets) and diagnosis data of a DP-Master (Class 1). Additionally the DP-Master (Class 2) can perform all communication capabilities of a DP-Master (Class 1). Usually personal computers are hosts for DP Master Class2 for programming, parameterizing, diagnozing, and monitoring purposes.	154	Drives	TopLevel
DP Protocol	The DP protocol is defined in detail within IEC 61158 together with other fieldbus protocols. The PROFIBUS DP specific parts are defined in IEC 61784-1 as Type CPF 3/1 and 3/2.	418	PA-Devices	TopLevel
DP Slave	IEC 61158-5: A field device that is assigned to one DP master class 1 as a provider for cyclic I/O data exchange. In addition acyclic functions and alarms could be supported.	238	DLL-AL	TopLevel
DP Telegram Elements	IEC 61158-4: The elements and abbreviations of the DP telegram types are defined as follows: SD = Start delimiter SDL = Start delimiter (synchronous transmission) LE = Length of PDU LE = Length repeated DA = Destination address SA = Source address FC = Frame control PDU= Protocol data unit FCS = Frame checksum FCS = Frame checking sequence (synchronous transmission) ED = End delimiter See "DP telegram types".	637	TC3	TechGeneral
DP Telegram Types	IEC 6118-4: The data link protocol data unit (DLPDU) can be structured in the following ways: a) Fixed length, no data, asynchronous transmission: SD1 | DA | SA | FC | FCS | ED | (SD1 = 0x10) Acknowledgement has the same structure or short ack: | SC | (SC = single character = 0xE5) b) Fixed length, no data, synchronous transmission: SDL1 | DA | SA | FC | FCS | ED | (SDL1 = 0x10) Acknowledgement: SDL5 | FCS | (SDL5 = 0xE5) c) Fixed length, with data, asynchronous transmission: SD3 | DA | SA | FC | PDU = 8 octets | FCS | ED | (SD3 = 0xA2) Response: dto. d) Fixed length, with data, synchronous transmission: SDL3 | DA | SA | FC | PDU = 8 octets | FCS | (SDL3 = 0xA2)	140	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
DP-V0	IEC 61784-1: DP-V0 is the basic stage of the PROFIBUS DP communication protocol. DP-V0 devices (master and slaves) perform the following basic functionalities: - Cyclic exchange of I/O data between controlling and slave devices - Device, Identifier (module) and Channel related Diagnosis - Parametrization of DP-slaves - Configuration of DP-slaves	375	DLL-AL	TopLevel
DP-V1	DP-V1 is the first stage of extension of PROFIBUS DP after DP-V0. DP-V1 devices shall comply with the following features: - Device related diagnosis is replaced by status and alarms. - The first three octets of the user parameterization data are now standardized Optionally these devices may support: - Acyclic communication (MS1, MS2) - If alarms are used, MS1 shall be supported	155	Drives	TopLevel
DP-V2	DP-V2 is the second stage of extension of PROFIBUS DP after DP-V1. DP-V2 devices shall comply with the following features: - Data Exchange Broadcast (DxB) for slave to slave communication (publisher/subscriber principle). - Isochronuos Mode (time tick synchronized operating slaves, e.g. drives) - Up- and/or download of Load Region Data (domains) - Function Invocation - Clock Control (synchronization within slaves) and Time Stamping - Redundancy	376	DLL-AL	TopLevel
Drive	A drive is the power electronics board (drive device) which is used to control the speed, torque, position, etc. of an AC or DC motor. The power AC voltage is rectified to DC and then connected to the motor through a set of transistors. These transistors are switched rapidly on and off in a technique known as pulse width modulation (PWM). The transistors act as a gate to allow a precise amount of current to flow to the motor. Depending on the on/off times and ratios a motor can be controlled in speed and torque. These types of drives are often called inverter drives. The PNO maintains two application profiles for drives: (1) "PROFIBUS Profile for variable speed drives", order no. 3.072 (2) "PROFIdrive - Profile drive technology", order no. 3.172	83	Drives	TopLevel
DxB Link	A DxB link designates a slave-to-slave communication relationship between a publisher and a subscriber	48	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
DxB Linktable	Within PROFIBUS a list of all publishers and their assigned subscribers. A subscriber may be related to the whole input data or a part of the input data of a publisher according to the attribute values of the DxB Linktable object.	85	Drives	TechGeneral
Electromagnetic Compatibility (EMC)	The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other coutries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.	157	Drives	TechGeneral
Electronic Device Description (EDD)	ASCII text file describing a type of a PROFIBUS field device (meta information). Its content follows the grammar of the EDDL (Electronic Device Description Language). An interpreter software, usually a part of an engineering system, is using a device's EDD to enable parameterization, manipulation and diagnosis of a particular field device. The device manufacturers are responsible for completeness and consistency with the appropriate device. The PNO maintains a guideline "Specification for PROFIBUS Device Description and Device Integration, Volume 2: EDDL", order no. 2.152. See "Electronic Device Description Language (EDDL)"	28	EDD	TopLevel
Electronic Device Description Language (EDDL)	Standardized device description language within PROFIBUS defining the syntax and semantics of device parameters, user interfaces and routing communications. It comprises static and dynamic (behavioral) properties of devices. Top level constructs are available for: - data (e.g. parameters, methods) - communications (e.g. acyclic, MS2) - human interfaces (e.g. menues) EDDL is standardized in the IEC61804-2. See "Electronic Device Description (EDD)".	27	EDD	TechGeneral
ElectroSensitive Protective Equipment (ESPE)	ElectroSensitive Protective Equipment (ESPE) is defined in IEC 61496. An ESPE is a non-contact sensing safety equipment consisting of the sensing function and its associated control/monitoring function with one or more output signal switching devices (OSSD). See "IEC 61496".	470	ZVEI-Safe	TechGeneral
Emergency Switching Off	IEC 60204-1: An operation in case of emergency that shall lead to a shut-down of the power supply of the whole or of a part of an installation. It shall avoid or mitigate existing or up-coming hazards to humans and existing or up-coming damages to machines or to material or to the environment. Remark: Hazards are e.g. functional irregularities, malfunctions of a machine, not acceptable characteristics of the material in process, and human errors.	482	ZVEI-Safe	TechGeneral

Term	Meaning	ID	WG	Scope
EN 50170	European standard by CENELEC containing the PROFIBUS specifications of the communication layers 1 and 2 and the PROFIBUS FMS variant. These standards are replaced by the international standard IEC 61158, edition 3 and IEC 61784, edition 1, that are comprising PROFIBUS. EN 50170, General purpose field communication system EN 50170-3-1:1996, Part 3-1:Data link layer definitions EN 50170-3-7:1996, Part 3-7: Network management	615	DLL-AL	TopLevel
Engineering System (ES)	Set of hardware and software components that provide planning, configuring, programming, commissioning, parameterization, diagnosis and maintenance capabilities for an automation system. An Engineering Tool is a compact version (e.g. a programmer or personal computer) of an ES.	4	Ex-i	TechGeneral
Engineering Tool (ET)	Software component for standard computer that supports configuring, programming, parameterization, and diagnosis of control systems for the commissioning phase or for maintenance. See "Engineering System".	325	TC3	TopLevel
Epsilon value	PROFINET: An updated value of a variable should only be transferred again when a specified deviation is reached. This deviation is called "epsilon value".	568	PROFINET	TechGeneral
Error	Errors are static conditions that exist throughout the product lifecycle, and are inherent characteristics of the system. These errors are caused by a misconception in the design resulting from e.g. incorrect information. Errors may also be temporary incorrect bits within memories or within received data telegrams e.g. due to electromagnetic interference (EMI). See "failure", "fault", "fail-safe".	40	Safety	TechGeneral
E-Stop Button	An emergency stop pushbutton is a switching device. It is a means to protect humans or investments in shutting-down a process or a machine if activated in case of emergency. It shall be designed using positively driven contacts. Put in operation it shall easily be reachable and it shall not be possible to fox it out (EN 418).	481	ZVEI-Safe	TechGeneral
Ethernet	Ethernet is the most widely-installed local area network (LAN) technology. Ethernet is standardized in IEEE 802.3. Specifications include access technology, transmission procedures and transmission media for Ethernet (10 Mbps), for Fast Ethernet (100 Mbps) and for Gigabit Ethernet (1Gbps). Devices are connected to the cable and compete for access using a Carrier Sense Multiple Access with Collision Detection (CSMA/CD) protocol up to 10BASE-T (10 Mbps). Fast Ethernet or 100BASE-T and above are using the switching technology that avoids collisions. PROFINET uses Fast Ethernet.	572	PROFINET	TopLevel
European Norm (EN)	The official standard approved and applied by the European countries. Many of the IEC standards were adopted as EN. See "CENELEC".	158	Comm-FB	TopLevel

Term	Meaning	ID	WG	Scope
Event	Within PROFIBUS DP/PA this is a signal or I/O data or process value within a certain field device at that point in time where a trigger condition arises. The values are associated with a time stamp and stored in a buffer. The time-stamped sample values are used to archive and visualise significant changes over the course of the production process. Such an event mechanism does not prevent from the cyclic transmission of these signals. A separate event alarm is requesting the transfer of the events to the main system. Within PROFINET events and methods are defined. Whenever an event occurs the provider informs the associated consumer which applied for the information. The relationship is established during start up phase.	256	TimeStamp	TopLevel
Ex Scheme	Equipment for use in hazardous locations must normally be certified by a recognized certification body in the country where it is to be installed. One exception to this is in the European Community where, if a certificate for equipment is received from a certifying body (known in Europe as a "notified body"), it must be accepted by all of the other member countries. However, IEC have devised a scheme that will be effective worldwide! The aim of the IEC scheme is to facilitate international trade in this field. The IEC Ex Scheme provides the means for manufacturers of Ex equipment to obtain certificates of conformity that will be accepted at national level in all participating countries. A certificate of conformity may be obtained from any certification body accepted into the scheme. The certificate will attest that the equipment design conforms to the relevant IEC standard/s and that the product is manufactured under a quality plan assessed by an ExCB (Ex Certification Body). Manufacturers holding certificates of conformity may affix the IEC "Ex Mark of Conformity" to equipment that they have verified complies with	549	PA-Devices	TopLevel
Explosion Protection Classes	Explosion Groups: Ignitability and explosion characteristics of an explosive mixture are properties typical of the material. The requirements for the construction of explosion protected electrical apparatus can be graduated depending on the gasses and vapors existing in the planned application. The gasses and vapors are therefore classified into sev-eral explosion groups. The danger of gas increases from explosion group IIA to IIC according to EN (?). The requirements for electrical apparatus for these explosion groups increase accordingly. Electrical apparatus certified for IIC for example is of course suitable for all other explosion groups. Note: Group I refers to electrical equipment for mining only! Temperature Classes: The ignition temperature is dependent on the type of existing gases or vapors. The maximum temperature of the exposed surface of electrical apparatus must always be lower than the ignition temperature of the gas or vapor mixture, where it is to be used. Gases are classified to temperature classes T1 to T6 according to their ignition temperature, whereby the maximum surface temperature of the respective class must be lower than the ignition temperature of the corresponding gas	548	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Explosion Zones (Ex)	The different explosion zones according to international standards are defined by the risk and frequency that explosive gas composition occur. It does not say anything about the ease with which the gas mixture is ignited: - Zone 0 --> All time and/or for a long duration - Zone 1 --> Sometimes - Zone 2 --> Rarely See "Explosion Protection Classes", "Ex Scheme"	524	Ex-i	TopLevel
Extended Slave Parameterization (Ext Prm)	IEC 61158-5: PROFIBUS DP provides a set of services to parameterize and configure a DP-slave itself and its modules containing I/O data. With the advent of DP-V2 of PROFIBUS DP and its isochronous mode, the slave to slaves communication (DxB) and clock time synchronization a second parameterization service (Ext Prm) was established to handle the increased amount of parameters. This service follows right after the standard service (Prm) during start-up of a slave. This service shall only be used if the device attribute "DPV1" is set to TRUE (GSD file). See "Slave Parameterization (Prm)".	641	TC3	TechGeneral
Extended Special Identifier Format (ESIF)	An extension of the special identifier format (SIF) which was introduced with DP-V1. The extended special identifier format uses the manufacturer specific part to code the data types of the defined I/O data. The length of I/O data must correspond with the length of the sequence of data types. Within the GSD file the slave indicates the usage of ESIF via DPV1 = 1 and DPV1_Data_Types = 1. IEC 61158-6: The structure of the special identifier format is defined like follows: SIF basic identifier, [extended length octet], [extended length octet], [data type*], [manufacturer specific data*] Extended length octet fields shall always start with fields that indicate output data if present. The field data type shall only be omitted in case of an empty slot. Otherwise it shall be present in relation to the length fields. Legend: * = may appear more than once [ ] = optional See "Special identifier format". The PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512. These include an actual list of data type codings for PROFIBUS DP.	300	GSD	TechGeneral
Extensible Markup Language (XML)	The Extensible Markup Language (XML) is the universal format for structured documents and data on the Web that can be used within other interconnected applications also. This format is the basis for some of the PROFIBUS guidelines (e.g. FDT, GSDML, I&M, etc.). The XML standards are driven by the World Wide Web Consortium. --> www.w3.org	461	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Factory Automation (FA)	Automation technology especially adopted to the requirements of Discrete Manufacturing. Within the scope of PROFIBUS the abbreviation "FA" is used for the application of the PROFIBUS DP protocol in factory automation together with corresponding application profiles (e.g. "Ident Systems", "Low Voltage Switchgear") and the appropriate transmission technologies (e.g. RS485).	386	PA-Devices	TopLevel
Fail-safe (F-)	IEC 61508: Ability of a system that by adequate technical or organizational measures prevents from hazards either deterministically or by reducing the risk to a tolerable measure. IEC 61508 is the major international standard for fail-safe technology with programmable devices and fieldbus (functional safety). It covers systematic and stochastic errors and failures of safety systems and defines certain "safety integrity levels" (SIL) which are probabilities of failure. The PNO maintains an application profile "PROFIsafe - profile for safety technology", order no. 3.092. It provides the appropriate safety means for the communication related part and comlies with IEC 61508. Within PROFIBUS any term with the prefix "F-" belongs to PROFIsafe or general safety technology. Fail-safe in terms of safety systems shall not be confused with the "fail-safe mode" of PROFIBUS DP.	391	Safety	TopLevel
Fail-safe Mode	In general: eliminating danger by compensating automatically for a failure or malfunction. IEC 61158-5: While in "clear mode" a PROFIBUS Master Class 1 is preparing its slaves for data exchange through parameterizing and configuring one after the other. During this time frame the master sets the output signals of the activated slaves to "0". For slaves supporting a special "fail-safe mode" the following applies: The "clear mode" is commenced by the master with a global control broadcast telegram enabling these slaves to switch into a predefined default state that will not cause damage to the process. See "Substitute Value". Caution! This measure is not sufficient for safety applications in hazardous environments with an intolerable risk for people, investments or nature. In these cases the PROFIsafe mechanisms provide the appropriate safe communication means. A PROFIsafe slave device shall be developed or assessed according IEC 61508 or derived standards. PNO maintains an application profile "PROFIsafe - Profile for Safety Technology", order no. 3.092	396	DLL-AL	TechGeneral

Term	Meaning	ID	WG	Scope
Failure	The nonperformance of a system to achieve its intended function within its performance constraints. Failures are events that occur and some point in time, leading to a failed condition (state) e.g. due to hardware defects. See "error", "fault", "fail-safe".	41	Safety	TechGeneral
Fast Ethernet	defines a maximum transfer rate of 100 Megabit/sec on Ethernet.	574	PROFINET	TechGeneral
Fault	(1) A fault is an unsatisfactory system condition. Thus, failure states and errors are different kinds of faults. See "Failure" and "Error". (2) Within "Intrinsically Safe Systems": A defect or electrical breakdown of any component, spacing, or insulation that alone or in combination with other defects or breakdowns may adversely affect the electrical or thermal characteristics of the intrinsically safe system. If a defect or breakdown leads to defects or breakdowns in other components, the primary and subsequent defects and breakdowns are considered to be single fault. Certain components may be considered not subject to fault when analyses or tests for intrinsic safety are made.	39	Safety	TechGeneral
Fiber Optic (FO)	In hazardous areas it may happen that a common bus physics in copper technicque may lead to problems due to disturbances. This problem can be solved when using fibre optic technique. See "Optical Transmission"	575	PROFINET	TopLevel
Field Device	Components interacting directly with the process, usually remote I/O, sensors, actuators, transducers. The communication for field devices is smoothly migrating from interfaces like 4-20 mA, HART, 0-24V, etc. to a fieldbus connection. Thus the increasing capability of field devices due to powerful microcontrollers can be supported by adequate powerful communication features like wide range digital data transmission (float data types), flexibility through parameterization and high availability through diagnosis and predictive maintenance. Inter-networking components are not Field Devices.	7	Ex-i	TopLevel
Field device (FD)	IEC 61158-5: Field devices are primary automation devices. They are located close to the process substances, the fabricated part, the machine, the operator and the environment. Within PROFIBUS DP this is a part of an equipment connected over the field bus and used for a specific function. A field device hosts a DP slave.	239	Comm-FB	TopLevel

Term	Meaning	ID	WG	Scope
Field Device Tool (FDT)	Field device tool technology standardizes the communication interface between field devices and engineering or process monitoring systems (host). Previous solutions had been proprietary and usually based on e.g. RS232 communication. The key feature of FDT is its independence from the communication protocol and the software environment of either the device or the host system. The host environment provides an FDT "frame application" that defines a set of interfaces to the field devices's parameterization and diagnosis software, e.g. on a standard PC platform. Such a software package with an FDT interface is called a Device Type Manager (DTM). Key features are: - nested communication across hierarchies through gateways and CommDTM - storage and retrieval of field device related parameters or information with versioning - central printing support across different field device software packages (DTM) The PNO provides a guideline "Specification for PROFIBUS Device Description and Device Integration, Volume 3: FDT", order no. 2.162. See "Device type manager (DTM)".	378	PA-Devices	TopLevel
Fieldbus	A Fieldbus is a digital, serial, two-way, multi-drop communication link among controllers and its remote I/Os, sensors, actuators and inter-networking components. In comparison to standard Local Area Networks (LAN) fieldbusses are spezialized for rugged industrial environment, determinism, bus powering, etc.	6	Ex-i	TopLevel
Fieldbus Application Layer (FAL)	IEC 61158-5: The FAL is an application layer communication standard designed to support the conveyance of time-critical and non-time-critical application requests and responses among devices in an automation environment. The term "time-critical" is used to represent the presence of an application time-window, within which one or more specified actions are required to be completed with some defined level of certainty. See "OSI Reference Model".	282	DLL-AL	TopLevel
Fieldbus Data Link Layer (FDL)	IEC 61158-4: The fieldbus data link layer provides basic time-critical messaging communications between devices in an automation environment. Type 3 of the IEC standard defines a protocol and the services for PROFIBUS DP. The maximum system size is an unlimited number of links of 127 nodes, each with 66 SAP-addresses.	160	Drives	TechGeneral
File Transfer Protocol (FTP)	File Transfer Protocol: A special protocol based on TCP/IP to handle a big amount of data between two devices. The transfer method is following the Client-Server principle.	577	PROFINET	TopLevel
Filter Table (DXB)	Every subscriber requires a filter table, in order to filter-out the telegrams configured for itself from the broadcast telegrams. See "data exchange broadcast".	49	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
Final Element	General usage of the term "Final Element" or "Final Control Element" within process automation for e.g. control valves with pneumatic and electric actuators, electric motor starters, variable frequency drives, and servo drives. IEC 61511: Part of a safety instrumented system which implements the physical action necessary to achieve a safe state. Examples are valves, switch gear, motors including their auxiliary elements e.g., a solenoid valve and actuator if involved in the safety instrumented function. This definition is process sector specific only. "Smart Final Elements" contain logic solving capabilities. See "Actuator".	669	Safety	TechGeneral
Firewall	A firewall is a net component which connects an internal network (Intranet) to a public network (Internet). Accesses from the other network can be controlled or completely blocked. These mechanisms may depend on the identification. See "Security"	576	PROFINET	TechGeneral
FISCO model	Fieldbus Intrinsically Safe COncept model. Prepared by the Physikalisch-Technische Bundesanstalt (PTB) in cooperation with renowned manufacturers, this model describes a possible implementation of an "i" fieldbus (intrinsically safe) for use in potentially explosive areas. The primary characteristic of this model is that only one active device (i.e., the bus power supply device) is connected to the transmission lines (MBP-IS). The other devices only are consumers with respect to power supply on the lines. Within certain limits, the characteristics of the lines do not affect the intrinsic safety. The adherence to according installation guidelines and the deployment of certified field devices avoids a special assessment of those automation systems.	8	Ex-i	TopLevel
Flying Redundancy (FR)	A redundancy structure which supports a redundant slave with and without master redundancy or with and without media redundancy (similar to hot standby).	261	Redundancy	TechGeneral
Frame Control (FC)	IEC 61158-4: The frame control octet in the DP telegram header shall indicate the telegram type, such as send/request and acknowledgement or response. In addition, the frame control octet shall contain the Function Code and the control information, which prevents loss and multiplication of messages, or the station type with the data link status. See "Function code".	624	DLL-AL	TechGeneral
FREEZE mode	IEC 61158-5: During a normal DP cycle the inputs of slaves are sampled just one after the other. In order to synchronize the sampling of input values a master may send a broadcast telegram "global control" with 2 octets of data: Octet 1: bits to indicate "freeze" or "unfreeze" to the slave (besides other bits) Octet 2: number for a group of concerned slaves (assigned via parameterization). After a "freeze" broadcast telegram the corresponding slaves sample current input values. They are conveying these "frozen" values during the following normal data exchanges. The slaves are updating the input values after a new "global control" telegram indicates "unfreeze".	528	DLL-AL	TechGeneral

Term	Meaning	ID	WG	Scope
Full duplex transmission	Data transmission can be done in both directions at the same time.	578	PROFINET	TechGeneral
Function	IEC 61131-3: A program organisation unit which, when executed, yields exactly one data element and possibly additional output variables (which may be multi-valued, e.g., an array or structure), and whose invocation can be used in textual languages as an operand in an expression.	241	Comm-FB	TechGeneral
Function Block (FB)	IEC 61131-3: A programmable controller programming language element consisting of: - the definition of a data structure partitioned into input, output, and internal variables and - a set of operations to be performed upon the elements of the data structure when an instance of the function block type is invoked. The concept of function blocks is similar to the class/object concept of the object oriented programming methodology but adapted to the needs of automation. See: - Instance (of a function block) - Type (of a function block) - Library (of function blocks) - Communication function blocks (Comm FB) - Proxy function blocks - Block (EDDL)	240	Comm-FB	TopLevel
Function Code	IEC 61158-4: The 4 (least significant) Bits within the frame control (FC) octet are carrying status or control information respectively. Following some frequently occurring decimal codings. Master telegrams (send/request): 0 = Clock time Synchronisation (CS; no service access points = SAPs in use) 4 = Send Data with No acknowledge low (SDN; broadcast telegrams) 12 = Send and Request Data low (SRD; normal cyclic data exchange) 13 = Send and Request Data high (SRD; cyclic data exchange requesting diagnosis data) Slave telegrams (acknowledgement/response): 0 = Acknowledgement positive 8 = Response data low / send data ok (SRD; normal cyclic data exchange) 10 = Response data high / send data ok (SRD; slave announces diagnosis data) See "Frame control".	625	DLL-AL	TechGeneral
Function Invocation	IEC 61158-5: The function invocation application service element (ASE) provides a set of services to invoke stateless and/or stateoriented function invocation objects. The application of the DP-master has to invoke each function individually. The function invocation ASE can be related to all application processes of a DP-slave.	631	DLL-AL	TopLevel

Term	Meaning	ID	WG	Scope
Functional Safety	IEC 61508-4: part of the overall safety relating to the equipment under control (EUC) and the EUC control system which depends on the correct functioning of the electric/ electronic / programmable safety-related systems, other technology safety-related systems and external risk reduction facilities. See "IEC 61508".	644	Safety	TopLevel
GAP Update Factor (G)	IEC 61158-3: GAP is defined as the range of station addresses from this station (TS) to its successor (NS) in the logical token ring, excluding stations above HSA. The GAP update factor is defined as the number of token cycles between GAP maintenance (update) cycles, i.e. the number of cycles to be skiped until the next attempt to include new active stations.	161	Drives	TechGeneral
Gateway	Interconnects two or more networks with even different physical layers. Provides the necessary translation, both in terms of hardware and software. Gateways play a role within FDT/DTM (Comm-DTM) where they forward packets from one network to another, e.g. from Ethernet to PROFIBUS DP to HART.	9	Ex-i	TechGeneral
General Identifier Format (GIF)	See "Identifier Octet (Byte)" and "Configuration Identifier (Cfg)".	616	DLL-AL	TechGeneral
General Station Description (GSD)	A GSD is an electronically readable ASCII text file and contains both general and device-specific parameters for communication and network configuration. By means of keywords, a configuration tool allows to - read device information (manufacturer, type, versions, bitmaps, etc.) - read texts for comfortable and easy to use configuration - select transmission rates - select modules and their I/O data length (configuation identifier) - read texts to assign diagnosis IDs to HMI displays - select supported services (freeze, sync, etc.) from the GSD for the configuration of the device. A GSD replaces the previously conventional manuals or data sheets and thus already supports plausibility checks during the configuration phase. Distinction is made between a device GSD (for an individual device only) and a profile GSD, which may be used for devices that comply exactly with a profile such as a "PA device". GSDs for different languages may be provided in separate files with corresponding file extensions (*.gse for English, *.gsg for German, etc.) or altogether in one file (*.gsd). The device manufacturers are responsible for the scope and quality of the GSD of their devices. Submis	162	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
Generic Device Model	PROFIBUS DP defines a generic device model that fits to modular and compact field devices decomposed in virtual modules. The model is based on the following major adressing scheme (address/slot/index): - The field device is using a unique address to establish a communication connection to its master - Physical or virtual modules of the field device can be reached via slot addresses - Parameters of the modules may be grouped into records that can be reached via indices Families of field devices are expanding and refining their specific device models on top of the generic device model via application profiles, e.g. PA devices, drives, etc. See "Device Model (EDDL)"	423	PA-Devices	TopLevel
Gigabit Ethernet	Gigabit Ethernet defines a maximum transfer rate of 1000 Megabit/sec on Ethernet	579	PROFINET	TechGeneral
Global Control (GC)	IEC 61158-5: a broadcast message sent by a master which is addressed to a group of slaves and which contains either a "freeze", "sync", "unsync", "unfreeze" or a "clear" command. IsoM: The synchronisation "sync" indicated to the application of the DP-slave may jitter, may be lost at the conveyance to the DP-slave or may be received too late because the DP-master class 1 has sent the synchronisation message not in time. A PLL (built in hardware or software) shall be used in the DP-slaves to minimise the jitters and phase shifts of the synchronisation message and to compensate the loss of synchronisation messages and may reduce the possible variation of the synchronisation to a value the DP-slave operating in the isochronous mode can tolerate. If the variation exceeds a certain limit the application of the DP-slave will leave the isochronous mode and will change to a fail-safe state (no safety!).	80	Drives	TechGeneral
Grounding	IEC 61158-2: Grounding is a permanent connection earth through a sufficiently low impedance with sufficient current carrying capability to prevent voltage built up which might result in undue hazard to connected equipment or persons.	10	Ex-i	TechGeneral
Group Safety Publication ("B-Norm")	IEC guide 104: "The preparation of safety publications and the use of basic safety publications and group safety publications". This guide defines a hierarchical structure of safety standards. Group safety publications being publications covering all safety aspects of a specific group of products within the scope of two or more product technical committees (TCs). See "International Electrotechnical Commission (IEC)".	488	ZVEI-Safe	TopLevel
GSD Editor	Official software tool of the PNO to edit and to check GSD files. Available via download from the PNO web-server (www.profibus.com).	302	GSD	TopLevel
GSD Library	Official library of GSD files for registered PROFIBUS DP devices. This library is accessible at the PNO web-server (www.profibus.com).	303	GSD	TopLevel

Term	Meaning	ID	WG	Scope
GSD Revision	A version identifier of the GSD file format and the GSD specification (guideline). The GSD revision does not describe the version of an individual GSD file for a particular device. During the life time of PROFIBUS DP several revisions had to be published so far to support the growing functionality. Following a short content description of the revisions: Rev 1: General keywords to describe cyclic data exchange for simple I/O devices. Rev 2: Some syntactical changes and extensions (Baud rates) Rev 3: Keywords for the acyclic data exchange (DP-V1) and new transmission technologies Rev 4: Support for isochronous mode, data exchange broadcast (DxB), PROFIsafe, extended parameterization and diagnosis Rev 5: Support for publisher-subscriber tables, redundancy, comfortable diagnosis (help text) The GSD definitions are standardized within ISO 15745. The PNO maintains a technical guideline "Specification for PROFIBUS device description and device integration, Volume 1: GSD", Version 5.0, order no. 2.122	291	GSD	TechGeneral
GSDML	GSDML is the XML based language to describe the charateristcs of PROFINET IO devices e.g communication and module parameters. PNO maintais the PROFINET Guideline "GSDML Specification for PROFINET IO", Ordernumber 2.352.	680	GSD	TechGeneral
Hamming Distance (HD)	In general: The number of bits (HD) which differ between two binary strings of the same length. IEC 61158-4: A measure of the (data link) processing data unit integrity. It can be shown that to detect n bit errors, a coding method requires a HD of at least n + 1. For type 3 (PROFIBUS) the following applies: (1) Asynchronous transmission ("RS485"): HD = 4, method in use is "frame checksum". (2) Synchronous transmission ("MBP"): HD = 4 for <= 255 octets and HD= 5 for <= 15 octets, method in use is frame checking sequence = cyclic redundancy checking (CRC).	530	DLL-AL	TopLevel
HART Communication	HART is an acronym for "Highway Addressable Remote Transducer", a two-way digital communication simultaneously with the 4-20mA analog signaling used by traditional instrumentation equipment. In July 1993, the HART Communication Foundation was established to provide worldwide support for application of this technology. The PNO maintains a specification "HART", order no. 3.102.	531	PA-Devices	TopLevel
Hazard	IEC 61508-4: Potential source of harm. The term includes danger to persons arising within a short time scale (for example, fire and explosion) and also those that have a long term effect on a person’s health (for example, release of a toxic substance).	398	Safety	TopLevel

Term	Meaning	ID	WG	Scope
Head Station	Remote I/O devices usually are built up in a physically modular manner consisting of a power supply, a head station and several modules.The head station contains the communication interface to PROFIBUS and the corresponding management functions such as identification and maintenance functions, parameterization server, data aquisition, diagnosis, etc. The head station can be redundant. In this case, the redundant head station may occupy a backplane slot different from 0. It is handled as a module without channels.	509	RIO	TechGeneral
Highest Station Address (HSA)	IEC 61158-3: Highest station address installed (configured) on this PROFIBUS segment.	165	Drives	TechGeneral
Host	General: A computer connected to a network. Within PROFIBUS a computing device that "hosts" a DP master class 1 with at least one PROFIBUS segment and its DP slaves.	237	TC3	TopLevel
Hub	A Hub is a simple component of a communication network. It refreshes a signal and passes the information on to all nodes which are connected to the Hub. Data frames which were received on one port are transferred to all the other ports (chicken foot technique).	343	PROFINET	TechGeneral
Human Machine Interface (HMI)	Component to monitor various data, parameter, and diagnosis information and to manipulate operational modes and parameters of an automation system. Typical large scale representations are PCS, DCS and SCADA systems. Typical small scale systems are the Operator Panels.	3	Ex-i	TechGeneral
Hyper Text Tansfer Protocol (HTTP)	Basic Internet protocol on top of TCP/IP to mainly transfer information packed in HTML format. HTML stands for Hyper Text Markup Language, a derivation and extension of its relative SGML, which stands for Standard Generalized Markup Language, a publication standards format.	342	PROFINET	TechGeneral
I/O Channel	Represents within a module the input or output signal that is connected to the process.	274	TimeStamp	TechGeneral
Ident Number	See "Device Identifier". Notes: - The ident number is necessary for all DP devices except for master class 2. - The same ident number may be used for modular devices as long as the device can be described in the GSD file as a modular device. See "Brandlabel device" and "Profile ident number" also.	289	GSD	TopLevel
Identification & Maintenance Functions (I&M)	The main purpose of the I&M functions is to support the end user during various scenarios of a device's life cycle be it configuration, commissioning, parameterization, diagnosis, repair, firmware update, asset management, audit trailing, and alike. It is kind of a "type plate" or "boiler plate". Using the "call" mechanism of the load region services (MS1/MS2) opens up an additional subindex address space of 65535 data records. The I&M functions are assigned a space between 65000 and 65199 for basic, profile specific and manufacturer specific items. Some of these items are: manufacturer ID, order ID, serial number, hardware revision, software revision, profile ID, tag function, tag location, etc. The I&M functions are mandatory for all PROFIBUS devices with MS1and/or MS2 services. The PNO maintains "Profile Guidelines, Part 1, Identification & Maintenance Functions", order no. 3.502.	627	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Identifier	In general: a symbol that establishes the identity of the one bearing it. Within this context here it represents an absolute value of a parameter such as a physical address. It is intended for systematic and performant handling capabilities within computer systems, e.g. sorting, consistency checking, physical localization and alike. Usually an absolute value is associated with a logical value to represent the particular deployment of the identifier. Typical abbreviation for identifier is ID. IEC 61131-3: A combination of letters, numbers, and underline characters, which begins with a letter or underline and which names a language element. Some of the major identifiers within PROFIBUS DP are: - Data type numeric identifier - Configuration identifier (Cfg) - Device identifier (ident number) - Manufacturer identifier (MANUFACTURER ID) - Profile ident number (PROFILE ID) Some of the major identifiers within PROFINET are: - Provider identifier (PROVIDER ID) - Consumer identifier (CONSUMER ID)	242	Comm-FB	TechGeneral
Identifier Format (GIF, SIF, ESIF)	See "General Identifier Format (GIF)", "Special Identifier Format (SIF)", and "Extended Special Identifier Format (ESIF)"	424	PA-Devices	TechGeneral
Identifier Octet (Byte)	One single octet describing the - length of I/O data (1 .. 16) - type (input/output) or format extension - structural units (byte/word) - consistency checking mode module by module of a slave. This is called the general identifier format (GIF). See "Configuration identifier".	299	GSD	TechGeneral
Idle Time 1 (Tid1)	IEC 61158-4: This time defines the delay the sender of a telegram, after having received a response (or a token), shall wait until it may send another telegram.	225	Drives	TechGeneral
Idle Time 2 (Tid2)	IEC 61158-4: This time defines the delay the sender of an unacknowledged telegram shall wait until it may send another telegram.	226	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
IEC 60204-1	IEC standard: "Safety of Machinery - Electrical Equipment of Machines". The scope of this standard is: Application of electrical and electronic equipment and systems to machines not portable by hand while working, including a group of machines working together in a coordinated manner but excluding higher level systems aspects (i.e. communications between systems). IEC 60204-1 is a guidance for the general electrical construction of an electrical equipment. For example this standard defines safety functions such as "Uncontrolled stopping of a motor by removal of power" as stop category 0 and "Controlled stopping of a motor by control of braking torque within a required time and by removal of power afterwards" as stop category 1. This standard can play a role in the application of PROFIsafe-related devices. See "International Electrotechnical Commission (IEC)"	668	Safety	TopLevel

IEC 61000	IEC standard: "Electromagnetic compatibility (EMC)"
	This generic standard applies to electrical and electronic apparatus intended for use in industrial environments for which no dedicated product or product-family standard exists.
	IEC 61000 is published in separate parts according to the following structure:
	- Part 1: General
	  - General considerations (introduction, fundamental principles)
	  - Definitions, terminology
	- Part 2: Environment
	  - Description of the environment
	  - Classification of the environment
	  - Compatibility levels
	- Part 3: Limits
	  - Emission limits
	  - Immunity limits (insofar as they do not fall under the responsibility of product committees)
	- Part 4: Testing and measurement techniques
	  - Measurement techniques
	  - Testing techniques
	- Part 5: Installation and mitigation guidelines
	  - Installation guidelines
	  - Mitigation methods and devices
	- Part 6: Generic standards
	- Part 9: Miscellaneous
	See "International Electrotechnical Commission (IEC)"
		647	TC3	TopLevel

Term	Meaning	ID	WG	Scope
IEC 61010	IEC standard: "Safety requirements for electrical equipment for measurement, control, and laboratory use". The scope of this standard is e.g. to protect against electrical shock. Thus it specifies requirements such as - Circuit separation (clearance = "through air", creepage = "along surface") - Environmental conditions (altitude, ambient, temperature, humidity) for electrical equipment intended for professional, industrial process, and educational use, including equipment and computing devices for: - Measurement and test - Control - Laboratory use See "International Electrotechnical Commission (IEC)"	648	TC3	TopLevel
IEC 61131-2	IEC standard: "Programmable controllers - Part 2: Equipment requirements and tests". This Part of IEC 61131 specifies requirements and related tests for programmable controllers (PLC) and their associated peripherals (for example, programming and debugging tools (PADTs), human-machine interfaces (HMIs), etc.) which have as their intended use the control and command of machines and industrial processes. PLCs and their associated peripherals are intended to be used in an industrial environment and may be provided as open or enclosed equipment. If a PLC or its associated peripherals are intended for use in other environments, then the specific requirements, standards and installation practices for those other environments must be additionally applied to the PLC and its associated peripherals. This standard also applies to any products performing the function of PLCs and/or their associated peripherals. Equipment covered in this standard is intended for use in overvoltage category II (IEC 60664-1) in low-voltage installations, where the rated mains supply voltage does not exceed a.c.	345	PROFINET	TopLevel
IEC 61131-3	IEC standard: "Programmable controllers - Part 3: Programming languages". This part of IEC 61131 specifies syntax and semantics of programming languages for programmable controllers as defined in part 1 of the IEC 61131. The functions of program entry, testing, monitoring system, etc, are specified in part 1 also. Languages covered are: - Instruction list (IL) - similar to assembly language - Ladder diagram (LD) - similar to relais contact drawings - Function block diagram (FBD) - similar to electronic circuit logic drawings - Structured text (ST) - similar to PASCAL - Sequential function chart (SFC) - similar to state diagram drawings See "International Electrotechnical Commission (IEC)"	651	TC3	TopLevel

Term	Meaning	ID	WG	Scope
IEC 61158	IEC standard: "Digital data communications for measurement and control - Fieldbus for use in industrial control systems". The "fieldbus standard" IEC 61158 consists of the following parts: Part 1: Overview and guidance for the IEC 61158 series Part 2: Physical Layer specification and service definition Part 3: Data Link Service definition Part 4: Data Link protocol specification Part 5: Application Layer Service definition Part 6: Application Layer protocol specification PROFIBUS DP and PROFINET are standardized as communication profiles type 3 and 10. See "International Electrotechnical Commission (IEC)"	346	PROFINET	TopLevel
IEC 61496	IEC standard: The first part of the standard, IEC 61496-1, sets out the general requirements and necessary tests for ESPE, including testing for functionality (e.g., response time and number of outputs), design (e.g., electrical supply and software), and environmental stress (e.g., stress and mechanical vibration). The standard's second part, IEC 61496-2, deals with active optoelectronic protective devices (AOPDs), the most common types of electrosensitive protective equipment. The optical requirements for such devices are specified in this part of the standard. Typical AOPDs are light curtains or laser scanner. See "ESPE" and "International Electrotechnical Commission (IEC)".	670	Safety	TopLevel
IEC 61499	IEC standard: "Function blocks for industrial-process measurement and control systems". This standard specifies a concept of distributed function blocks across networks with a quality-of-service event mechanism. It is a synthesis of the paradigms within IEC 61131-3 (centralized programmable function blocks), IEC 61804 (decentralized configurable function blocks), and IEC 61158 (fieldbus communication). It consists of - Part 1: Architecture - Part 2: Software tools requirements - Part 3: Technical report- tutorial information - Part 4: Rules for compliance profiles The PROFINET component model is one of the prospects for a full-blown IEC 61499 realization. See "International Electrotechnical Commission (IEC)"	653	TC3	TopLevel

Term	Meaning	ID	WG	Scope
IEC 61508	IEC standard: "Functional safety of electrical/ electronic/ programmable electronic safety-related systems". This standard sets out a generic approach for all safety lifecycle activities for systems comprised of electrical and/or electronic and/or programmable electronic components (electrical/electronic/ programmable electronic systems (E/E/PESs)) that are used to perform safety functions. This unified approach has been adopted in order that a rational and consistent technical policy be developed for all electrically-based safety-related systems. A major objective is to facilitate the development of application sector standards. See "International Electrotechnical Commission (IEC)"	532	TC3	TopLevel
IEC 61511	IEC standard: "Functional safety - Safety instrumented systems for the process industry sector". This international standard addresses the application of safety instrumented systems for the process industries. The safety instrumented system includes sensors, logic solvers and final elements. The safety instrumented system logic solvers addressed include programmable electronic safety-related technology (PES) amongst others. Where other technologies are used for logic solvers, the basic principles of this standard shall be applied. This standard also addresses the safety instrumented system sensors and final elements regardless of the technology used. This standard is process industry specific within the framework of the IEC 61508. It comprises: - Part 1: Framework, definitions, system, hardware and software requirements - Part 2: Guidelines for the application of IEC 61511-1 - Part 3: Guidance for the determination of the required safety integrity levels See "International Electrotechnical Commission (IEC)"	649	TC3	TopLevel
IEC 61784	IEC standard: "Digital data communications for measurement and control" Part1 of IEC 61784 defines a set (types) of protocol specific communication profiles based primarily on the IEC 61158 series. The communication profile family CPF3 covers the following 3 members: - CPF3/1: Type 3 of IEC 61158-3, -4, -5, -6; asynchronous transmission; RS 485 (ANSI TIA/EIA RS-485-A); optional RS 485-IS; plastic fiber; glass multi mode fiber or glass single mode fiber; PCF fiber; - CPF3/2: Type 3 of IEC 61158-3, -4, -5, -6; synchronous transmission; manchester coded and bus powered (MBP); optional intrinsically safe (MBP-IS) and lower power (MBP-LP) - CPF3/3: Type 10 of IEC 61158-5, -6; ISO/IEC 8802-3 Current IEC activities are going to add further parts to this standard: - Safety solutions - Security solutions - Installation guides - Realtime Ethernet See "International Electrotechnical Commission (IEC)"	618	DLL-AL	TopLevel

Term	Meaning	ID	WG	Scope
IEC 61800	IEC standard: "Adjustable speed electrical power drive systems". - Part 1: General requirements - Rating specifications for low voltage adjustable speed d.c. power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency a.c. power drive systems - Part 3: EMC product standard including specific test methods - Part 4: General requirements - Rating specifications for a.c. power drive systems above 1 000 V a.c. and not exceeding 35 kV - Part 5-1: Safety requirements - Electrical, thermal and energy - Part 5-2: Safety Requirements - Functional - Part 7: Profile for information exchange of PDS (Power Drive System) See "International Electrotechnical Commission (IEC)"	650	TC3	TopLevel
IEC 61804	IEC standard: "Function Blocks (FB) for Process Control" IEC 61804 consists of the following parts: Part 1: Overview of system aspects (Technical Report) Part 2: Specification of FB concept and Electronic Device Description Language (EDDL) Part 2 provides conceptual function block (FB) specifications, which can be mapped to specific communication systems and specifies the Electronic Device Description Language (EDDL). The latter is intended for use in industrial automation applications, which may include devices such as generic digital and analog input/output modules, motion controllers, human machine interfaces, sensors, closed-loop controllers, encoders, hydraulic valves, and programmable controllers. The devices can be described via - Device parameters and their dependencies; - Device functions, for example, simulation mode, calibration; - Graphical representations, for example, menus; - Interactions with control devices. See "International Electrotechnical Commission (IEC)"	619	EDD	TopLevel

Term	Meaning	ID	WG	Scope
IEC 62061	IEC standard: "Safety of machinery - Functional safety of electrical, electronic and programmable control systems". This standard provides a machine sector specific framework for functional safety of safety-related electrical control systems (SRECS) of machines. It only covers those aspects of the overall safety lifecycle that are related to safety requirements allocation through to overall safety validation. Requirements are provided for information for safe use of a SRECS of machines that can also be relevant to later phases of the life of a SRECS. This standard is machine sector specific within the framework of the IEC 61508. In contrast to the ISO 13849 (sucessor of EN954) it only covers the electrical portion of a machine's safety aspects. This standard can play a role in the application of PROFIsafe-related devices. See "International Electrotechnical Commission (IEC)"	652	TC3	TopLevel
IEC 62390	IEC Technical Report (TR): "Common Automation Device Profile Guideline". This guideline is a recommended outline for use by standardization product committees, fieldbus consortia and product manufacturers to develop and provide profiles for (fieldbus)-networked devices. The present wide variation in the form of concepts and methods used for disclosing device information and behavior to users of devices leads to longer evaluations required to understand how to use and apply networked industrial devices. This variation makes determining device interoperability, interchangeability, comparisons and common device behaviour more difficult. Therefore, it is the intention of this guideline to provide a common and more generic way to publish device information and behavior. This is a contribution to reduce the total cost of the industrial control system. Profiles define a common set of functionality for a class of devices in a given industrial domain, thus allowing system designers, system integrators and maintenance staff to handle profile-based devices without special tool configuration. They also allow consistent structuring and semantics of device functionality.	646	TC3	TopLevel
Index	IEC 61158-5: Address of an object within an application process. The permitted range in PROFIBUS DP is 0 - 255. Indices are used to address records of data (parameters, variables, state information, commands, etc.) within modules of a field device.	36	EDD	TechGeneral
Industrial Personal Computer (IPC)	A rugged version of standard Personal Computers.	536	PROFINET	TopLevel
Information Technology (IT)	Information technology stands for applied computer systems - both hardware and software, and often including networking and telecommunications, usually in the context of a business or other enterprise. Automated production systems are going to be integrated in IT more and more due to technology such as PROFINET.	352	PROFINET	TopLevel

Term	Meaning	ID	WG	Scope
Ingress Protection (IP)	IEC/EN 60529: The IP Code indicates the degree of protection provided by enclosures for electrical equipment, e.g. IP67. The first numeral indicates protection of persons against access to dangerous parts and protection of internal equipment against the ingress of solid foreign objects. 0 - No Protection 1 - Protected against solid objects > 50mm, e.g. accidental touch by hands 2 - Protected against solid objects > 12mm, e.g. fingers 3 - Protected against solid objects > 2.5mm, e.g. tools and wires 4 - Protected against solid objects of 1mm, e.g. tools, wire and small wires 5 - Protected against dust (limited ingress permitted) 6 - Protected against dust (totally) The second numeral indicates protection of internal equipment against harmful ingress of water. 0 - No Protection 1 - Protected against water falling vertically (condensation) 2 - Protected against direct sprays up to 15° from vertical 3 - Protected against direct sprays up to 60° from vertical 4 - Protected against sprays from all directions (limited ingress permitted)	533	TC3	TopLevel
Input/Output Data (I/O Data)	IEC 61158-6: I/O data are designated to be transferred cyclically for the purpose of processing between a master and its slaves. Source and destination of I/O data within slaves are the modules. A module may have one or more channels which represent the real structure of the input and/or output data.	244	Comm-FB	TopLevel
Instance (of a function block)	IEC 61131-3: An individual, named copy of the data structure associated with a function block type or program type, which persists from one invocation of the associated operations to the next.	243	Comm-FB	TechGeneral
Int. Organization for Standardization (ISO)	ISO is an international organization for standardization based on a network of the national standards institutes of 148 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. ISO began operations back in 1947. Its principal activity is the development of technical standards. In the meantime it is the world's largest developer of standards. The following ISO standards amongst others are playing a role within PROFIBUS: - ISO 12100-1 "Safety terms" - ISO 13849 "Safety of machinery" - ISO 14121 "Risk assessment" - ISO 15745 "Automation framework" See "OSI reference model". --> www.iso.ch	654	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Interchangeable	IEC 62390: Unlike the other compatibility levels (which refer to two or more devices working in the same system) interchangeability refers to the replacement of one device with another. Devices are interchangeable for a given role in a distributed application if the new device has the functionality to meet the application requirements. See "IEC 62390".	366	PA-Devices	TechGeneral
Interconnectable	IEC 62390: Two or more devices are interconnectable if they are using the same communication protocols, communication interface and data access. See "IEC 62390".	367	TC3	TechGeneral
Interface	General term for any connection and interaction between hardware, software and the user. Within PROFIBUS DP a slave interface module (SIM) denominates a bus connector and a complete PROFIBUS stack. Used with redundant slaves.	332	PA-Devices	TechGeneral
International Electrotechnical Commission (IEC)	The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies. These serve as a basis for national standardization and as references when drafting international tenders and contracts. IEC has been established back in 1906. Most of the guidelines of PROFIBUS International are integrated in or are strongly related to IEC standards such as: - IEC 60204-1 ("Safety equipment of machines") - IEC 61000 ("Electromagnetic compatibility") - IEC 61010 ("Safety requirements for electrical equipment") - IEC 61131-2 ("Programmable controllers - Part 2: Equipment requirements and tests") - IEC 61131-3 ("Programmable controllers - Part 3: Programming languages") - IEC 61158 and IEC 61784 ("Fieldbus standard") - IEC 61508, 61511, 62061 ("Functional safety") - IEC 61800 ("Adjustable speed electrical power drive systems") - IEC 61804 ("Function blocks for process control") - IEC 62390 ("Common Automation Device Profile Guideline")	167	Drives	TopLevel

Term	Meaning	ID	WG	Scope
International System of Units (SI)	The coherent system of physical quantities and units adopted and recommended by the general conference on weights and measures (CGPM) in 1960. The SI is maintained by the international bureau of weights and measures located near Paris, France. It carries out measurement-related research. It takes part in, and organizes, international comparisons of national measurement standards, and it carries out calibrations for member states. The SI is founded on seven SI base units for seven base quantities assumed to be mutually independent: Base quantity — Name — Symbol length — meter — m mass — kilogram — kg time — second — s electric current — ampere — A thermodynamic temperature — kelvin — K amount of substance — mole — mol luminous intensity — candela — cd	507	TC3	TechGeneral
Internet	The Internet is the largest computer network in the world. It is a three level hierarchy composed of backbone networks, mid-level networks, and stub networks. These include commercial (.com or .co), university (.ac or .edu) and other research networks (.org, .net) and military (.mil) networks and span many different physical networks around the world with various protocols, chiefly the Internet Protocol. Until the advent of the World Wide Web ("www") in 1990, the Internet was almost entirely unknown outside universities and corporate research departments and was accessed mostly via command line interfaces such as telnet and FTP. While the web (primarily in the form of HTML and HTTP) is the best known aspect of the Internet, there are many other protocols in use, supporting applications such as electronic mail, Usenet, chat, remote login, and file transfer.	348	PROFINET	TopLevel
Internet Control Message Protocol (ICMP)	This protocol offers a simple diagnostic method. By calling a Ping function on a computer, the IP connection to a remote computer can be checked. See "Ping".	344	PROFINET	TechGeneral
Internet Protocol (IP)	The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer. IPv4 is the version in widespread use and IPv6 (extended MAC addresses) is just beginning to come into use since the year 2000. See "TCP/IP".	350	PROFINET	TopLevel

Term	Meaning	ID	WG	Scope
Interoperable	IEC 62390: Two or more devices are interoperable if they can work together to perform a specific role in one or more distributed applications. The parameters and their application related functionality fit together both syntactically and semantically. Interoperability is achieved when the devices support complementary sets of parameters and functions belonging to the same profile. See "IEC 62390".	364	TC3	TechGeneral
Interworkable	IEC 62390: Two or more devices are interworkable if they can transfer parameters between them, i.e. in addition to the communication protocol, communication interface and data access, the parameter data types are the same. See "IEC 62390".	368	TC3	TechGeneral
Intranet	Any network which provides similar services within an organisation to those provided by the Internet outside it but which is not necessarily connected to the Internet. The most common example is the use by a company of one or more World-Wide Web servers on an internal TCP/IP network for distribution of information within the company. Some companies give limited access to their intranets to other companies or the general public. This is known as an "extranet".	349	PROFINET	TechGeneral
Intrinsic Safety (IS)	A type of protection in which a portion of the electrical system contains only intrinsically safe equipment (apparatus, circuits and wiring) that is incapable of causing ignition in the surrounding atmosphere. No single device or wiring is intrinsically safe by itself (except for battery-operated self-contained apparatus such as portable pagers, transceivers, gas detectors, etc., which are specifically designed as intrinsically safe self-contained devices) but is intrinsically safe only when employed in properly designed intrinsically safe system. This type of protection is referred to as 'i'.	523	Ex-i	TopLevel
Invocation	IEC 61131-3: The process of initiating the execution of the operations specified in a program organization unit like function block and function. See "Function invocation".	245	Comm-FB	TechGeneral
IO-Controller	A PROFINET control unit responsible for the defined run-up of an I/O subsystem and the cyclic or acyclic data exchange.	606	PROFINET	TopLevel
IO-Device	A PROFINET field device that cyclically receives output data from its IO-Controller and responds with its input data.	607	PROFINET	TopLevel
IO-Supervisor	A PROFINET engineering station or PC/PG enabled to read and write data from and to an IO-Device. In contrast to an IO-Controller it does not take over an active role during the run-up of an IO-System. An IO-Supervisor is not part of the IO-System.	608	PROFINET	TopLevel
IO-System	A PROFINET IO-System comprises all the IO-Devices associated to a particular IO-Controller.	609	PROFINET	TopLevel

Term	Meaning	ID	WG	Scope
IP address	The 32-bit host address defined by the Internet Protocol in STD 5, RFC 791. A hosts's Internet address is sometimes related to its Ethernet address. The Internet address is usually expressed in dot notation, e.g. 128.121.4.5. The address can be split into a network number (or network address) and a host number unique to each host on the network and sometimes also a subnet address. The way the address is split depends on its "class", A, B or C as determined by the high address bits (# = number): Class A - high bit 0, 7-bit network #, 24-bit host #. n1.a.a.a 0 <= n1 <= 127 Class B - high 2 bits 10, 14-bit network #, 16-bit host #. n1.n2.a.a 128 <= n1 <= 191 Class C - high 3 bits 110, 21-bit network #, 8-bit host #. n1.n2.n3.a 192 <= n1 <= 223 The Internet address must be translated into an Ethernet address by either an Address Resolution Program or constant mapping.	351	PROFINET	TechGeneral
ISO 12100	ISO standard: "Safety of machinery -- Basic concepts, general principles for design" Part 1: Basic terminology, methodology Part 2: Technical principles Part 1 defines basic terminology and methodology used in achieving safety of machinery whereas part2 defines technical principles to help designers in achieving safety in the design of machinery. Part1 together with ISO 14121 are instrumental in the risk assessment of machinery. This standard can play a role in the application of PROFIsafe-related devices. See "Int. Organization for Standardization (ISO)"	666	Safety	TopLevel
ISO 13849	ISO standard: "Safety of machinery - Safety-related parts of control systems". This standard provides safety requirements and guidance on the principles for the design of safety-related parts of control systems (SRP/CS). For these parts it specifies characteristics and categories required for carrying out related safety functions. It applies to safety-related parts of control systems, regardless of the type of technology and energy used (e.g. electrical, hydraulic, pneumatic, mechanical). It does not specify which safety functions and which categories shall be used in a particular case. It comprises Part 1: General principles for design Part 2: Validation. ISO 13849 is the successor of the EN 954-1. This standard can play a role in the application of PROFIsafe-related devices. See "Int. Organization for Standardization (ISO)" and "Category (acc. EN 954-1)"	655	TC3	TopLevel

Term	Meaning	ID	WG	Scope
ISO 14121	ISO standard: "Safety of machinery -- Principles of risk assessment" ISO 14121 has been positioned as a type A standard. According to this standard, risk is related to a considered harm and consists of: - Severity of a possible harm and the - Probability of its occurrence. The standard has the following two features. (1) Risk assessment procedures are defined as repetitive processes: - determination of the limits of the machinery - hazard identification - risk estimation - risk evaluation - judgement if the machinery is safe (2) Hazards should be identified by referring to the table in annex A of the standard. This standard can play a role in the application of PROFIsafe-related devices. See "Int. Organization for Standardization (ISO)".	667	Safety	TopLevel
ISO 15745	ISO 15745: "Industrial automation systems and integration - Open systems application integration framework" with the following parts: - Part 1: Generic reference description - Part 2: Reference description for ISO 11898-based control systems - Part 3: Reference description for IEC 61158-based control systems - Part 4: Reference description for Ethernet-based control systems The application integration framework (AIF) described in ISO 15745 defines elements and rules that facilitate: - the systematic organization and representation of the application integration requirements using integration models; - the development of interface specifications in the form of application interoperability profiles (AIPs) that enable both the selection of suitable resources and the documentation of the "as built" application. The languages for GSD and PCD are contained in part 3 of this standard. GSDML will be contained in part 4 of this standard.	620	GSD	TopLevel

Term	Meaning	ID	WG	Scope
Isochronous DP Cycle Time (Tdp)	IEC 61158-5: The isochronous DP cycle time (Tdp) may elapse to handle all parts of the isochronous DP cyclic, i.e. data and parameter exchange. The isochronous DP cycle consists of the following parts: - synchronization (SYNCH) - cyclic services (DX) - acyclic services (MSG) - spare time (RES)	203	Drives	TechGeneral
Isochronous Mode (IsoM)	IEC 61158-5/6: special operation mode of a DP system that implies both a constant DP cycle with a fixed schedule of the cyclic and acyclic DP services, and the synchronisation of the application in the DP-master (Class 1) and the DP-slaves with this constant DP cycle, e.g. synchronous sampling times in the closed loop control software of drives. The broadcast telegram "global control" to the address 127 is used to trigger an ASIC output signal such that a microcontroller can start its processing cycle. A PLL may be used to overcome the impact of telegram dropouts. Isochronous mode functionality over multiple networks is not possible. However, repeaters are allowed. PNO maintains an application profile "PROFIdrive - Profile Drive technology", order no. 3.172	51	Drives	TopLevel
Jitter	Random variation in the timing of a signal. Within PROFIBUS DP primarily interesting for the transmission signal and the sampling times in isochronous mode.. (1) IEC 61158-2, Transmission signal: Offset of the 50 % transition points of pulse edges from their ideal position as the result of all causes. The transmitted bit cell jitter shall not exceed ±0,025 Tbit from the ideal zero crossing point, measured with respect to the previous zero crossing. (2) IEC 61158-5, Isochronous mode: The cycle jitter is less than 1 µs for data rates above 1,5 Mbit/s. Jitters may be caused by: - network components like repeaters or fibre optic interfaces - transmission rate dependent jitters (jitters < 1 Tbit for the sender, receiver and the network components in between) - implementation dependent reaction times in the sending and receiving station and the network components in between	53	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
Laserscanner (Safety)	A safety laserscanner provides protection for humans in either stationary or mobile applications such as machines, robots, conveyors, vehicles. It is an optical area scanner that periodically sends out laser light pulses via a rotating mirror. Humans or objects within a defined protection field are detected through the reflexion of the laser light. The coordinates of the "obstacle" are being calculated with the help of the elapsed time frame between the emission of the pulse and the reception of the reflected pulse. Special parameterization software tools allow to freely draw protection field borders within certain constraints. An obstacle within this protection field will cause the laser scanner's OSSDs to trip the safety function.	497	ZVEI-Safe	TechGeneral
Least Significant Bit (LSB)	Within an octet of bits the value of the lowest order binary digit 2^0. PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512	169	Drives	TechGeneral
Life Cycle	The course of developmental changes through which a device or system passes from its conception to the termination of its use and subsequent salvage. For example, a life cycle might include the phases and activities associated with the analysis, acquisition, design, development, assembly, integration, commissioning, test, operation, maintenance, and modification of the device or system. With the advent of sophisticated technology such as fieldbusses the cost-benefit check for a particular plant is going to shift from a total cost of parts (TCP) point of view over total cost of ownership (TCO) towards total cost of life cycle (TCL) to calculate the real return of invest.	389	PA-Devices	TopLevel
Link	(1) IEC 61158-2/4: A link is a collection of nodes (devices) with unique MAC IDs (addresses). All of those devices may communicate directly whenever in an instance of communication they are simultaneously attentive to the fieldbus segment(s) during the period(s) of attempted communication. An extended link consists of one or more fieldbus segments connected through repeater. See data link layer. (2) Fiber optics: The standard optical link is a model that is used to specify the admissible range of signal levels and signal distortions. (4) PROFIBUS PA: (DP/PA-) Links are protocol converters that modulate the RS 485 signals to the MBP signal level and vice versa. Additionally they map all of the I/O data of the field devices connected to the MBP segment into the telegram of a single slave within the RS 485 segment.	98	Drives	TopLevel

Term	Meaning	ID	WG	Scope
Load Region (Up-/Download)	IEC 61158-5/6: A Load Region represents an unstructured memory area whose contents may be uploaded (read) or downloaded (written). Unstructured in this context means that the memory area is represented only as an ordered sequence of octets. No other structure is apparent. Load regions may represent an unnamed volatile memory area, such as that implemented by dynamic computer memory, or a named non-volatile memory object, such as a file. The contents of a load region are referred to as a load image. Load images may contain programs or data. The transfer of a load image to or from a load region is performed using the load process. The MS2 communication relationship processes the services Read, Write and Data_Transport as well as the Load Region and Function Invocation services.	628	DLL-AL	TopLevel
Local Area Network (LAN)	A LAN supplies networking capability to a group of computers in close proximity to each other such as in an office building, a school, or a home (<= 1km). LANs are useful for sharing resources like files, printers, or industrial automation applications. A LAN in turn often connects to other LANs, and to the Internet or other WAN (Wide Area Network). Topology, protocols and media are characteristics differentiate one LAN from another. The most common type of LAN is an Ethernet LAN. The smallest home LAN can have exactly two computers; a large LAN can accommodate many thousands of computers. Many LANs are divided into logical groups called subnets. Because the network is known to cover only a small area, optimizations can be made in the network signal protocols that permit data rates up to 1 GigaBit/s.	353	PROFINET	TopLevel
Manchester Bus Powered (MBP)	IEC 61158-2: Type of medium attachment unit (MAU) suited for process automation: - line, tree, and star topology with - two wire transmission - 31.25 kBaud (preferred), high speed variants w/o bus powering and instrinsic safety - synchronous transmission (--> Manchester encoding) - optional: bus powered devices (>= 10mA per device = -->low power option) - optional: --> intrinsic safety (Ex-i) via additional constraints according --> FISCO model	324	TC3	TopLevel
Manchester Encoding	IEC 61158-2: means by which separate data and clock signals can be combined into a single, selfsynchronizing data stream, suitable for transmission on a serial channel. A binary encoding method enabling receivers of serial communications to unambiguously determine the start, end, or middle of each bit without reference to an external clock (synchronous). Used for the MBP and MBP-IS transmission technology.	14	Ex-i	TechGeneral
Mandatory (M)	IEC 61158: means a parameter or function shall be implemented and put at the disposal of the user. In this context the abbreviation "M" is often used within PROFIBUS guidelines and specifications.	170	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
Manufacturer ID	(1) one of the items within I&M functions. See "Identification & Maintenance Functions" (2) The PNO is maintaining a reference list on the Internet (in form of XML data) containing manufacturer_IDs, the associated name of the company and other useful information. This list is partly coordinated with the reference list of the HART association. (3) Already existing individual definitions in profiles such as "PA Devices" and "PROFIdrive" will migrate to the common definitions within the "Identification & Maintenance Functions"	99	Drives	TopLevel
Mapping	A function or process such that for every element of one set there is a unique element of another set.	540	DLL-AL	TechGeneral
Master Parameter	IEC 61158-5: Master parameter consist of bus parameters and slave parameters of the asigned slaves. Frequently mentioned bus parameters are: - Data transmission rate - Slot time (Tsl) - Minimum station delay time of responder (min_Tsdr) - Maximum station delay time of responder (max_Tsdr) - Quiet time (Tqui) - Setup time (Tset) - Target token rotation time (Ttr) - Gap update factor (G) - Highest station address (HSA) - Maximum retry limit - Minimum slave interval - Complete isochronous DP cycle time (Tct) - Maximum shift time (max_Tsh)	222	Drives	TechGeneral
Maximum allowed Time Shift (max_Tsh)	IEC 61158-4: This parameter specifies the maximum allowed time shift (in units of Tbit) of the DP cycle time (Tdp) measured by the DPM1. The shift may be caused by the following reasons: - delayed sending of the synchronisation message (SYNCH) at the DPM1 - inexact calculation of the DP cycle time (Tdp) at the DPM1. This is a master parameter. See "Master parameter".	228	Drives	TechGeneral
Maximum Retry Limit (max_retry_limit)	IEC 61158-4: The acknowledgement or response of a slave shall arrive within a predefined time, the slot time (Tsl), otherwise the initiator repeats, depending on the predefined retry limit (max_retry_limit). Value range is 0 to 15 (preferably 0). This is a master parameter. See "Master parameter".	621	DLL-AL	TechGeneral

Term	Meaning	ID	WG	Scope
Maximum Station Delay Time of Responder (max_Tsdr)	IEC 61158-4: A master shall wait a (max_Tsdr) time before it starts its next unacknowledged telegram (e.g. broadcast). A slave shall have startet its response before this (max_Tsdr) time elapsed. (max_Tsdr) time shall be larger than the largest ready time (Trdy) of all the devices within the network. See "Station Delay Time (Tsdx)".	428	PA-Devices	TechGeneral
Medium Access Control (MAC)	PROFINET: Part of layer 2 in respect to the OSI reference model. Lowest level of a communication standard layer model.	355	PROFINET	TechGeneral
Medium Access Control Identifier (MAC ID)	PROFINET: MAC ID is the unchangeable physical address of a network device	356	PROFINET	TechGeneral
Medium Attachment Unit (MAU)	The medium attachment unit is the field bus counterpart to the commonly used term "medium access control" within IT technology (PROFINET). IEC 61158-2: The medium attachment unit (MAU) is an optionally separate part of a communication station that connects to the medium directly or via passive components (lowest level of the physical layer). For electrical signalling variants the MAU is the transceiver, which provides level shifting and wave shaping for transmitted and received signals. Within PROFIBUS DP three different kinds of signalling variants are defined: - RS 485 acc. ANSI/TIA/EIA-485-A - MBP (Manchester Bus Powered, synchronous transmission) - FOC (Fiber Optic Cable)	15	Ex-i	TechGeneral
Message	A set of data that is transmitted over a communications line. A telegram contains one or more messages. Within PROFIBUS DP the content of a processing data unit (PDU). See "Telegram"	183	TC3	TopLevel
Message Transfer Period (Tmp)	IEC 61158-4: A message transfer period MP consists of the send/request telegram and the acknowledgement or response telegram. The transfer period (Tmp) is composed of the telegram transmission times, the transmission delay times and the station delay times.	664	TC3	TechGeneral
Minimum Slave Interval	IEC 61158-5: This DPM1 parameter indicates the smallest allowed period of time between two consecutive DP slave poll cycles. This ensures that the DP slave can handle the sequence of cyclic service requests from the DPM1. Value range is 1 - 65535. Time base is 100µs. See "Master Parameter".	430	PA-Devices	TechGeneral
Minimum Station Delay Time of Responder (min_Tsdr)	IEC 61158-4: A slave shall not start with its response before this (min_Tsdr) time elapsed. (min_Tsdr) time shall be larger than the largest ready time (Trdy) of all the devices within the network. See "Station Delay Time (Tsdx)".	431	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
MM1	IEC 61158-5: Connectionless application relationship for the following purposes: - upload and download for configuration information - upload of diagnosis information - activation of the previously transferred configuration See "Application Relationship (AR)"	661	TC3	TechGeneral
MM2	IEC 61158-5: Connectionless application relationship for the following purpose: - activation of the previously transferred configurations See "Application Relationship (AR)"	662	TC3	TechGeneral
Modular Slave	A slave with a flexible structure and length of input and output data. These data shall be described as a number of modules in the GSD. The data structure of each and every module shall be described via a single configuration identifier. During the configuration of the device in an engineering tool there is an opportunity of selecting modules and input and output data. This kind of slaves may be available with physically pluggable I/O modules or as a virtual modular slave ("smart field device") via software.	295	GSD	TopLevel
Module	IEC 61158-5: Addressable unit inside the DP-Slave. A module may have one or more channels which represent the real structure of the input and/or output data. These channels may be a further subdivision of the input and/or output data object. Each module can be addressed by a slot number (1 to 244). Numbering is without gaps, ascending, beginning with 1. If a slot is not occupied with a module, an empty slot will be registered under the corresponding slot number in the configuration. The slot number "zero" (Slot = 0) refers to the DP-slave itself (head station). Modules contain process data which is index addressable.	248	Comm-FB	TopLevel
Most Significant Bit (MSB)	Within an octet of bits the value of the highest order binary digit 2^7. PNO maintains Profile Guidelines, Part 2 "Data types, programming languages, and platforms", order no. 3.512	172	Drives	TechGeneral
MS0	IEC 61158-5: Application relationship for the following purposes: - cyclic exchange of the I/O data with the DPM1 - cyclic exchange of the Input Data between DP-slaves (DXB) - acyclic data transfer for parameterisation, configuration and diagnosis (DPM1) - acyclic transfer of commands to a set of field devices (DPM1) - cyclic transfer of synchronisation messages to a set of field devices (DPM1) - acyclic read of the I/O data (DPM2) - acyclic read of configuration information (DPM2) - acyclic read of diagnosis information (DPM2) - acyclic write of remanent parameter (DPM2) See "Application Relationship (AR)"	434	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
MS1	IEC 61158-5: Connection-oriented application relationship for the following purposes: - acyclic read and write of variables - acyclic transfer of alarms - up- and/or download of load region data - invocation of stateless and/or state-oriented functions See "Application Relationship (AR)"	435	PA-Devices	TechGeneral
MS2	IEC 61158-5: Connection-oriented application relationship for the following purposes: - acyclic read and write of variables - up- and/or download of load region data - invocation of stateless and/or state-oriented functions See "Application Relationship (AR)"	436	PA-Devices	TechGeneral
MS3	IEC 61158-5: Connectionless application relationship for the following purpose: - synchronisation of time See "Application Relationship (AR)"	437	TC3	TechGeneral
Multicast	Multicasting refers to sending a message to a selected group whereas broadcasting refers to sending a message to everyone connected to a network. --> "Broadcast"	541	DLL-AL	TopLevel
Multiple Fault Occurrence Time (MFOT)	The process safety time within a programmable electronic system depends on system features. Faults that only in combination with other additional faults can cause dangerous states can be detected by background testing within the multiple fault occurence time (MFOT). The value of the MFOT parameter is assigned together with the parameterization of the "process safety time" and is defined as a factor of it. A distinction is made with the testing: (1) Tests within the "process safety time" are executed as foreground tasks. The reaction upon the detection of a fault shall be immediately or within the "progress safety time" at the latest. (2) Tests within the MFOT are executed as background tasks and stretched over many cycles. The reaction upon detection of a fault shall be immediately or within the "multiple fault occurrence time" at the latest. Example for the reaction time: double cycle time at the maximum. That means for a required "process safety time" of 1 s a cycle time not longer than 500 ms.	506	ZVEI-Safe	TechGeneral
Muting	IEC 61496-1: Muting means temporary automatic suspension of a safety function(s) by safety-related parts of the control system.	480	ZVEI-Safe	TechGeneral
Network Management (NM)	Network management covers all the functions required for the administration of a network, such as configuration (e.g. assignment of addresses), diagnostics and diagnosis reporting or performance optimization.	314	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
NIL, CS	IEC 61158-4: At the data link service interface, a data transmission (or several thereof) is processed via a data link service-access-point (DLSAP). Several DLSAPs may exist at the same time in master and slave stations. The related DLSAP-address (0 ...63) shall be transmitted together with the message, except for the DLSAP-addresses NIL and CS. (NIL) The DLSAP-index NIL means that the default DLSAP is addressed (e.g. cyclic data exchange). In this case the corresponding data link PDU contains no DLSAP-index for efficiency reasons. This is indicated via the station address extension (EXT-bit) = 2^7 of the station address. If the corresponding data link PDU contains DLSAP-indices, this EXT-bit is set to 1, otherwise it is set to 0. (CS) The DLSAP-index CS is reserved for clock time synchronization only. The corresponding data link PDU contains no DLSAP-indices. Thus the EXT-bit in the station address is set to 0. To distinguish from NIL, in this case bit 2^7 and 2^6 of the frame control octet are set to 1, function code is 0.	449	DLL-AL	TechGeneral
Nuisance Trip	Nuisance trips are reducing the availability of systems in shutting down safety functions (fail-safe state) due to internal abnormal failures, e.g. EMI problems, synchronization problems of redundant systems, race conditions, unreliable relays, etc.	553	Safety	TechGeneral
Numerical Control (NC)	Control of a process or machine by encoded commands that are commonly prepared by NC programs and stored in a controller for execution. The encoded commands are transferred via PROFIBUS DP. Today's inexpensive personal computers and software allow even the smallest NC shops to afford and use computers to help write NC programs. There are four ways computers and software are used to write NC programs: 1. Offline programming terminals. 2. Text-based programming using an NC programming language. 3. CAD/CAM programming. 4. Solid modeling systems. The PNO maintains an application profile "PROFIBUS - Profile for NC / RC", order no. 3.052	175	Drives	TechGeneral
Object Technology	Software technology was and is facing a continual growing complexity and a need for easy change without jeopardizing the stability and quality. The answer is object technology. It can be summarized in terms of three key concepts: - Objects that provide encapsulation of data and procedures - Messages that support polymorphism across objects - Classes that implement inheritance within class hierarchies. These key concepts launched many different activities such as object oriented analysis, modeling, design, and programming as well as data bases. The Object Management Group is one of the driving organizations in the world: www.omg.org. See "Unified Modeling Language (UML)".	438	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
Offline Engineering	Planning, Configuration, Programming, Parameterization, etc. without communicating to automation systems connected to the process.	381	PA-Devices	TopLevel
OLE for Process Control (OPC)	The OPC Specification is a non-proprietary technical specification that defines a set of standard interfaces based upon Microsoft's OLE/COM technology. The application of the OPC standard interface makes possible interoperability between automation/control applications, field systems/devices and business/office applications. Traditionally, each software or application developer was required to write a custom interface, or server/driver, to exchange data with hardware field devices. OPC eliminates this requirement by defining a common, high performance interface that permits this work to be done once, and then easily reused by HMI, SCADA, Control and custom applications.	534	DLL-AL	TopLevel
Online Engineering	Planning, Configuration, Programming, Parameterization, etc. while communicating to automation systems connected to the process.	382	PA-Devices	TopLevel
OPC-DX	OPC Data Exchange (DX) standard for Ethernet. ControlNet International, Fieldbus Foundation, Open DeviceNet Vendor Association and PROFIBUS International have agreed to support the OPC working group that will produce the DX specification. The OPC DX standard will provide interoperable data exchange and server-to-server communications across Ethernet networks. It is an extension of the existing OPC data access specification - backed by a majority of today's leading automation suppliers - which provides interchange of HMI and controller data. The OPC DX standard extends this data sharing exchange during run-time, independent of the real-time application protocol that is being used.	535	PROFINET	TopLevel
Open Systems Interconnection (OSI)	The international organization for standardization (ISO) defined a so-called open systems interconnections - basic reference model within ISO/IEC 7498 or its predecessor ISO 9636. See "OSI reference model".	283	DLL-AL	TopLevel
Operator Acknowledge	Normally, after tripping of a safety function automatic start-up of this safety function shall happen only after its deliberate (manual) checking and testing and a manual acknowledgement by the operator or another designated person. See "PROFIsafe", "Restart Inhibit".	484	ZVEI-Safe	TechGeneral
Operator Panel (OP)	Usually a dedicated human machine interface device providing the following features: - Visualization of operating states and current process values or I/O data - Alteration of process parameters - Display of machine diagnosis - etc.	176	Drives	TechGeneral

Term	Meaning	ID	WG	Scope
Optical Data Transmission (Fiber Optics)	IEC 61158-2: Type of medium attachment unit (MAU) with the following characteristics: - Fibre optic cable (FOC) manufactured from quartz or plastic - Large range, independent of the transmission speed - Insensitivity to electromagnetic disturbance - Galvanic isolation between the connected stations - Star, ring, line and mixed topologies (tree) - Connection to electrical network segments - Data rates: 9,6/ 19,2/ 45,45/ 93,75/ 187,5/ 500 kbit/s; 1,5/ 3/ 6/ 12 Mbit/s Possible FOCs: - Multi-mode glass fiber - Single-mode glass fiber - Plastic fiber - HCS glass fiber (step index, Hard Clad Silica)	281	DLL-AL	TopLevel
Optional (O)	IEC 61158: means a parameter or function may be implemented and put at the disposal of the user. In this context the abbreviation "O" is often used within PROFIBUS guidelines and specifications.	642	TC3	TechGeneral
OSI Reference Model	The OSI (Open Systems Interconnection) model within the standard ISO 9636 defines a networking framework for implementing protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, proceeding to the bottom layer, over the channel to the next station and back up the hierarchy. Layer 7, Application: This layer supports application and end-user processes. Layer 6, Presentation: This layer provides independence from differences in data representation (e.g., encryption) by translating from application to network format, and vice versa. Layer 5, Session: This layer establishes, manages and terminates connections between applications. Layer 4, Transport: This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end-to-end error recovery and flow control (sequenzing). It ensures complete data transfer. Layer 3, Network: This layer provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node. Layer 2, Data Link: At this layer, data packets are encoded and decoded into bits. The data link layer is c	537	DLL-AL	TopLevel
Output Switching Signal Device (OSSD)	IEC 61496-1: component of the electro-sensitive protective equipment (ESPE) connected to the machine control system which, when the sensing device is actuated during normal operation, responds by going to the OFF-state.	483	ZVEI-Safe	TechGeneral
Package Internet Groper (PING)	Special telegram to check the connection (reachability) between two devices on the Internet. Ping is working with the ICMP protocol which is also based on IP protocol. See "Internet Control Message Protocol"	360	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
Parameter	(1) Any value passed to a program or a device by the user or by another program in order to customize the program or device for a special purpose. (2) IEC 61131-3: A variable assuming a constant used as an argument to pass in or out a function block or function.	107	TC3	TopLevel
Parameter Assignment (Prm)	IEC 61158-5: PROFIBUS DP provides a set of services to parameterize and configure a DP-slave itself and its modules containing I/O data. These DP-slaves are expecting an MS0 parameter set or, for more flexibility, several MS0 structured parameter sets. The values for these sets are provided by the DP-master class 1 and assigned after validation from the application of the DP-slave. The following parameter sets are defined: - MS0 user parameter set (basic parameterization) - MS0 structured user parameter set - DxB linktable set - DxB subscribertable set - IsoM parameter set - Time parameter set The parameter sets have to be conveyed at the start-up phase from the DP-master class 1 to the assigned DP-slaves via the MS0 services. The application of the DP-slave has to check the parameterization data. If the check fails the DP-slave may respond with an appropriate entry in the standard diagnosis information. See "Extended Parameter Assignment (Ext Prm)".	186	Drives	TechGeneral
Performance Check	IEC 60204-1: A performance check may be accomplished either automatically by the safety system or manually through monitoring or testing at run-time and within defined time intervals. Whenever appropriate a combination of both methods is posible. Manual performance checks are always required in case of safety functions with active optoelectronic protective devices (AOPD) such as light curtains and laser scanners after tripping of the safety function. Restart shall only be possible after an operator acknowledge. See "IEC 61496" and "Operator Acknowledge".	477	ZVEI-Safe	TechGeneral
Phase Locked Loop (PLL)	Freely running clock generator that can be synchronized by occasional received signals. See "isochronous mode".	117	Drives	TechGeneral
Physical Layer (ISO/OSI)	The Physical Layer is the layer 1of the OSI model. It receives messages from the communications stack and converts the messages into physical signals on the fieldbus transmission medium, and vice-versa (transmission system). In case of PROFIBUS this layer consists of e.g. a two-wire line or fibre optics as the transmission medium, terminating resistors, connection elements (e.g., plug connectors), bus interfaces, and an optional bus powering (possibly with barrier). Radio transmission is becoming another option.	17	Ex-i	TechGeneral

Term	Meaning	ID	WG	Scope
Polling	The process of inviting data stations to transmit, one at a time. In case of PROFIBUS a master class 1 that continually interrogates its assigned and connected DP Slaves in a round robin sequence. Polling contrasts with event driven systems.	18	Ex-i	TechGeneral
Post Transmission Gap Time (Tptg)	IEC 61158-2/4: Synchronous transmission (MBP): After transmission of a telegram there shall be a minimum period of time during which a subsequent transmission shall not commence. A receiver shall ignore all received signalling during this time frame that shall be at least four nominal bit times. The synchronization time (Tsyn) shall correspond to the post transmission gap time (Tptg). See "Synchronization Time (Tsyn)".	455	PA-Devices	TechGeneral
Power On Reset	First transition within the communication state machine of PROFIBUS DP slaves. See "state machine (DP)".	123	Drives	TechGeneral
Process Alarm	IEC 61158-5: One of the alarm types. A process alarm signals the occurrence of an event in the connected production process, for instance upper limit of a process measurement value exceeded. See "Device Related Diagnosis" and "Alarm". The PNO maintains a Profile Guideline, Part3: Diagnosis, Alarms and Time Stamping , order no. 3.522.	275	TimeStamp	TechGeneral
Process Automation (PA)	Automation technology especially adopted to the requirements of Continuous Manufacturing. Within the scope of PROFIBUS the term "PROFIBUS PA" is used for the application of the PROFIBUS DP protocol in process automation together with the corresponding application profile "PA Devices" and the appropriate transmission technologies (e.g. MBP-IS).	383	PA-Devices	TopLevel
Process Control System (PCS)	Digital computing system to measure quantities via transducers, to calculate necessary corrective adjustments and/or steps and to affect actuators in a corresponding manner such that technical processes can be automated. PCS are using fieldbusses to connect transducers and actuators. Usually a process control system comprises a process monitoring system. Whenever necessary operators may intervene manually, e.g. in case of faults. The term PCS is more and more replacing the former term DCS (Distributed Control System).	19	Ex-i	TopLevel
Process Controller (PC)	A PC is a central component of a process control system that is used for direct processing of information according to configured algorithms and in conjunction with process monitoring. PCs may be realized as standard computers with specialized real-time operating systems or programmable logic controllers (PLC). Algorithms usually are defined in languages such as "Continuous Function Chart" (CFC) or "Sequential Function Chart" (SFC). Within DCS these components sometimes are called "Remote Terminal Unit (RTU)".	2	Ex-i	TechGeneral

Term	Meaning	ID	WG	Scope
Process Data	IEC 61158-5: object(s) which are already pre-processed and transferred acyclically for the purpose of information or further processing. Process data may be parameters, variables, operational states, commands, etc. The access to process data objects is performed according to the client/server access model. The client/server model is characterised by a client application on the master side sending a read or write request to a server application on the slave side that responds accordingly. Process data may be structured in - simple data types - arrays (collection of the same simple data type) - records (collection of mixed simple data types)	42	Drives	TopLevel
Process Monitoring	Observation of a continuous or discrete manufacturing process, to gather information and measures on its specific characteristics. Usually associated with the possibility to take corrective actions by operators. May be part of a "process control system" or a SCADA system.	150	Drives	TopLevel
Process Quantity	Any physical quantity in continuous and discrete manufacturing processes that can be converted into electrical signals and vice versa in order to be measured or controlled. Examples are pressure, temperature, flow, level, etc. It has a value and a unit.	441	PA-Devices	TechGeneral
Process Safety Time	Single faults that may lead to a dangerous state during operation will be detected within the process safety time by the self-monitoring equipment. The process safety time is an application specific quantity which in user guidelines often is called "Safety time". See "Multiple Fault Occurrence Time".	505	ZVEI-Safe	TechGeneral
Process Variable (PV)	A process variable is the representative of a real process quantity like temperature, pressure, flow, level, etc. or an internal computed auxiliary quantity. A process quantity can be described by its value and its unit. Usually only the value is communicated cyclically while the unit is noted via data sheet or via field device information (See profile "PA Devices" and "Identification & maintenance functions").	257	TimeStamp	TechGeneral
Product Safety Publication ("C-Norm")	IEC guide 104: "The preparation of safety publications and the use of basic safety publications and group safety publications". This guide defines a hierarchical structure of safety standards. Product safety publications being publications covering all safety aspects of one or more products within the scope of a single product technical committee (TC). See "International Electrotechnical Commission (IEC)".	489	ZVEI-Safe	TopLevel

Term	Meaning	ID	WG	Scope
PROFIBUS	IEC 61784-1: Communication network according communication profile family 3 (CPF3); incorporating application profiles and system integration aspects like interfaces and languages for engineering tools and HMI. PROFIBUS is an open, digital communication system with a wide range of applications, particularly in the fields of factory and process automation. PROFIBUS is suitable for both fast, time-critical applications and complex communication tasks. The PROFIBUS logo is a registered trademark.	187	DLL-AL	TopLevel
PROFIBUS Competence Center (PCC)	PROFIBUS International has established a worldwide network of PROFIBUS Competence Centers (PCCs) and PROFINET Competence Centers (PNCCs). They offer a wide range of expertise and experience in the deployment of PROFIBUS or PROFINET technology in the related country such as training classes, demonstration models, consultancy, etc. The know-how of the competence centers is ensured by a "Quality of Services" agreement and qualified expert reports on the competence centers. Currently, 29 PCCs/PNCCs are already established worldwide. See "www.profibus.com/organization.html" for details.	388	PA-Devices	TopLevel
PROFIBUS DP	Acronym for "PROFIBUS for Decentralized Peripherals". Specification of an open fieldbus system with the following characteristics: - Polling master-slave-system (cyclic communications, MS0) - Flying masters with robin round token passing coordination (MM) - Connection based (MS1) and connectionless (MS2, MS3) acyclic communication between masters and slaves Options (e.g.): - Data exchange broadcast (DXB), i.e. slave to slaves communication - Isochronous mode of slaves - Clock synchronisation - Redundancy PROFIBUS DP is standardized within IEC 61158 and IEC 61784, communication profile families 3/1 and 3/2 The term "PROFIBUS DP" also is a synonym for the RS485 based deployments within factory automation.	20	Ex-i	TopLevel
PROFIBUS FMS	Acronym for "PROFIBUS with FMS protocol", the universal communication profile for demanding communication tasks based on the former international MAP project with its Manufacturing Message Specification (MMS). Over the years PROFIBUS DP gained in importance over PROFIBUS FMS due to its simplicity.	21	Ex-i	TechGeneral

Term	Meaning	ID	WG	Scope
PROFIBUS International (PI)	With more than 1,200 members around the world, PROFIBUS International (PI) is the world's largest organization for industrial communication. The local representation with Regional PROFIBUS Associations (RPA) in 24 countries and more than 29 PROFIBUS Competence Centers in 16 countries ensures worldwide PROFIBUS Support. The PI Support Center in Karlsruhe, Germany, is the international point of contact and the communication center for members, technical committees, working groups, press contacts, RPAs, and other liaison partners. See "www.profibus.com/organization.html" for details.	387	PA-Devices	TopLevel
PROFIBUS PA	Acronym for "PROFIBUS for Process Automation". This is an application profile based on PROFIBUS DP independent from the physical profiles (RS485, Fiber Optics, MBP). The requirements of continuous manufacturing are covered within the application profile "PA-Devices" and the extension MBP to the physical profiles.	550	PA-Devices	TopLevel
PROFIBUS User Organization (PNO)	PROFIBUS International (PI) has engaged PNO (PROFIBUS Nutzerorganisation e. V.), Germany to establish Technical Committees (TC) and Working Groups (WG) in order to define and maintain the open and vendor independent PROFIBUS technology. PNO was founded in 1989. PNO is a non-profit organization with its headquarter in Karlsruhe, Germany. Members of PROFIBUS International have the right to join the Technical Committees (TC) and Working Groups (WG) of PNO. A member may take an active part in maintenance and further development of the PROFIBUS technology. This guarantees openness and vendor independence of the PROFIBUS technology. See "www.profibus.com/organization.html" for details.	385	PA-Devices	TopLevel
PROFIdrive	Communication technology especially adopted to the requirements of position and speed controlled drive applications (e.g. speed synchronized axis). Within the scope of PROFIBUS "PROFIdrive" is used for the application of the PROFIBUS DP protocol (DP-V2) in motion control automation together with the corresponding application profiles ("PROFIdrive - Profile for variable speed drives" and "PROFIdrive - Profile drive technology") for the transmission technology RS485.	393	Drives	TopLevel
Profile	Besides other things profiles in common define agreements on how to use communication means in a standardized manner. Within the context of fieldbusses several types of profiles are known: - communication profiles (e.g. IEC 61784) - physical profiles (MBP-IS, RS485) - application profiles (see PROFIBUS TC3) - device profiles (e.g. robots) - branch profiles (e.g. extruder)	370	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Profile Ident Number	Identifier of a particular profile definition. The profile ident number is taken from the pool of ident numbers handled by the PNO. It plays a role within the following scenarios: (1) In cases where the device of a manufacturer A should be replaceable by an equivalent device the PNO is assigning number ranges to dedicated device types (Profile specific IDs) in combination with certain "Profile GSDs". Profiles using this methodology are e.g. "PA Devices" and "PROFIdrive". (2) Usually these slave devices are designed to communicate with a master class 2 application (e.g. profile application or profile DTM). In order to ensure a master application is communicating with an appropriate slave it is sending a profile specific ID during the establishment of the connection (MS2 Initiate Service). The slave may answer with the same profile specific ID (if it is supporting this profile) , with another ID (if it is supporting another profile) or with "0000h" if it is not supporting any profile. (3) I&M functions: Besides its basic I&M information devices - following a certain profile - are enabled to provide more detailed profile specific information. A profile identifier (PROFILE_ID) is used to reference See "Device identifier" and "Ident number".	290	GSD	TopLevel
PROFINET	PROFINET is the Ethernet-based automation standard of PROFIBUS International for the implementation of an integrated and consistent automation solution based on Industrial Ethernet. PROFINET supports the integration of simple distributed field devices and time-critical applications in (switched) Ethernet communication (PROFINET IO), as well as the integration of component-based distributed automation systems for vertical and horizontal integration of networks (PROFINET CBA). Integration of PROFIBUS DP and/or other fieldbus subsystems is supported through the PROXY technology.	394	PROFINET	TopLevel
PROFINET Component Description (PCD)	Device description of a PROFINET component similar to a GSD file. However it already is using XML as a structuring and describing means.	611	PROFINET	TopLevel
PROFINET Controller	PROFINET controllers are directly connected to Ethernet. They may be hosted by a PLC or an intelligent field device. Within the engineering tools they are represented as PROFINET components. In addition PROFIBUS DP segments can be included in PROFINET using the PROXY concept.	362	PROFINET	TopLevel
PROFINET library	A library within a PROFINET engineering tool (connection editor) containing reusable PROFINET components.	363	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
PROFIpoint	A powered point-to-point half-duplex communication designated to cross "the last meter" of fieldbus communication from remote-IOs to low-cost sensors and actuators that need parameterization and diagnosis to evolve their full capabilities, e.g. ultrasonic proximity switches. PROFIpoint devices are upward compatibel to standard digital I/O technology of remote-IOs. PROFIpoint is characterized by: - 2 wire technology - 3ms frame duration - 24V power supply for 2 ms (current limited to 60 mA) - Followed by 1 ms master - slave communication with 230 kBit/s - Coding "1" = 24V, "0" = 0V, UART mode - Message frame: 1 Byte command, 1 Byte data (initial), 1 Byte block check - Data length negotiable: 1,2,4 Bytes - Master slave message/ response protocol The PNO is operating a WG to maintain the technology and to develop further device profiles.	614	PROFIpoint	TopLevel
PROFIsafe	Communication technology especially adopted to the requirements of safety related distributed discrete and continuous manufacturing. Within the scope of PROFIBUS "PROFIsafe" is used for the application of the PROFIBUS DP protocol in factory and process automation together with the corresponding PROFIsafe technology for all the transmission technologies (e.g. RS485, MBP, Fiber Optics). Caution: A PROFIsafe slave device shall be developed or assessed as a whole according to IEC 61508 or derived standards. The implementation of safe communication is not sufficient for functional safety! The PNO maintains the following "PROFIsafe" specifications: - PROFIsafe - Profile for Safety Technology; order no. 3.092 - PROFIsafe Policy; order no. 2.282 - PROFIsafe - Requirements for Installation, Immunity, and electrical Saftey; order no. 2.232 - PROFIsafe - Test Specification for safety related PROFIBUS DP Slaves; order no. 2.242	392	Safety	TopLevel
Programmable Electronic safety-rel. System (PES)	IEC 61508-4: System for control, protection or monitoring based on one or more programmable electronic devices, including all elements of the system such as power supplies, sensors and other input devices, data highways and other communication paths, and actuators and other output devices. PROFIsafe is focusing on PES and "Safety functions".	397	Safety	TechGeneral

Term	Meaning	ID	WG	Scope
Programmable Logic Controller (PLC)	A PLC is a computing device used to automate, to monitor and to control industrial manufacturing plants or machines. It usually provides a dedicated real-time operating system and processes the mainly binary input and output values in a cyclic manner. It has its specialized programming system with programming languages according to or similar to IEC 61131-3. PROFIBUS DP with its polling master fits well into the PLC paradigm. PLCs can be used stand-alone or in conjunction with a SCADA or within a PCS system.	22	Ex-i	TechGeneral
Programming Unit (PU)	According to the size of a particular PLC several types of programming devices and/or software are provided by the manufacturer: - Single instruction programmer attachable to the PLC. This programmer is useful for a small edit of an existing program. - Usually a dedicated manufactures computer hardware and software (PC compatible) for dedicated programming languages such as ladder logic including special features for the support of automation applications or for industrial environment. These programming units are completed to engineering tools thus enabling all the commisssioning steps. - PC compatible software to allow a standard desktop or laptop computer to be the programming unit. In order to complete the system to an engineering tool additional hardware is required, e.g. a PROFIBUS DP interface. IEC 61131-2 defines a "programming and debugging tool (PADT)".	179	Drives	TechGeneral
Property	PROFINET: In object oriented data communication COM objects are defined. The services a COM object can offer are made public via so called properties.	580	PROFINET	TechGeneral
Proprietary	Any characteristics of devices in structure, parameters and behavior that are not defined in any standard may be implemented by a manufacturer in a proprietary manner.	369	PA-Devices	TopLevel
Protective Extra-Low Voltage (PELV)	Protective extra low voltage is a grounded variant of SELV. Being specified as a PELV system according to IEC 60364-4-41 (originally DIN VDE 0100-410:1997-01) or IEC 61010-1 includes a protective measure against direct and indirect contact with hazardous voltages through "safe separation" of the primary and secondary side (for example, isolation testing with 500V DC for 1 minute or power pack according to PELV specification) implemented in the device. The above mentioned isolation testing voltages only refer to the SELV/PELV voltages or data lines respectively. On the same level are electronic devices if, in case of normal conditions, the voltage on the output terminals and against ground is no higher than 30V AC, 42,4V peak or 60V DC. In case of a single fault no higher than 50V AC, 70V peak or 120V DC. See "IEC 61010".	657	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Protocol Data Unit (PDU)	A packet of data passed across a network via telegrams. The term implies a specific layer of the OSI seven layer model and a specific protocol. Each layer has its own PDU that is extended subsequently from the physical layer up to the application layer: - Physical layer protocol data unit (PhPDU) - Data link protocol data unit (DLPDU) - Application protocol data unit (APDU)	178	Drives	TechGeneral
Protocol Stack	In the ISO/OSI reference model a communication protocol consists of several layers, which build on top of each other. For this reason, (an implementation of the) protocol is also described as Protocol Stack. The term stack also refers to the actual software that processes the protocols. So, for example, programmers sometimes talk about loading a stack, which means to load the software required to use a specific set of protocols. Another common phrase is binding a stack, which refers to linking a set of network protocols to a network interface card (NIC). Every NIC must have at least one stack bound to it.	440	PA-Devices	TopLevel
Provider	A Provider represents the source of a data communication relationship in PROFINET. A provider has an assigned unique identifier (Provider ID).	581	PROFINET	TechGeneral
Proxy	PROFINET: Representative of a field device or a complete fieldbus subsystem be it PROFIBUS DP or another type.	582	PROFINET	TopLevel
Proxy Function Block (Proxy FB)	A function block (or set of function blocks) used in an IEC 61131-3 application program representing a field device or a functional part of a field device. Several PROFIBUS DP profiles are defining Proxy FBs: - PROFIdrive - Ident systems - Weighing and dosage systems. Proxy function blocks shall be portable on IEC 61131-3's structured text (ST) language and on the Comm FBs. See "IEC 61131-3" and "Comm FB".	249	Comm-FB	TopLevel
Publisher	IEC 61158-5: role of a slave that transmits data onto the fieldbus for consumption by one or more subscribing slaves. See "data exchange broadcast".	46	Drives	TopLevel

Term	Meaning	ID	WG	Scope
Pull & Plug Alarm	(1) IEC 61158-5: Two of the alarm types. A pull alarm signals the withdrawal of a module and a plug alarm the insertion of a module in a certain slot. See "Device Related Diagnosis". The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522. (2) Within PROFINET a Pull & Plug Alarm is defined.	613	PROFINET	TechGeneral
Qualifier (Quality Code)	In general: Additional information associated with a variable or parameter. (1) PROFIBUS application profiles: Qualifiers are values usually associated to measured quantities e.g. the specific trustability (good, uncertain, bad), the exceeding of limits, the unavailability do to failures, etc. They are communicated together with the measurement value in a cyclic manner. The additional information can be used in user programs to temporarily stabilize the process by using the last valid measurement value or a replacement value. Diagnosis information should not be transferred via this "channel". Application profiles that use qualifiers are e.g. "PA Devices", "Weighing & Dosage Systems", "Remote I/O for PA". See "Quality of Service".	643	TC3	TechGeneral
Quality of Service (QoS)	Property, that guaranties a special functionality or service for a PROFINET data connection, e.g. time triggered, event driven or cyclic.	583	PROFINET	TopLevel
Quiet Time (Tqui)	IEC 61158-4: Asynchronous transmission (RS485): When transposing the NRZ signals into a different signal coding, the transmitter fall time after switching off the transmitter (at the initiator) shall be taken into account if it is greater than the station delay responder time (Tsdr). During this quiet time (Tqui), transmission and receipt of telegrams shall be disabled. This shall also be taken into account when using self-controlled repeaters, whose switching time shall be taken into consideration. The implementation shall ensure, that the following condition is fulfilled: (Tqui) < (min Tsdr). Synchronous transmission (MBP): The transmitter fall time or repeater switch time corresponds to the post transmission gap time (= Tsyn). The following shall apply: (Tqui) = (Tptg) = (Tsyn) "Quiet Time" is a master parameter. See "Station delay responder time (Tsdr)" and "Post transmission gap time (Tptg)".	622	DLL-AL	TechGeneral

Term	Meaning	ID	WG	Scope
Ready Time (Trdy)	IEC 61158-4: Asynchronous transmission (RS485): The ready time (Trdy) is the time within which a master station shall be ready to receive an acknowledgement or response after transmitting a request. The implementation shall ensure, that the following condition is fulfilled: (Trdy < min Tsdr). Synchronous transmission (MBP): Same as above. However, during the quiet time (Tqui), transmission and receipt of telegrams shall be disabled. The implementation shall ensure, that the following condition is fulfilled: (Tqui) = (Tptg) = (Tsyn) < (Trdy). See "Minimum station delay resonder time (min Tsdr)".	623	DLL-AL	TechGeneral
Real Rotation Time (Trr)	IEC 61158-4: Immediately after token reception the master station shall read the current value of its token rotation timer to calculate the real rotation time (Trr = difference between the target rotation time (Ttr) and the current value of the token rotation timer). Low priority message transfer periods may be processed if at the instant of processing the real token rotation time is less than the value of the actual token rotation. See "Token Holding Time (Tth)" and "Target Rotation Time (Ttr)".	454	PA-Devices	TechGeneral
Realtime Ethernet	Performance of a standard Ethernet communication system that meets the requirements of standard automation applications to a certain extend. Soft RealTime (SRT): By using isolating means like switches on the entries of the network and omitting layers (e.g. IP) and services (e.g. sequencing and acknowledgements of TCP) besides the standard layers the performance can be improved to a further extend. Isochronous RealTime (IRT): By using special ASICs that integrate timed switch functionality besides the standard layers the performance can be improved to a further extend such that isochronous mode values of PROFIBUS DP can be outranged.	587	PROFINET	TopLevel
Redundancy	Within fieldbusses a means to increase availability of an automation system by doubling hosts, transmission media (cables) and/or slaves. Within PROFIBUS DP only slave redundancy is standardized. Redundancy may be a pre-requisite to achieve functional safety.	264	Redundancy	TopLevel
Redundancy Alarm	(1) Within PROFIBUS DP redundancy diagnosis information is conveyed via the status mechanism. See "Device Related Diagnosis". The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522. (2) Within PROFINET a Redundancy Alarm is defined.	612	PROFINET	TechGeneral
Redundant Slave	Pair of slave PROFIBUS DP interface modules with its I/O modules where one is the primary and one is the backup slave.	265	Redundancy	TopLevel

Term	Meaning	ID	WG	Scope
Regional Profibus Associations (RPA)	The most important goals of PROFIBUS International are advancement of the PROFIBUS technology, know-how transfer and protection of investment. Today, more than 1,200 companies around the world profit from advance information to achieve a competitive edge in the market. Members of the organization can be vendors of hardware, software and systems as well as users and operators, scientific institutes and federations provided they support the purposes of PROFIBUS International and the respective Regional PROFIBUS Association (RPA). See "www.profibus.com/organization.html" for details.	384	PA-Devices	TopLevel
Reliability	Reliability can be specified as the mean number of failures in a given time (failure rate Lambda), or as the mean time between failures (MTBF) for items which are repairable or as mean time to failure (MTTF) for items which are not repairable. For repairable items, it is often assumed that failures occur at a constant rate, in which case the failure rate Lambda = 1/ MTBF. The reliability of components usually is measured in FIT (= one failure in 10^9 device-hours) during its operating stage after the infant mortality stage and before the wear-out stage ("bathtub" curve). It is important to note that the reliability for a given item decreases over time within the MTBF time frame. This mathematical quantity is used within PROFIBUS/PROFIsafe for calculations of residual error rates and the probability of failures.	404	Safety	TopLevel
Remote Input/Output (RIO)	Generally, a remote I/O is a subunit located apart from its computing system (e.g. PLC). Referring to PROFIBUS DP, this subunit is either a physical modular or a compact slave that is preprocessing mainly binary process quantities (signals). The signal information is packed into data telegrams and exchanged with the PROFIBUS master. A remote I/O may be expanded with sophisticated modules such as motor starters, gateways, etc. PNO maintains an application profile "Remote I/O for PA", order no. 3.132	38	EDD	TechGeneral
Remote Procedure Call (RPC)	RPC is a protocol that one program can use to request a service from a program located in another computer in a network without having to understand network details. It uses the client/server model. The requesting program is a client and the service-providing program is the server. An RPC is a synchronous operation requiring the requesting program to be suspended until the results of the remote procedure are returned. However, the use of lightweight processes or threads of a computer program that share the same address space allows multiple RPCs to be performed concurrently. When program statements that use RPC are compiled into an executable program, a stub is included in the compiled code that acts as the representative of the remote procedure code. When the program is run and the procedure call is issued, the stub receives the request and forwards it to a client runtime program in the local computer. The client runtime program has the knowledge of how to address the remote computer and server application and sends the message across the network that requests the remote procedure. Similarly, the server includes a runtime program and stub that interface with the remo	585	PROFINET	TopLevel

Term	Meaning	ID	WG	Scope
Repeater	In general: An electronic device that amplifies a signal before transmitting it again. Repeaters can be used in computer networks to extend cabling distances. IEC 61158-2: Two-port active physical layer device that receives and retransmits all signals to increase the distance and number of devices for which signals can be correctly transferred for a given medium.	286	PROFINET	TopLevel
Requirements Class (AK1..6)	German standard DIN V 19250 ("Basic Safety Evaluation of Measuring and Control Protective Equipment") defines eight "AK" classes (AK1 to AK8). AK = Anforderungsklasse = Requirement Class (RC). According to this standard an AK is the assignment to requirements for the realization of a safety instrumented system. The AK results from the product of the severity of the potential injury and the probability of occurence. The AK rating shall lead to an adequate safety related performance of the safety instrumented system. The ratings have been used in DIN V VDE 0801 (for computers/PLC's) so far, and more generally, in (draft) DIN 19251. See "Risk Assessment".	463	ZVEI-Safe	TopLevel
Reserved (RES)	Within PROFIBUS guidelines the following applies: - RES is an acronym for "reserved for future usage" - Implementations shall always set "0" for digital values or "20h" (blank) for characters - Receiving applications shall not interpret or derive actions from the reserved values These definitions ensure a well defined behavior of devices once the reserved values will be defined. The revocation of reservations within new releases of guidelines shall be affirmed by the advisory board of the PNO.	191	Drives	TechGeneral
Restart Interlock	IEC 61496-1: A restart interlock is a means of preventing automatic restarting of a machine - after tripping of the sensing device during a hazardous part of the machine operating cycle, - after a change in "mode of operation" of the machine, and - after a change in the "means of start control" of the machine. Modes of operation include jog, single stroke, automatic. Means of start control include foot switch, twohand control, and single or double actuation of the electro-sensitive protection equipment (ESPE) sensing device.	501	ZVEI-Safe	TechGeneral
Revision Number	Version identifier of a DP device in 8 bit format. It is defined within the GSD file of a particular device. The device may report the revision number via an extended diagnosis information. The revision number does not describe the revision of the GSD file of the device! See "Diagnosis".	292	GSD	TechGeneral
Risk	IEC 61508-4: A combination of the probability of occurrence of harm and the severity of that harm.	403	Safety	TopLevel

Term	Meaning	ID	WG	Scope
Risk Assessment	The European standard EN 1050 defines procedures necessary for the execution of a risk assessment. The assessment thus comprises a risk analysis prior to a risk validation. The ISO 14121 is the corresponding international standard. See "ISO 14121".	485	ZVEI-Safe	TechGeneral
Router	On the Internet, a router is a device or, in some cases, software in a computer, that determines the next network point to which a packet should be forwarded toward its destination. The router is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to. A router is located at any gateway (where one network meets another), including each Internet point-of-presence. A router is often included as part of a network switch.	584	PROFINET	TopLevel
Routing	In general: The process of finding a path to the destination host. Routing is very complex in large networks because of the many potential intermediate destinations a packet might traverse before reaching its destination host.	322	PA-Devices	TopLevel
RS485	IEC 61158-2: Type of medium attachment unit (MAU) corresponding to ANSI/TIA/EIA-485-A:1998, "Electrical characteristics of generators and receivers for use in balanced digital multipoint systems". Suited mainly for factory automation: - Linear bus, terminated at both ends, stubs <0,3 m, no branches (spurs) (see note) - Total of the capacities of all stubs 0,05 nF at 3, 6 and 12 Mbit/s - Shielded twisted pair cable (type A recommended) - Line length: <= 1200 m, depending on the data rate and cable type - Number of stations: 32 (master stations, slave stations or repeaters) - Data rates: 9,6/ 19,2/ 45,45/ 93,75/ 187,5/ 500/ 1 500/ 3 000/ 6 000/ 12 000 kbit/s Note: It is highly recommended to not exceed a total capacity of 15 pF per station and a length of more than 5 cm between connector and line driver circuit if 12 Mbit/s are to be supported. See RS485-IS also.	280	DLL-AL	TopLevel
RS485-IS	Intrinsically safe version of the transmission technology RS485. See "Intrinsic Safety". The PNO maintains a guideline "PROFIBUS RS485-IS User and Installation Guideline", order no. 2.262	395	PA-Devices	TopLevel
Runtime Automation Object (RT Auto)	PROFINET: Automation functionality of a component which can be used from any application.	586	PROFINET	TechGeneral
Safe Dynamic Braking	IEC 61800-5-2: "Safe dynamic braking (including slowdown)" means a combination of "Controlled stopping by control of braking torque" and "Speed limiting".	525	Safety	TechGeneral

Term	Meaning	ID	WG	Scope
Safe Maximum Increment	IEC 61800-5-2: "Limited maximum increment": An input signal (e.g. start) initiates the (safe) adjustable speed electrical power drive system to move a specified increment. After having completed the travel required for this increment the motor shall be brought to standstill by one of the following safety functions: - Controlled stopping by control of braking torque; or - Uncontrolled stopping by removal of power. Followed by one of the following: - Controlled hold; or - Power removal.	526	Safety	TechGeneral
Safe Position Limiting	IEC 61800-5-2: Safe (absolute) position limiting means the motor is operating within specified position limit(s) where all controlling functions (torque, speed, position, etc.) between the basic or complete drive module and the motor are active. The (safe) adjustable speed electrical power drive system shall control the speed so as not to exceed the specified position limit(s). Those should be determined by the installation designer for all modes of use. The (safe) adjustable speed electrical power drive system shall achieve a hold condition (e.g. controlled stopping followed by controlled hold) when a specified position limit is exceeded. Specification of the position limit value(s) shall take into account the maximum possible overtravel distance(s).	527	Safety	TechGeneral
Safety Extra-Low Voltage (SELV)	A circuit which has no direct connection to primary power and derives its power from a transformer, converter or equivalent isolation device, or from a battery. It is so designed and protected that, under normal and single fault conditions, its voltages do not exceed a safe value. Being specified as a SELV system includes a protective measure against direct and indirect contact with hazardous voltages through "safe separation" (for example, isolation testing with 500V DC for 1 minute or power pack according to PELV specification) implemented in the device. However, a SELV system must not be grounded (in contrast to a PELV system). On the same level are electronic devices if, in case of normal conditions, the voltage on the output terminals and against ground is no higher than 30V AC, 42,4V peak or 60V DC. In case of a single fault no higher than 50V AC, 70V peak or 120V DC. See "IEC 61010".	656	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Safety Function	IEC 61508-4: function to be implemented by an electric, electronic, programmable electronic safety-related system, other technology safety-related system or external risk reduction facilities, which is intended to achieve or maintain a safe state for the equipment under control, in respect of a specific hazardous event. Within the scope of PROFIsafe this usually corresponds each with one or more actuators (relays, motors, valves, robots, etc.) together with its communications, logic solving equipment and probably software, sensors or other inputs, and the power supplies involved in a risk assessment and associated with a certain level of risk for a specific hazardous event. It is the intention of PROFIsafe to reduce the amount of effort for the application of safety equipment by well defined safety components (safety data SIL and PFD) and standardized approved safety function blocks and using standards such as: - IEC 61511 (process automation) - IEC 62061 (machinery, electrical part) - ISO 13849 (machinery, mechanical and electrical parts).	636	Safety	TopLevel
Safety Instrumented Systems (SIS)	A term used in ANSI/ISA S84.01-1996 "Application of Safety Instrumented Systems for Process Industries". This standard is going to be replaced by IEC 61508 and IEC 61511. SIS include all elements from the sensor to the actuator, including inputs, outputs, power supplies and logic solvers. See "Programmable Electronic safety-rel. System" and "Safety Function".	493	ZVEI-Safe	TopLevel
Safety Integrity Level (SIL)	The international standard IEC 61508 "Functional Safety of electrical/electronic/ programmable electronic safety-related systems" defines four safety integrity levels (SIL1 to 4). They are defined as the measure for the safety performance of electrical or electronic control equipment. There is no direct conversion between the AK requirement classes or the categories of EN954-1 and SIL levels, but for example in a typical application AK 5 and AK 6 or category 4 might correspond to SIL 3. The SIL levels from IEC 61508 are also used in IEC 61511 (for the process industry). See "IEC 61508", "Requirements Class (AK1..6)", and "Category (acc. EN 954)".	499	ZVEI-Safe	TopLevel
Safety Light Beam	IEC 61496-2: A light beam device is either a single light beam device or a multiple light beam device. A single light beam device is an active opto-electronic protective device (AOPD) comprising one emitting element and one receiving element, where a detection zone is not specified by the supplier. A multiple light beam device is an active opto-electronic protective device (AOPD) comprising multiple emitting elements and corresponding receiving elements, and where a detection zone is not specified by the supplier.	495	ZVEI-Safe	TechGeneral
Safety Light Curtain	IEC 61496-2: An active opto-electronic protective device (AOPD) comprising an integrated assembly of one or more emitting element(s) and one or more receiving element(s) forming a detection zone with a detection capability less than or equal to 116 mm, both specified by the supplier. A light curtain with a detection capability between 40 mm and 116 mm may be referred to as a light grid.	494	ZVEI-Safe	TechGeneral

Term	Meaning	ID	WG	Scope
Safety Margin Time (Tsm)	IEC 61158-4: Asynchronous transmission (RS485): The following time interval is specified as safety margin (Tsm): (Tsm) = 2 bit + 2 × (Tset) + (Tqui). Synchronous transmission (MBP): The safety margin (Tsm) is defined as the time interval: (Tsm) = 2 bit + 2 × (Tset).	227	Drives	TechGeneral
SCADA	Supervisory Control and Data Acquisition systems are used in industry to monitor and control plant status and provide logging facilities. It consist of a central host or master (usually called a master station, master terminal unit or MTU); one or more field data gathering and control units or remotes (usually called remote stations, remote terminal units, or RTU's); and a collection of standard and/or custom software used to monitor and control remotely located field data elements. SCADA systems are highly configurable, and usually interface to the plant via PLCs. Systems similar to SCADA systems are often referred to as Distributed Control Systems (DCS). They have similar functions to SCADA systems, but the field data gathering or control units are usually located within a more confined area. Communications may be via a local area network (LAN), and will normally be reliable and high speed. A DCS system usually employs significant amounts of closed loop control. SCADA systems on the other hand generally cover larger geographic areas, and rely on a variety of	182	TC3	TopLevel
Scalable Device Integration	PROFIBUS DP provides the following device integration technologies: (1) Generic Station Description (GSD) for simple devices and fixed run-up configurations (2) Electronic Device Description (EDD) for additional individual device parameterization and diagnostics at run-time based on "electronic data sheets" and interpreter tools. Suitable for mid-range device complexity. (3) Field Device Tool (FDT) and Device Type Manager (DTM) for individual device parameterization and diagnostics at run-time based on PC application software and a standard interface (FDT) to engineering tools or monitoring stations. Suitable for medium to high device complexity. The PNO maintains a series of guidelines "Specification for PROFIBUS Device Description and Device Integration, - Volume 1: GSD, order no. 2.122 - Volume 2: EDDL, order no. 2.152 - Volume 3: FDT, order no. 2.162"	422	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
Security	Automation systems based on PROFIBUS DP and PROFINET are more and more directly linked to public networks like the Internet and thus are becoming more vulnerable in terms of - endangerment of public or employee safety - loss of public confidence - violation of regulatory requirements - loss of proprietary or confidential information - economic loss In anticipation of these threads PI and the PNO are working closely together with other organizations such as IEC or ISA to establish appropriate technical standards (e.g. IEC 61784-x). Following a list of technologies that might be considered during the specification phase: Firewall - DMZ - access control list - password - passphrase - cryptography - cryptanalysis - code - cipher - ciphertext - block cipher - stream cipher - encryption and decryption - key - one-time pad - Secure Socket Layer (SSL) - Secure Hypertext Transfer Protocol (HTTPS) - public key infrastructure (PKI) - public key - private key - digital certificate - certificate authority (CA) - registration authority (RA) -	617	PROFINET	TopLevel
Segment	IEC 61158-2: main section of a fieldbus that is terminated in its characteristic impedance. Segments are linked by repeaters within a logical link and by bridges to form a fieldbus network.	315	DLL-AL	TopLevel
Segment Coupler	Segment couplers are used to connect PA devices with its low speed and intrinsically safe MBP-IS transmission physics to the high speed RS485 transmission technology. A segment coupler does this interfacing and provides intrinsically safe power. Basically, two different variants of the segment coupler are available: the "transparent" coupler with a fixed baud rate on the RS485 side (45,45 kbit/s or 93,75kbit/s) and the "intelligent" coupler with a variable baud rate up to 12Mbit/s. The "transparent" coupler simply converts the asynchronous 11-bit/character DP/RS485 physics into the 8-bit/character synchronous MBP physics. An address is not assigned to the coupler. Only one PA device can be connected to this type of coupler. The "intelligent" coupler may be a combined slave/master device with its own slave address to the high speed DP-segment. This type of coupler "folds" and "unfolds" the telegram contents of several PA devices on the PA-segment to/from one telegram of the DP-segment. The other type is transparent and just acts like a "gear reduction" without its own address. Either type has its advantages and disadvantag	444	PA-Devices	TopLevel
Sensor	A device that measures or detects a real world quantity such as voltage, current, motion, proximity, position, heat, pressure or light. It converts the quantity into an analog or digital representation (signal). In form of field devices sensors may not only communicate its process values (of signals) but provide parameterization, diagnostics, etc.	24	Ex-i	TechGeneral
Serial Line Internet Protocol (SLIP)	Offers a simple possibility of TCP/IP data packages over serial point to point connections. With this method devices without LAN interface can easily be connected to a network via a serial interface.	589	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
Service Access Points (SAP)	The OSI reference model term for the component of a network address which identifies the individual application process (AP) on a host which is sending or receiving a data packet. The PROFIBUS DP protocol is using both a source service access point (SSAP) and a destination service access point (DSAP) within its telegrams. PROFIBUS DP defines a total of 66 SAP addresses. See "DP telegram types".	193	PROFINET	TechGeneral
Setup Time (Tset)	IEC 61158-4: the time, which expires from the occurrence of a transmission event (for example, an interrupt on the last bit of a sent telegram or when synchronization time expires) until the necessary reaction is performed (for example, to start synchronization time or to enable the receiver). This is a master parameter. See "Master parameter".	229	Drives	TechGeneral
Shielded Twisted Pair (STP)	Shielded twisted pair is a special kind of copper wiring used in business installations. An outer covering or shield is added to the ordinary twisted pair wires; the shield functions as a ground. To reduce crosstalk or electromagnetic induction between pairs of wires, two insulated copper wires are twisted around each other. The PNO maintains several guidelines around cable types, connectors and installations.	594	PROFINET	TechGeneral
Shock Protection (electrical)	IEC 61784, Type 3: "PROFIBUS master and slave devices shall comply with the legal requirements of that country where they are deployed (within Europe e.g. indicated via the CE mark). The measures for protection against electrical shocks (i.e. electrical safety) within industrial applications shall be based on IEC 61010 or IEC 61131-2 depending on a device type specified therein."	419	Safety	TopLevel
Sign (SN)	A symbol that identifies a positive or negativ number. In digital form, it is either a separate character or part of the octets (data types). The PNO maintains a "Profile guideline, Part 2, "Data types, programming languages and platforms", order no. 3.512	195	Drives	TechGeneral
Signal	Is the representative of a real world quantity such as voltage, current, motion, proximity, position, temperature, pressure or light. The signal data are communicated as process values (I/O data) within PROFIBUS DP.	276	TimeStamp	TechGeneral
Simple Mail Transfer Protocol (SMTP)	Simple mail transfer protocol is a TCP/IP protocol used in sending and receiving e-mail. However, since it's limited in its ability to queue messages at the receiving end, it's usually used with one of two other protocols, POP3 or Internet Message Access Protocol, that let the user save messages in a server mailbox and download them periodically from the server.	590	PROFINET	TopLevel
Simple Network Management Protocol (SNMP)	Simple network management protocol is the protocol governing network management and the monitoring of network devices and their functions. It is not necessarily limited to TCP/IP networks. SNMP is described formally in the Internet Engineering Task Force (IETF) Request for Comment (RFC) 1157 and in a number of other related RFCs.	591	PROFINET	TopLevel

Term	Meaning	ID	WG	Scope
Simple Object Access Protocol (SOAP)	The simple object access protocol is a lightweight protocol for exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined datatypes, and a convention for representing remote procedure calls and responses. SOAP can potentially be used in combination with a variety of other protocols; however, the only bindings defined in this document describe how to use SOAP in combination with HTTP and HTTP Extension Framework.	592	PROFINET	TopLevel
Single Fault Safety	Single fault safety means that even in case of the occurence of one fault the appropriate safety function is ensured. See "IEC 61010".	475	ZVEI-Safe	TechGeneral
Slave Parameterization	For a DP slave several levels of parameterization exist: (1) The parameters on the DP communication level can be defined via a GSD file and comprise features such as baudrates, timing constraints, identification, options, transferable data structures, publisher subscriber links, etc. This level supports parameterization of simple modular slaves and special common additional communication layers such as PROFIsafe also. This parameterization is fixed for a given operational life cycle after start-up. (2) More complex devices may be parameterized via EDD and/or FDT/DTM technology via an acyclic communication service (MS2). (3) For parameter changes at run-time such as batch operation (recipes) or motion control, special "parameter channels" associated with the cyclic data structures may be added or the MS1 services together with proxy function blocks may be used. See "Structured parameterization" and "Communication parameter".	136	Drives	TechGeneral
Slave to slave(s) communication	refers to the communication between PROFIBUS DP slaves based on data exchange broadcast (DxB) and the publisher/subscriber principle. See DxB.	44	Drives	TechGeneral
Slot	IEC 61158-5: The address of a module within a DP-Slave (0 - 254). However, the permitted maximum number of modules in PROFIBUS DP is 244.	35	EDD	TechGeneral
Slot Time (Tsl)	IEC 61158-3: A timer in a master station monitors after a request or token pass whether the receiving station responds or becomes active within the predefined time Tsl, the slot time. After transmission of a data link PDU's last bit this timer is loaded with Tsl and decremented each bit time as soon as the receiver is enabled. See "Master parameter".	445	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Source Service Access Point (SSAP)	IEC 61158-5: This station address extension specifies the local data link service access point that is to be activated and configured. The SSAP index values 0 to 63, CS and NIL are permissible. See "Destination Service Access Point (DSAP)".	446	PA-Devices	TechGeneral
Special Identifier Format (SIF)	An extension of the general identifier format (GIF) permitting the description of larger data lengths (1 .. 64) and the addition of manufacturer specific information to the I/O data. A configuration identifier according to the SIF consists of at least 1 (empty slot) and up to a maximum of 18 octets (1 basic + 1 or 2 length + 15 manufacturer specific data). It is considered to be atomic in respect to one module. IEC 61158-6: The structure of the special identifier format is defined like follows: SIF basic identifier , [length octet] , [length octet], [manufacturer specific data*] Length octet fields shall always start with fields that indicate output data if present. Legend: * = may appear more than once [ ] = optional	301	GSD	TechGeneral
Speed Limiting (Overspeed)	IEC 61800-5-2: The motor is running within specified speed limits where all controlling functions (torque, speed, position, etc.) between the basic or complete drive module and the motor are active. The (safe) adjustable speed electrical power drive systems shall control the speed so as not to exceed the specified limit. This speed should be determined by the installation designer for all modes of use.	486	ZVEI-Safe	TechGeneral
Spur	A spur is a branch line connecting a sub segment to the main segment of MBP based networks. Only one slave shall be connected to the end of the sub segment. Maximum length is 30m. German term is "Abzweig". See "Stub".	626	PA-Devices	TopLevel
Standard Diagnosis Information	IEC 61158-5: Any master may request diagnosis data from a slave any time even if there is no abnormal or unexpected phenomenon. The slave responds with at least 6 octets of standard diagnosis information. This information comprises i.a. parameterization and configuration status, services not supported, watchdog timer exceeded, sync and freeze mode status, etc. In case the slave generated diagnosis information beyond the standard level it sets the "Extended diagnosis" (Ext Diag) Flag and adds the extended diagnosis information. The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522.	448	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
State Machine (DP)	An abstract machine consisting of a set of states (including the initial state), a set of input events, a set of output events, and a state transition function. A state machine describes the behavior of a field device how to react in different situations. The state machine for DP slaves comprises the following states/actions: - Power_On_Reset --> Set slave address --> if succesful, a transition follows to: - Wait_Prm --> Parameterization, diagnosis (optional) --> if succesful, a transition follows to: - Wait_Cfg --> Configuration, diagnosis (optional) --> if succesful, a transition follows to: - Data_Exch --> Normal operation: cyclic data exchange On top of this basic communication layer state machine application profiles are defining their own additional state machines, e.g. PA devices, PROFIdrive, PROFIsafe, Ident Systems, Weighing and Dosage Systems. State machines are best modeled and documented with the help of the "Unified Modeling Language (UML)".	593	PROFINET	TopLevel
State Transitions	See "state machine".	145	Drives	TechGeneral
Station Address	Within PROFIBUS DP the address of a communication participant (master or slave). The permitted range is 0 to 127, with - 126 intended to be used for the "soft" addressing of slave devices - 127 intended to be used for broadcast messages to all the slaves. The most significant Bit of the address is used to indicate a cyclic data exchange telegram without any DSAP and SSAP subaddresses (DSAP = NIL).	634	TC3	TechGeneral
Station Delay Time (Tsdx)	IEC 61158-3: The station delay time Tsdx is the period of time which may elapse between the transmission or receipt of a telegram's last bit until the transmission or receipt of a following telegram's first bit (with respect to the transmission medium, that is, including line receiver and transmitter). See "Minimum station delay time of responder (min_Tsdr)" and "Maximum station delay time of responder (max_Tsdr)".	221	Drives	TechGeneral
Status (Diagnosis)	In general: Temporal indication of current states and activities within a system or device. Within PROFIBUS DP a diagnosis event without acknowledge. Since DP-V1, "Device related diagnosis" is the basis for the "Alarm" and "Status" types of diagnosis events (GSD: "DPV1"=1). The following status types are defined: Module Status, DxB Link Status, Redundancy Status, Status Message, and PrmCmd_Ack. See "Device Related Diagnosis". The PNO maintains a Profile Guideline, Part 3: Diagnosis, Alarms and Time Stamping , order no. 3.522.	554	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Stop Category 0	IEC 60204-1 and IEC 61800-5-2: "Uncontrolled stopping by removal of power". The power that can initiate hazardous rotation (motion) shall be removed from the motor. The removal of this power should lead to an uncontrolled stop of the motor. After power removal it shall not be possible for the motor to generate a torque resulting in hazardous movements. Where a motor rotates after removal of power, for example, as result of inertial torque, it may be necessary to apply additional measures to prevent a hazardous situation.	674	Safety	TechGeneral
Stop Category 1	IEC 60204-1 and IEC 61800-5-2: "Controlled stopping by control of braking torque". The adjustable speed electrical power drive system suitable for use in safety-related applications PDS(SR) shall control the braking torque within specified limits to bring the motor to the stopped condition. This braking torque (and its limits) should be determined by the installation designer to safely achieve the stopped condition within a required time. This safety function corresponds to a controlled stop in accordance with category 1 of IEC 60204-1 when power is removed after the motor has attained the stop condition.	450	Safety	TechGeneral
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Structured Parameterization	IEC 61158-5: In contrast to the DPV0 user parameterization the structured parameterization defines separate objects for the device itself and for each of its modules. Furthermore these objects allow the unique identification and assignment. The structuring should be used by more complex devices with a high variation of parameters which may not be present in every application. This method is mandatory for DP-slaves which support the Isochronous Mode and for the conveyance of the DXB-Linktable.	638	TC3	TechGeneral
Stub	IEC 61158-2: A short length of cable connecting a node to a segment. Stubs are not recommended in PROFIBUS DP and prohibited with 12 Mbaud and PROFIsafe operations. A slave device designed for 12 Mbaud shall not exceed 5 cm wire length between the bus connector and the RS485 line driver circuit and 12 pF of capacitance. German term is "Stichleitung". See "Spur".	316	PA-Devices	TopLevel
Subscriber	IEC 61158-5: role of a slave in which it receives data produced by a publishing slave. See "data exchange broadcast".	47	Drives	TopLevel

Term	Meaning	ID	WG	Scope
Substitute value	PROFIBUS DP: See "Fail-safe Mode" PROFINET: In case of a transmission error or an instability of the mapping table inside a field device, substitute values can be used by the application.	595	PROFINET	TechGeneral
Switch	In a telecommunications network, a switch is a device that channels incoming data from any of multiple input ports to the specific output port that will take the data toward its intended destination. In the Open Systems Interconnection (OSI) communications model, a switch performs the layer 2 or Data-Link layer function. That is, it simply looks at each packet or data unit and determines from a physical address (the "MAC address") which device a data unit is intended for and switches it out toward that device. However, in wide area networks such as the Internet, the destination address requires a look-up in a routing table by a device known as a router.	522	DLL-AL	TopLevel
SYNC Mode	During a normal DP cycle the outputs of slaves are updated just one after the other. In order to synchronize the appearance of updated values a master may send a broadcast telegram "global control" with 2 octets of data: Octet 1: bits to indicate "sync" or "unsync" to the slave (besides other bits) Octet 2: number for a group of concerned slaves (assigned via parameterization). After a "sync" telegram the corresponding slaves are holding current output values, despite of the following normal data exchange. The slaves are storing the updated values internally until a new "global control" telegram indicates "unsync".	142	Drives	TechGeneral
Synchronization	An adjustment that causes something to occur or recur in unison. The version DP-V2 of PROFIBUS DP specifies two kinds of synchronization mechanisms: - Isochronous mode (synchronized processing within slaves, e.g. drives) - Sychronized clocks within slaves for e.g. time stamping of messages	50	Drives	TechGeneral
Synchronization Time (Tsyn)	IEC 61158-4: (1) Asynchronous transmission: The synchronization time (Tsyn) is the minimum time interval during which each station shall receive idle state (idle = binary "1") from the transmission medium before it may accept the beginning of a send/request or token telegram. The value of the synchronization time shall be set to: Tsyn = 33 bit. (2) Synchronous transmission: The synchronization time shall correspond to the post transmission gap time (Tptg). Its value shall be set to at least 4 bit and may be increased by the user up to 32 bit: Tsyn = Tptg = Tqui = 4 to 32 bit. See "Post Transmission Gap Time (Tptg)".	456	PA-Devices	TechGeneral

Term	Meaning	ID	WG	Scope
Synchronous Communication	(1) A data link layer protocol wherein signal events (e.g. raising and trailing edges) occur with precise clocking (e.g. "manchester encoding"). (2) In program-to-program communication, synchronous communication requires that each end of an exchange of communication responds in turn without initiating a new communication later on.	143	Drives	TechGeneral
Synchronous Transmission	Sometimes in literature used synonym for one of the possible PROFIBUS DP medium attachment units: MBP	279	DLL-AL	TopLevel
System Earth (Ground)	Grounding of cable shields within hazardous areas when using isolated powering	321	Ex-i	TechGeneral
System Reaction Time (Tsr)	IEC 61158-4: (1) The maximum system reaction time (Tsr) in a system with one master station and n slave stations (master slave system) is calculated from the message transfer period (Tmp) multiplied with the number of slave stations. If retries are allowed, this time frame has to be added. (2) The maximum system reaction time in a system with several master stations and slave stations equals the target token rotation time (Ttr).	665	TC3	TechGeneral
Target Token Rotation Time (Ttr)	IEC 61158-3: the anticipated time for one token cycle, including allowances for high and low priority transactions, errors and GAP maintenance. This is a master parameter. See "Master parameter".	223	Drives	TechGeneral
TCP/IP	Transmission Control Protocol: TCP is one of the main protocols in TCP/IP networks. Whereas the IP protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent. Internet Protocol: IP specifies the format of packets, also called datagrams, and the addressing scheme. Most networks combine IP with a higher-level protocol called Transport Control Protocol (TCP), which establishes a virtual connection between a destination and a source.	546	DLL-AL	TopLevel
Technical Commitee (TC)	The development and maintenance work of PROFIBUS is structured into 5 Technical Committees: Test and Certification, Communication Profiles, Application Profiles, System Integration and Marketing. The TCs are responsible for the coordination of its related working groups.	338	TC3	TopLevel
Technological Function	The technological function of a PROFINET component contains the application specific functionality of an automation device or field device and the technological interface for the communication with other PROFINET components.	596	PROFINET	TechGeneral
Technological Functions	Standardized complex automation functions for drives, e.g. position, velocity, position table.	43	Drives	TechGeneral
Technological Module	A technological module consists of mechanical-, electrical-, electronical-, and software parts which are encapsulated in one unit (mechatronic unit).	597	PROFINET	TechGeneral

Term	Meaning	ID	WG	Scope
Telegram	The complete set of bit signals a physical layer is coding onto a transmission line. Within PROFIBUS DP it starts with some synchronization bits and a start delimiter and ends with an end delimiter or data integrity checking. The "payload" of a telegram contains one or several messages. See "Message".	400	TC3	TechGeneral
Telegram Header	Administrative information of a telegram for its correct transmission, e.g. addresses, telegram type, flow control, length. Usually the header is accompanied by a trailer at the end of the telegram that covers the data integrity (frame checksum or CRC).	598	PROFINET	TechGeneral
Terminator	IEC 61158-2: A resistor connecting conductor pairs at both ends of a wire medium segment to prevent reflections from occurring at the ends of cables. Ideally it should be the wave impedance of the wire medium.	317	DLL-AL	TechGeneral
Test Report	Document describing the results of a carried out test campaign. A Test Report is the basis for issuing a certificate.	451	PA-Devices	TechGeneral
Time Master	A PROFIBUS DP master, which is able to send clock time synchronization telegrams for slaves to sychronize the built-in clocks using MS3 services. Any class 1 or class 2 master may be a time master.	259	TimeStamp	TechGeneral
Time Stamp	A time stamp is clock time information added to a process value to form an alert. The time information corresponds with the point in time when the alert occurred. The PNO maintains a guideline "Time Stamp", order no. 2.192.	278	TimeStamp	TopLevel

Term	Meaning	ID	WG	Scope
Timing Parameter (DP Timings)	Frequently used DP timing parameters are: Bit Time Tbit Token Transfer Period Ttp Target Token Rotation Time Ttr Token Holding Time Tth Real Rotation Time Trr Data Exchange Time Tdx Slot Time Tsl Synchronization Time Tsyn Quiet Time Tqui Ready Time Trdy Station Delay Time Tsdr Setup Time Tset Message Transfer Period Tmp Watchdog Time Twd Idle Time 1 Tid1 Idle Time 2 Tid2 Minimum Slave Interval	639	TC3	TechGeneral
Token Holding Time (Tth)	IEC 61158-4: When a master station receives the token, its token rotation timer is loaded with the target rotation time (Ttr) and decremented each bit time. When the station again receives the token, the timer value, the remaining time or token holding time (Tth), is read and the timer reloaded with (Ttr). The real rotation time (Trr) results from the difference (Ttr) - (Tth). See "Target Rotation Time (Ttr)" and "Real Rotation Time (Trr)".	452	PA-Devices	TechGeneral
Token Passing (TOK)	IEC 61158-4: Medium access method, in which the right to transmit is passed from master station to master station in a logical ring.	198	Drives	TopLevel
Token Transfer Period (Ttp)	IEC 61158-4: The token transfer period is the time that elapses to pass the token from one master to another until this one starts sending. It is measured in bits and composed of the token telegram length (33 bits), the transmission delay time (5 ns/m) and the idle time (Tid1). See "Idle Time 1".	453	PA-Devices	TechGeneral
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.	333	PA-Devices	TopLevel

Term	Meaning	ID	WG	Scope
Torque / Force Limiting (safe)	IEC 61800-5-2: The motor is operating within specified torque/force limits where all controlling functions (torque, speed, position, etc.) between the basic or complete drive module and the motor are active. The (safe) adjustable speed electrical power drive system shall control the torque so as not to exceed the specified limit. It also shall control the torque/force within specified limits to prevent hazardous conditions occurring (e.g. over-acceleration of a load). This torque/force (and its limits) should be determined by the installation designer for all modes of use.	496	ZVEI-Safe	TechGeneral
Transducer Block	According to the device model within the profile "PA Devices", a transducer block decouples function blocks from the local I/O channels required to read sensors and command output hardware. Transducer blocks contain information such as calibration date and sensor type. The PNO maintains an application profile "Profile for Process Control Devices", order no. 3.042.	318	PA-Devices	TechGeneral
Transmission Rate (Baudrate)	The signaling rate of a digital communication line. It's the switching speed, or number of transitions (voltage or frequency changes) that are made per second. Within PROFIBUS DP the possible transmission rates depend on the MAU in use.	336	PA-Devices	TechGeneral
Transmission Times	IEC 61158-4: A message transfer period MP consists of the send/request telegram and the acknowledgement or response telegram. The transfer period is composed of the telegram transmission times, the transmission delay times and the station delay times. The telegram transmission times are determined by the number of totally involved UART characters that consist of 11 bit.	146	Drives	TechGeneral
Transmitter	IEC 61158-2: transmit circuitry of a communication element (e.g. slave device)	319	DLL-AL	TechGeneral
Uncontrolled Stopping (Stop Category 0)	IEC 61800-5-2: In case of "Uncontrolled stopping by removal of power" the power that can initiate hazardous rotation (motion) shall be removed from the motor. The removal of this power should lead to an uncontrolled stop of the motor. After power removal it shall not be possible for the motor to generate a torque resulting in hazardous movements. Where a motor rotates after removal of power, for example, as result of inertial torque, it may be necessary to apply additional measures to prevent a hazardous situation. This safety function corresponds to an uncontrolled stop in accordance with category 0 of IEC 60204-1.	491	ZVEI-Safe	TechGeneral
Unified Modeling Language (UML)	The Unified Modeling Language (UML) is a language for specifying, visualizing, constructing, and documenting the artifacts of software systems based on the Object Technology and other non-software systems. The industry looks for techniques to automate the production of software and to improve quality and reduce cost and time-to-market. These techniques include component technology, visual programming, patterns and frameworks. The Automation domain focuses its UML activities on a subset of the UML best engineering practices like data encapsulation, real world modeling, etc. that fit to its real time and memory constraints. One current direction is the usage of modeling tools with coding and simulation capabilities. PNO strongly supports the application of UML within its specification work. --> www.uml.org	460	TC3	TopLevel

Term	Meaning	ID	WG	Scope
Universal Asynchronous Receiver/Transmitter (UART)	An integrated circuit used for serial communications, containing a transmitter (parallel-to-serial converter) and a receiver (serial-to-parallel converter), each clocked separately.	25	Ex-i	TechGeneral
User Datagram Protocol (UDP)	The user datagram protocol is a communications protocol that offers a limited amount of service when messages are exchanged between computers in a network that uses the Internet Protocol (IP). UDP is an alternative to the Transmission Control Protocol (TCP) Like the Transmission Control Protocol, UDP uses the Internet Protocol to actually get a data unit from one computer to another. Unlike TCP, however, UDP does not provide the service of dividing a message into packets (datagrams) and reassembling it at the other end. Specifically, UDP doesn't provide sequencing of the packets that the data arrives in. This means that the application program that uses UDP must be able to make sure that the entire message has arrived and is in the right order. Network applications that want to save processing time because they have very small data units to exchange (and therefore very little message reassembling to do) may prefer UDP to TCP (--> Realtime Ethernet). In the Open Systems Interconnection (OSI) communication model, UDP, like TCP, is in layer 4, the Transport Layer.	600	PROFINET	TopLevel
User Interface	The combination of menus, screen designs, keybord commands, pointer interactions, command language and help screens, which create the way a user interacts with a computer system (engineering, operation, maintenance, etc.). The PNO published a "Style Guide" for DTM applications in order to establish a common look and feel amongst various applications.	337	PA-Devices	TopLevel
Variable	A programming structure that holds data. It can contain numbers or alphanumeric characters and is given a unique name by the programmer.	323	TC3	TechGeneral
Virtual Field Device (VFD)	IEC 61158-5: The term "virtual field device" (VFD) is used in PROFIBUS FMS to remotely view a ceratin set of local device data ("view") described in the object dictionary. A typical device will have at least two VFDs. The views depend on the role or the task of the person to communicate with the device: commissioning, maintenance, monitoring, etc. Sometimes the communication channels to field devices are multiplexed such that the local device data, the "view", only points to one out of several real devices.	547	PA-Devices	TechGeneral
Warnings	Kind of preventive diagnosis. Warnings indicate that tolerances for certain internal parameters of a device have been exceeded such that a predective maintenance can be arranged. In contrast to diagnosis messages no direct intervention to the process by the control software is desired. The warning information shall only be propagated to HMI devices.	148	Drives	TechGeneral
Watchdog Control	IEC 61158-6: This timer is part of the DP layer within a slave. It is restarted by received requests from the bus master and will set the outputs of a slave to a fail-safe state after the expiration of the timer.	632	TC3	TechGeneral

Term	Meaning	ID	WG	Scope
Watchdog Time (Twd)	IEC 61158-5: The watchdog timer is part of the DP layer within a slave. The watchdog time is set by parameterization at run-up and consists of a watchdog time base (1 or 10 ms) and 2 factors. A selection can be made during configuration via the GSD file of a slave. This is a slave parameter. See "Watchdog control".	224	Drives	TechGeneral
Wide Area Network (WAN)	A wide area network is a geographically dispersed telecommunications network. The term distinguishes a broader telecommunication structure from a local area network (LAN). A wide area network may be privately owned or rented, but the term usually connotes the inclusion of public (shared user) networks. An intermediate form of network in terms of geography is a metropolitan area network (MAN).	602	PROFINET	TopLevel
Working Group	The PROFIBUS working groups draw up new specifications and profiles, deal with quality assurance and standardization, work in standardization committees, and take effective marketing measures (trade fairs, presentations) for expanding PROFIBUS technology	339	TC3	TopLevel
World Wide Web	A technical definition of the world wide web is: all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP). Here the definition of the Web inventor Tim Berners-Lee: "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."	603	PROFINET	TopLevel
World Wide Web Consortium (W3C)	The world wide web consortium develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential (--> www.w3.org).	601	PROFINET	TopLevel
ZVEI	The "Zentralverband der Elektrotechnik und Elektronikindustrie (ZVEI) e.V.", the German electrical and electronic manufacturers' association, promotes the common economic, technological and environmental policy interests of the German electrical and electronics industry: --> www.zvei.org	459	PA-Devices	TopLevel

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