INSTALLATION AND SELECTION OF APPARATUS

SELECTION OF ELECTRICAL APPARATUS, PROTECTION FROM DANGEROUS SPARKING, WIRING SYSTEMS AND FURTHER REQUIREMENTS ACCORDING TO IEC/EN 60079-14 (GAS) AND IEC/EN 61241-14 (DUST)

Meaning of optional brackets [E Ex ib]

Corresponding electrical equipment is located in the safe area. Signal lines lead to the explosion hazardous area.

Device groups

Group I comprises equipment which is approved for operation in firedamp endangered mines.

Group II applies to the areas "above-ground", such as chemical/ petrochemical plants, refineries and mills (dust). For the ignition protection classes "Intrinsic safety" and "Flameproof enclosure", a further classification is made into the groups IIA to IIC due to the different ignition energies of the different gases.

CENELEC marking	Typical gas	Ignition engergy µJ
I	Methane	280
II A	Propane	> 180
II B	Ethylene	60...180
II C	Hydrogen	< 60

Temperature classes

Electrical equipment of group II is divided into temperature classes according to its maximum surface temperature. In the same manner, the gases are classified on the basis of the different ignition temperatures. Highest surface temperature at the apparatus:

T 1	450 °C
T 2	300 °C
T 3	200 °C
T 4	135 °C
T 5	100 °C
T 6	85 °C

ADDITIONAL MARKING ACCORDING TO DIRECTIVE 94/9/EC (ATEX 95)

Certified according to the European CENELEC standard EN 50.../ EN 60079-...

Explosion proof

Design tested according to Directive 94/9/EC

Device Group
I = Mining Equipment
II = Surface Industries

Application area

Equipment that is certified according to the ATEX 95 directive is provided with an additional marking that describes the usage site (or, in the case of corresponding electric equipment, explains to where the signal lines may lead). First the device groups appear, then the category and finally the information concerning the atmosphere (gas and/or dust).
The following category division applies to device group II:

Category 1 Very high safety measure	Category 2 High safety measure	Category 3 Normal safety measure
Sufficient safety by means of 2 protective measures / 2 faults	Sufficient safety in the case of frequently occuring equip-ment faults / 1 fault	Sufficient safety during normal operation
For use in Zone 0 20 Atmosphere G D	For use in Zone 1 21 Atmosphere G D	For use in Zone 2 22 Atmosphere G D

G=Gas, D=Dust
For details on dust explosion protection please refer to the Pepperl+Fuchs Explosion Protection Manual.

MARKING ACCORDING TO IEC/EN 60079

MARKING ACCORDING TO EN 50014

Types of Protection

Marking code		EEx d	EEx e	EEx p	EEx m	EEx o	EEx q	EEx i	EEx n
Type of Protection	General requirements	Flameproof enclosure	Increased safety	Pressurized apparatus	Encapsulation	Oil immersion	Powder filling	Intrinsic safety	Type of protection "n"
Protection principle		Transmission of an explosion to the outside is excluded	Prevention of sparks and tempera-tures	Ex atmosphere is isolated from the source of ignition	Ex atmosphere is isolated from the source of ignition	Ex atmosphere is isolated from the source of ignition	Transmission of an explosion to the outside is excluded	Energy restriction of sparks and temperatures	Different protection principles for Zone 2
Application in zone		1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	1 or 2	0,1 or 2****	2
CENELEC* standard	EN 50014	EN 50018	EN 50019	EN 50016	EN 50028	EN 50015	EN 50017	EN 50020	EN 50021
IEC/EN standard	IEC 60079-0	IEC 60079-1	IEC 60079-7	IEC 60079-2***	IEC 60079-18	IEC 60079-6	IEC 60079-5	IEC 60079-11**	IEC 60079-15
Use	All applications	Control units, controllers, engines, command & monitoring units, power electronics	Branching and connecting boxes, housings, engines, luminaires, terminals	Control cabinets, engines, measurement and analytical equipment, computers	Relay and engine coils, electronics, solenoid valves, connecting systems	Transformers, relays, start-up controls, switching devices	Transformers, relays, condensors	Measurement, control and regulation technology, instrumentation	All applications for zone 2

nA Non-sparking equipment (rotating machines, fuses, luminaries, measuring instru-ments and low power equipment)

nC Sparking equip-ment with hot surfaces (closed switchgear and non-igitable components, hermetically sealed equipment, tightly sealed equipment)

nR Equipment protected by a restricted breathing enclosure

nL Energy-limited equipment and electric circuits (to be integrated into EEx ic-Standard)

* Cenelec Standards in process of being transferred to IEC/EN Norms.
** Equipment, *** Systems, **** ia used in Zone 0,1 and 2, **** ib used in Zone 1 and 2, ***** ic used in Zone 2
For non-electric explosion protection please refer to the Pepperl+Fuchs Explosion Protection Manual.