

### Design and installation

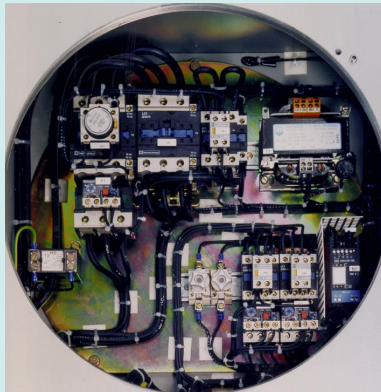
The design and installation of explosion-protected distribution and control boards having flameproof enclosures require considerable experience and careful consideration of relevant regulations in relation to the application data. Only thus are technically and economically satisfactory solutions, which combine a user-friendly design with a high degree of safety, possible. In addition to the Ex-regulations EN 50 014ff / DIN VDE 0171 and DIN VDE 0165, the general regulations, in particular DIN VDE 0100, DIN VDE 0113 and DIN VDE 0660 must all be observed in the assembly of distribution and control boards.



Control board 8220/.50 with EEx e connection chamber type 8125

### Components

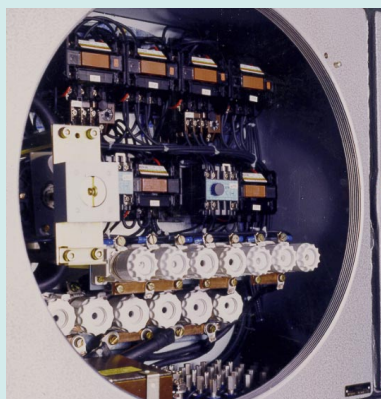
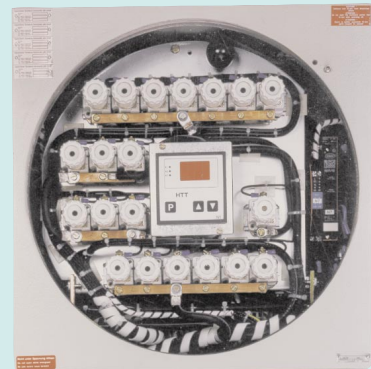
Standard industrial electrical equipment can be built into flameproof enclosures. It is, however, subject to a 'type test' by an authorised specialist or a recognised testing station. STAHL has such certificates issued by PTB (Physikalisch Technische Bundesanstalt in Braunschweig) permitting the assembly of explosion-protected systems for all standard applications.



Motor controller equipped with several motor starters, timer relay, control transformer, control fuses and current transformer for main motor current measurement.

### Motor protection devices

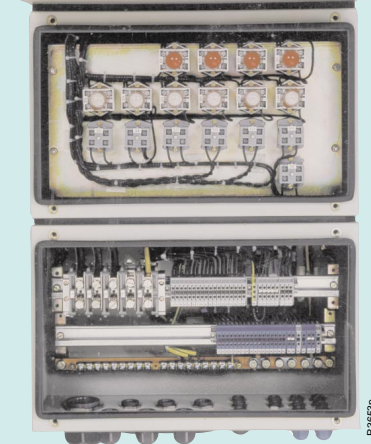
Motor protection devices which are used with EEx e „increased safety“ motors must be specially designed and certified for that purpose by a recognised testing station. This is because the validity of this type of explosion protection under conditions of motor overload is dependent on the tripping characteristics of the relay. Our certificates cover many designs and makes of PTB-approved protection relays.



Motor distribution box with contactors, motor protection relays, fuse links and a load switch with cover interlock.

### Type of protection „Intrinsic safety“

Equipment with 'intrinsically safe' circuits certified as associated electrical equipment, can also be built into flameproof enclosures and can thus be installed in hazardous areas. Further, the certificate must always accompany customer's processed-out material. Additionally, special conditions apply to the location, wiring and terminals for i.s. equipment.



EEx d starter 8220/.50 with series 8124 EEx e connection box

## Data required for the layout of control and distribution boards

Compliance with the relevant regulations and the arrangement of components in explosion-protected enclosures require specialist knowledge. We design systems to suit your requirements on the basis of the data you supply us with. Please take note of the instructions and information for layout and designs given below.

### Explosion protection

- the required minimum type of protection, selected from the parameters set out in VDE 0171 or EN 50 014;
- as appropriate, details of the hazardous atmosphere for which the equipment must be suitable

### Diagrams

- single line or wiring diagram
- schematic for control systems

### Electrical data

- operating, auxiliary and control voltages
- frequency
- short-circuit capacity at point of installation
- whether short-circuit protection integral or remote from distribution unit
- diversity factor for multiple sub-circuits
- power and current ratings of connected loads

### Components

Quantities and types of components required, e.g. contactors, switches, circuit-breakers, fuses, thermal relays, instruments, terminals etc.

#### Switches

- motor or circuit rating
- with or without padlock
- special requirements: "switches all within easy reach area of the hands (0,6 to 1,8 m)" etc.

#### Contactors

- switching duty required category AC 1 ... AC 4 or
- details of connected load, e.g. crane, fan, heating, whether inching mode, heavy start etc.

#### Thermal relay, motor c.b., motor details:

- type of motor protected, EEx e or EEx d
  - EEx e or EEx d
  - rated current  $I_e$
  - starting current  $I_A$
  - warming-up time at appropriate temperature class T1 ... T6

#### Miniature circuit breaker

- B, C or D characteristic
- details of connected load

#### Busbars (built into terminal chambers)

- flat copper busbars, rating 400/630 A
- prospective fault rating (peak symm.)
- number of bars, L1, L2, L3, N, PE

### Details of intrinsically safe circuits

For equipment with intrinsically safe circuits which are to be fitted by us at works, we require:

- Test certificate of a recognised testing authority with all information on how to retain the intrinsic safety

### Incoming/outgoing circuits

- quantity and types of cables
- number and size of conductors

### Cable entries

- quantity and location of entries (from top, bottom, side, centre)
- type of entries:
  - Cable glands
  - Bell-mouthed glands
  - Cable dividing box
  - Cable glands (for armoured cable)

### Wiring of incoming and outgoing cables

- to terminals
- direct to the barrier bushings (post type)

### Configuring aids

- ensure adequate space for separation of cores of cables with large cross-section
- ensure that the minimum degree for protection EEx e, IP 54 is maintained when installed

### Environmental conditions

- degree of protection (minimum permissible for EEx e equipment is IP 54)
- ambient temperature
- corrosive effects
- atmosphere
- indoor location
- outdoor location
- protective canopy

### Dimensions/Arrangement

- maximum height, width, depth
- separation points for ease of handling during transport
- method of transport

### Method of installation

- free-standing or
- wall-mounted