

OPERATING INSTRUCTIONS

CONTROL BOX CBE DISTRIBUTION BOX CBE SWITCH/DISTRIBUTIONS PANELS CBE



INDEX

APPLICATION.....	3
PURPOSE OF THESE INSTRUCTIONS.....	3
1 SAFETY INSTRUCTIONS.....	4
1.1 CONFORMITY TO STANDARDS.....	4
2 TECHNICAL DATA.....	6
3 MOUNTING.....	7
3.1 MECHANICAL INFORMATION.....	7
4 INSTALLATION.....	9
4.1 BACK-UP FUSE.....	9
4.2 INTERNAL WIRING.....	9
4.2.1 CABLES.....	9
4.2.2 CABLE RUNNING.....	9
4.2.3 INTRINSICALLY SAFE CIRCUITS.....	9
4.2.4 TERMINAL BLOCKS.....	10
4.2.5 EXTERNAL-CABLING.....	11
4.2.6 EARTHING-CONDUCTOR.....	11
5 COMMISSIONING.....	13
6 REPAIRS AND MAINTENANCE.....	14
7 ACCESSORIES / SPARE.....	17
8 DISPOSAL.....	17
9 EC-TYPE EXAMINATION CERTIFICATE.....	18
10 DECLARATION OF CONFORMITY.....	21

APPLICATION

Type CBE control and distribution boxes and switch and distribution panels are used, together with the equipment fitted in them, to control, switch and conduct electrical energy. These enclosures are intended for local mounting as standard.

PURPOSE OF THESE INSTRUCTIONS

Working in hazardous areas, the safety of personnel and plant depends on complying with all relevant safety regulations.

Assembly and maintenance staff working on installations therefore have a particular responsibility. They require precise knowledge of the applicable standards and regulations.

These instructions give a brief summary of the most important safety measures. They supplement the corresponding regulations which the staff responsible must study.

1 SAFETY INSTRUCTIONS

Use the enclosures only for their intended purpose.

Incorrect or impermissible use or non-compliance with these instructions invalidates our warranty provision.

No changes to the enclosures impairing their explosion protection are permitted.

Mount the enclosures only if they are clean and undamaged.

Observe the following when using the enclosures:

- national safety regulations;
- national accident prevention regulations;
- national installation regulations;
(e.g. IEC 60079-14)
- generally recognized technical regulations;
- safety guidelines in these operating instructions;
- characteristic values, rated operating conditions, temperature class and explosion protection on the rating and data plates;
- additional instruction plates on the enclosures.

Combined switch panels may only be operated with enclosures fully closed.
Any damage can invalidate the Ex-protection.

If required, we will provide a copy of the EC Type-Test Certificate with the relevant annex.

1.1 CONFORMITY TO STANDARDS

The enclosures comply with the following standards and regulations:

Directive 94/9/EC

EN 50014, EN 50017, EN 50018,

EN 50019, EN 50020, EN 50028,

EN 50281-1-1

Equivalent international standards:

IEC 60079-0 (1998)
IEC 60079-1 (2001)
IEC 60079-2 (2001)
IEC 60079-5 (1997)
IEC 60079-7 (1990)
IEC 60079-11 (1991)
IEC 60079-18 (1992)
IEC 61241-1 ()

EN 60947-1
EN 60439-1

Type CBE enclosures are suitable for use in hazardous areas, zones 1, 2, 21 and 22.

2 TECHNICAL DATA

Explosion protection

 II 2GD EEx e. II. T.

Test certificate

KEMA 02 ATEX 2273

Material

Sheet steel (galvanized and painted) or stainless sheet steel

Degree of protection to IEC/CEI 60529

max. IP 66 (dependent on fittings)



The devices fitted to type CBE enclosures differ according to customers' requirements. Please also observe the operating instructions for these.



The devices fitted determine the electrical data. Please observe the values on their type and rating plates.

Working temperature range

- 20 °C ... + 55 °C



If the ambient temperature < - 20 °C, then either special „low temperature“ cable glands must be used or the enclosure must be so mounted that the cable glands are mechanically protected.

Rated operating voltage

max. 11 kV

Connection cross-section

max. 300 mm²

Rated current

max. 1250 A



Please consult the manufacturer if operating conditions are non-standard.

3 MOUNTING

3.1 MECHANICAL INFORMATION

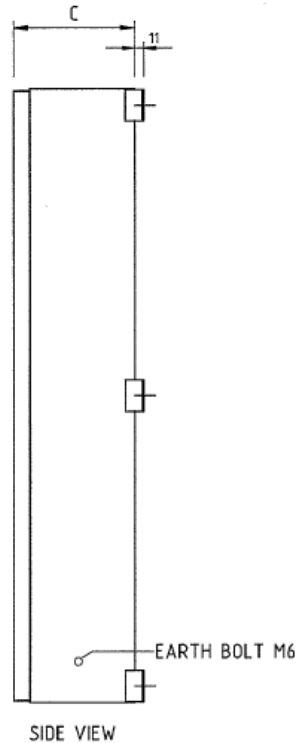
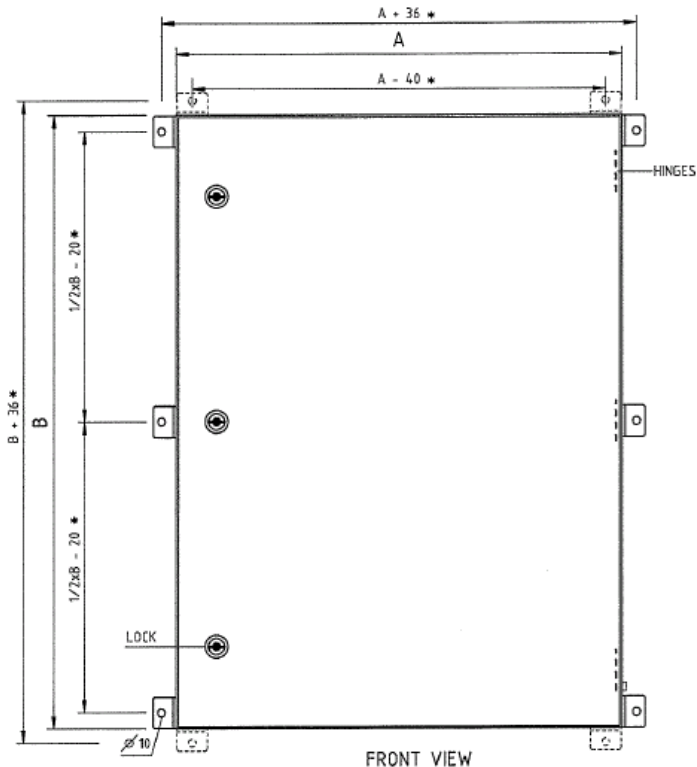
Mechanical details relating to fixing point positions, tolerances or weight of combined switch panels can be obtained from the construction drawing enclosed.

When explosion-protected electrical equipment is exposed to the weather, it is advisable to provide a protective cover or wall.

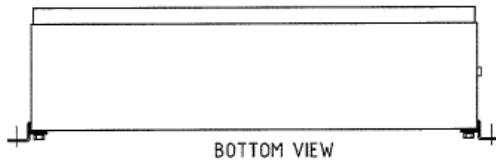


To avoid condensation forming in the metal enclosure, we recommend using a breather. It should be noted however, that this can result in a reduction in the degree of protection to IEC 60529, depending on where the breather is mounted.

Transport and storage is only permitted in the original packaging.



* ARE MOUNTING DIMENSIONS



A : MIN. 200mm MAX. 800mm
 B : MIN. 200mm MAX. 1600mm
 C : MIN. 100mm MAX. 800mm

- 1) BLIND RIVETED NUTS M6 ON REAR SIDE CAN ALSO BE USED FOR FRAME MOUNTING.
- 2) ALTERNATIVE : WELDED MOUNTING STRIPS.
- 3) LOCK DOUBLE BEARD (3mm)

1) WELDSTUDS M8x15 ON REAR SIDE CAN BE USED FOR FRAME MOUNTING

To securely fix the enclosures marked with *), use either the lugs supplied or the tapped holes in the enclosure base.

4 INSTALLATION



To avoid moisture and dirt collecting inside the combined switch panels, electrical installation must be carried out in a clean and dry environment. The enclosures may only be opened to carry out installation work and must be carefully closed again following completion of the work.

4.1 BACK-UP FUSE

The system must be protected by the back-up fuse specified. The fuse rating must be such that it blows when an appropriate system short-circuit current occurs.

4.2 INTERNAL WIRING

4.2.1 CABLES

Cables of the following types only may be used for internal wiring of the control or distribution panels:

H 05 V 2 for T6)

H 07 G for T5) - or equivalent.

Minimum cross-section 1.5 mm² copper.

4.2.2 CABLE RUNNING

The cables must be run such that the leakage and air distances necessary for EEx "e" are maintained.

To facilitate orderly cable connection, the mounting rails and components may be loosened. They must however be fully tightened again when connections have been made.

4.2.3 INTRINSICALLY SAFE CIRCUITS

Only insulated cables whose test voltage is at least AC 500 V and whose quality is at least H05 may be used for intrinsically safe circuits.

The diameter of individual conductors may not be less than 0.1 mm. This also applies to the individual wires of multi-strand cables.

With regard to the insulation and separation of terminals and cables, it should be noted that the insulation test voltage is derived from the sum of the rated operating voltages of intrinsically safe and non-intrinsically safe circuits.

In the case of „intrinsically safe against earth“ then the insulation voltage value is at least 500 V (or double the value of the intrinsically safe circuit rated operating voltage).

In the case of „intrinsically safe against non-intrinsically safe“, then the insulation voltage value is at least 1500 V (or double the rated operating voltage plus 1000 V).

Cables for EEx „i “ circuits must be run at least 8 mm away from the cables of other intrinsically safe circuits.

The only exception to this is the use of cables in which the cores of the intrinsically safe or the non-intrinsically safe circuit are surrounded by an earthed screen.

The pre-conditions for the separation between parts to be connected for intrinsically safe and non-intrinsically safe circuits are:

- a distance of 50 mm around an insulating (> 1 mm thick) or earthed metal (> 0.45 mm thick) isolating plate
or
- an isolating plate which is separated from enclosure walls by a distance < 1.5 mm.

4.2.4 TERMINAL BLOCKS

Only 1 cable may be connected per individual terminal. Links may only be made using original Ex-accessories.

Any isolating plates necessary may be fitted later.

Please take note of the terminal test certificate!

If additional protection against cable end splaying is necessary, then end-sleeves or lugs must be used. If end-sleeves are used, it is vital that these are gas-tight and fitted with the correct tool.

The cross-section of such additional devices used must match that of the cable.

4.2.5 EXTERNAL-CABLING

Connecting cables must be led through the cable glands into the connection chamber complete with their external insulation. This means that care must be taken to ensure that the external diameter of the cable matches the clamping cross-section specified for the cable gland.

To ensure that the connection chamber is fully sealed and all connections protected from strain, the hexagonal nuts of the cable glands must be fully tightened.

The cables must be run in the connection chamber such that the minimum permissible bending radius for each cross-section is not exceeded and mechanical damage to cable insulation from sharp edges or moving metal parts is avoided.

Please observe the following points:

- Connections must be made with special care;
- The conductor insulation must reach to the terminal. The conductor itself must not be damaged (nicked) when removing the insulation;
- Ensure that the maximum permissible conductor temperatures are not exceeded by suitable selection of cables and means of running them (avoid bunched cables);
- The permissible ambient temperature of the intrinsically safe equipment and devices fitted must not be exceeded.

4.2.6 EARTHING-CONDUCTOR

An earth connection must be made in all circumstances.

All blank, non-live metal parts must be included in the earthing system, whatever the operating voltage value.

Neutral conductors are considered to be live conductors in this area and must be run accordingly, i.e. insulation, cover, EEx „e“ certified terminals etc.

Inactive metal parts are insulated to EN 60439 (Part 1) and not connected to earth.



Please take the details relating to potential equalization, earthing and intrinsically safe circuits from the documentation of the relevant equipment.

The external earth conductor connection accepts a cable lug. The cable must be run close to the enclosure to avoid it loosening.

When all electrical installation work is complete, carry out the following:

- Fix touch guards;
- Adjust set values of tripping devices;
- Make visual checks for presence of loose metal parts, dirt and moisture;
- If necessary, clean and dry the connection chamber.



Please take note of the accompanying documents, such as wiring diagrams and similar.

5 COMMISSIONING



Please convince yourself before operation that the enclosure is completely without damage.

Before commissioning the enclosure, ensure that

- it has been correctly installed;
- it is not damaged;
- it contains no foreign bodies;
- the connection area is clean;
- connections have been correctly made;
- the cables have been correctly brought in;
- all screws and nuts are fully tightened;
- the cable glands are securely tightened;
- unused cable entries are sealed with plugs certified to Directive 94/9/EC, and unused holes are sealed by stopping plugs certified to Directive 94/9/EC;
- all covers and isolating plates for live parts are in position and fixed.

If the fixings of the equipment fitted referred to above are over-tightened, the degree of protection can be impaired.



We recommend the use of type 8290 stopping plugs for unused holes in the enclosure and type 8161 plugs for unused cable entries. Both are available from R.STAHL Schaltgeräte GmbH.



Any enclosure wired by the customer must be insulation tested to EN 60439-1.

6 REPAIRS AND MAINTENANCE



Do not open enclosure when supply is switched on!

Do not open when non-intrinsically safe circuits are energized!

Exception: Enclosures with intrinsically safe and non-intrinsically safe circuits with the notice „Non-intrinsically safe circuits protected by IP 30 cover“ may be opened when supplied with power.

Repairs and maintenance work on the enclosures may only be carried out by appropriately authorized and trained personnel.



Observe the relevant national regulations for your country!



If any flameproof devices fitted are damaged, absolutely no repair or maintenance work may be undertaken on them. Please replace any such device in this case.

For the purposes of maintenance work, the length of time between periodic checks shall be so set that any system faults likely to arise are found promptly. The maximum interval between checks is three years.

Note the following when establishing the interval between checks:

- the ambient conditions (installed in the open, wind, rain, sunlight, etc);
- the operating conditions (utilization of system, operator errors);
- manufacturers' instructions in technical documentation (mechanical and electrical life of switchgear);
- big changes in the whole system (e.g. change of zone allocation).

Checks should be by sight, adjacent or detailed, depending on local conditions.

If faults are found during these checks which affect the explosion protection, then the system must be taken out of service until the faults have been cleared.

The following points must be checked during maintenance:

- clamping screw holding the cable is securely seated;
- compliance with permitted temperatures (to EN 50014);
- damage to the gaskets;
- damage to the cable glands;
- state of potential equalization conductor external connection.



Please ensure that when maintaining several enclosures, the covers and enclosures are not mixed up. When maintenance is complete, the covers must be carefully closed.

Checking the enclosures externally:

- The enclosures must show no external damage such as cracks, holes, dents, material brittleness or corrosion.

Checking the flameproof joints (fitted equipment):

- All flameproof joints (flat, cylindrical, threaded) must be seen to be perfect. There must be no visible evidence of corrosion;
- The thread of threaded joints must not be damaged. At least five perfect turns of thread must be engaged;
- Flat joints must also show no damage;
- The average roughness of the joint surfaces must not exceed 6.3 um in peak-to-valley height.³



In case of doubt, these - and other values relating to flameproof joints - can be checked and compared with the standard values in EN 50018.

Rusted joints must not be cleaned with abrasives or wire brushes, but only by chemical means, e.g. non-oxidizing oils such as ESSO, VARSOL or others.

To prevent attack by corrosion, the flameproof joints of metal enclosures must be regularly treated with an acid-free grease, e.g. OKS sea-water resistant.



Corrosion-protection by painting is forbidden in principle.

Checking cable glands and pipe entries:

- The tightness of all screw joints and the condition of the seal around each one must be checked;
- Where there are direct entries into the pressurized area, check that the explosion protection is secure at the transition from screw joint seal to cable outer surface insulation.

Checking the condition of inspection glasses:

- The condition of inspection glasses must be carefully examined. In particular, care must be taken to ensure that there are no scratches on the surface likely to reduce the glass breaking strength.



Clean inspection glasses with a damp cloth.

Checking the internal condition of combined switch panels:

- The inside of the enclosures must be checked regularly. Such a check must include examining the condition of the sealing system as well as the internal surfaces.
- The general visual check should include establishing whether condensation or dirt have penetrated the inside. Both can lead to the formation of leakage paths to insulating material surfaces and thus cause short-circuits or impermissible warming within the enclosure. If dirt or condensation is found inside the pressurized area, it must be carefully removed.
- If enclosure gaskets show signs of damage, they must be changed immediately.
- The insulation must be checked for damage and leakage paths.
- The mechanical fixing of equipment fitted and the condition of electrical contacts must be examined. In particular, a check should be made for signs of impermissible warming and of contact stability.
- On completion of checking and maintenance, the enclosures must be properly closed.

Checking the condition of the equipment fitted:

- This check ensures that the lifetime (mechanical and electrical) specified by the manufacturer is not exceeded.
- If short-circuits occur in the system, the equipment and components included in the affected circuit must be changed, if it is not possible to examine the internal condition of the contact system.

7 ACCESSORIES / SPARE

When terminal blocks are fitted, care must be taken to ensure that they are of the type permitted by Directive 94/9/EC.



Use only original accessories and spare parts.

8 DISPOSAL

Observe the national standards for refuse disposal.



We are pleased to answer any special questions you may have.

Should you require the operating instructions in one of the other European Community languages, please feel free to contact Electromach.



9 EC-TYPE EXAMINATION CERTIFICATE



(1) EC-TYPE EXAMINATION CERTIFICATE

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 02ATEX2273** Issue Number: **2**

(4) Equipment: **Control / Distribution box, series CBE...**

(5) Manufacturer: **Electromach b.v., Member of the R. STAHL Technology Group**

(6) Address: **Jan Tinbergenstraat 193, 7559 SP Hengelo, The Netherlands**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 212646600-3.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014 : 1997 EN 50019 : 2000 EN 50281-1-1 : 1998

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

 **II 2 GD EEx e... II.. T6 ... T4
T 80 °C ... T 130 °C**

This certificate is issued on August 6, 2009 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

C.G. van Es
Certification Manager

Page 1/3 

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(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 02ATEX2273** Issue No. 2

(15) **Description**

Control and distribution boxes series CBE..., for fixed installation, made of stainless or sheet steel, for mounting of separately certified switchgear, control gear, measuring instruments, actuator elements, indicator lights and inspection windows.

The apparatus marking is completed by using the codes "d", "q", "m", "ja" and "jb", as applicable, depending on the built-in apparatus and components. For intrinsically safe circuits, the area for the terminals is marked, e.g. by a light blue colour.

The standard ambient temperature range is -20 °C to +40 °C. The CBE control and distribution boxes are also available with an ambient temperature range of -20 °C to +55 °C.

The temperature class T4 ... T6 of the complete unit is based on the temperature (class) of the built-in apparatus. The highest temperature class is normative.

The maximum surface temperature T 80 °C, T 95 °C or T 130 °C according to EN 50281-1-1 is related to the temperature class of the control and distribution box and based on a maximum ambient temperature of +55 °C.

Electrical data

The data are dependent on the built-in apparatus and are to be taken from the applicable certificates and manufacturers data.

Rated voltage.....	max. 11 kV
Rated current.....	max. 1250 A
Nominal conductor cross section.....	max. 300 mm ²
Degree of protection.....	IP 54 (gas) or IP 6X (dust) according to EN 60529

Installation instructions

The manual provided with the equipment shall be followed in detail to assure safe operation.

Routine tests

Each CBE control and distribution box which is ready for use, shall be subjected to routine tests according to EN 50019, clause 7.1 and/or EN 50020 clause 11.2 as applicable, using the applicable test voltage and test time, without breakdown.

(16) **Test Report**

KEMA No. 212646600-3.

(17) **Special conditions for safe use**

None.



(13) **SCHEDULE**

(14) **to EC-Type Examination Certificate KEMA 02ATEX2273** Issue No. 2


(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 212646600-3.

10 DECLARATION OF CONFORMITY



ELECTROMACH member of the R.STAHL Technology Group



EC-Declaration Of Conformity (acc. 94/9/EC / ATEX 95)

We
electromach B.V., Jan Tinbergenstraat 193, 7559 SP Hengelo
 hereby declare in our sole responsibility, that the product: **Control and Distribution Station Type CBE**
 which is the subject of this declaration, is in conformity with the following standard(s) or normative documents

Terms of the directive	Titel and/or No. and date of issue of the standard
94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres	EN 50014 (1997) EN 50017 (1998) EN 50018 (2000) EN 50019 (2000) EN 50020 (2002) EN 50028 (1987) EN 50281-1-1 (1998)
89/336/EEC: Electromagnetic compatibility	EN 60947-1 (1999) EN 60439-1 (1999)

EC-Type Examination Certificate: **KEMA 02 ATEX 2273**

Production Quality Assessment: **KEMA 01 ATEX Q3201**
 Issued by: KEMA Quality, 6812 AR Arnhem
 Identification number: 0344

Hengelo, 22-10-2009 Place and date	 <hr style="width: 100%;"/> J.F.W. Wijnen Managing Director	 <hr style="width: 100%;"/> C.L.L. Cameron Quality Manager	
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