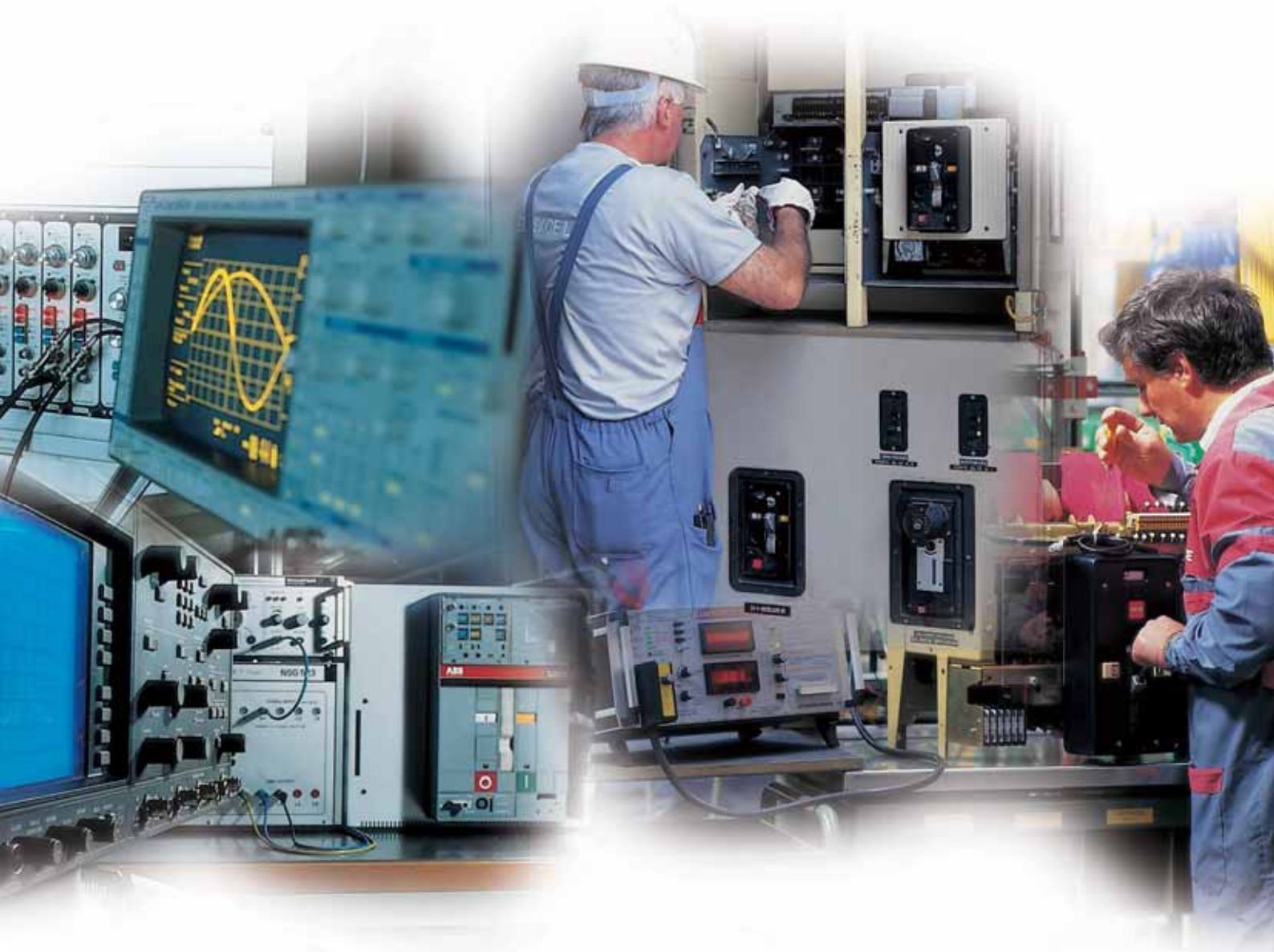


# Low voltage breakers Product Support ABB SACE

1SDC001002B0203



**ABB**

# Great **Technical Assistance** always knows where to put its hands.



Who better than ABB knows about ABB products? Apart from the time which has passed since an installation was put into service, there are various objective parameters which make it possible to establish its degree of obsolescence. An intervention for upgrading normally, becomes necessary when the materials in the installation have undergone considerable ageing, when finding spare parts becomes increasingly difficult, when the safety guaranteed for people and things no longer fully complies with the regulations in force, or when obsolete technologies are used in some of the components in the installation. Thanks to the competency present in the company, ABB SACE's Technical Assistance can offer you a tailored solution for your needs. Limiting complete replacement of the existing apparatus only to those cases where it is

absolutely necessary, ABB SACE's Technical Assistance works on apparatus which has been installed for some time, managing to restore it to conditions similar to the original ones. In many cases, it can even equip these pieces of apparatus with new technologies (such as electronic releases, dialogue units and supervision systems), which improve management and increase or modify the functions of the installation. On the other hand, when complete replacement is inevitable - or is due to the customer wanting to intervene on the functions - ABB SACE's Technical Assistance can carry this out in exceptionally short times and in such a way as to limit plant down times to a minimum. This is thanks to special replacement kits, designed entirely by ABB SACE, which allow apparatus of new concept to be inserted in the old compartments.

## ABB SACE's Technical Assistance

We know how

# Technical Assistance with red gloves. ABB SACE - an all-round service.

ABB SACE Technical Assistance offers you a service package to keep your plants fully efficient.

## **S**pare part

Maximum long-term guarantees: a stock of components which covers almost the entire range of apparatus products from the 70s to the present time. Furthermore, the capacity of designing and building local rapid intervention warehouses for the customers.



## **R**epairs

Functional recovery of each electrical and mechanical part of the circuit-breaker with completely free estimates. Moreover, following a total overhaul of the circuit-breaker, the warranty is reinstated for 24 months from re-delivery.



## **M**aintenance operation

Apart from maintenance of faulty unit, which includes any type of emergency intervention, there is a complete preventive maintenance offer, ensuring those who manage the plant considerable advantages in terms of reliability, safety and reduction of costs.



## **R**etrofitting

Replacement of old pieces of apparatus with others of more up-to-date concept thanks to the special conversion kits which allow rapid installation without structural modifications to the original compartment. Furthermore, complete "turnkey" solutions are available.



## **C**onsultancy & Global assistance

Technicians competent regarding both the products and relevant Standards, are available to verify the situation of the installations and apparatus and to propose tailored maintenance plans, divided up into several levels of completeness.



## **F**ault Prevention and thermography

Methods for forecasting and preventing faults based on the use of advanced apparatus, which guarantees extremely reliable results. Among these is the thermographic check aimed at showing up any overheating of the conductive and insulating parts of the installation.



## **T**raining

Training programmes which give the personnel in charge of managing/maintaining the installation the know-how needed to achieve operating independence. Apart from technologies, a Technical Assistance truly "at the service" of customers: a team of capable and skilled people, always ready to listen to, understand and solve problems.



Beside the customer at all times





# Spare Parts

Availability of spare parts for the air or moulded-case type of apparatus is an essential condition for correct maintenance of every installation. This becomes even more important when the installation was built some years ago and has pieces of apparatus in it which are now of phased-out production.

**ABB SACE is the only one to supply original and guaranteed spare parts**

Here again, ABB SACE can offer you maximum long-term guarantees. In fact, the company's Technical Assistance manages an efficient Spare Parts Service with components in stock which cover practically all the apparatus produced from the 70s up to today. All the spare parts are original ABB SACE pieces and are, moreover, covered by a warranty. On the basis of the apparatus installed, ABB SACE's Technical Assistance also collaborates with customers who want to create local rapid intervention warehouses tailored to the requirements of the individual plant, with

spare parts and technical consumer materials. To ensure maximum levels of assistance and to facilitate selection and ordering of the spare parts, ABB SACE uses a capillary network of agencies distributed throughout the territory, able to deal with any request you may have rapidly, with competent personnel who

you can contact directly for any needs regarding our products.



The ABB SACE catalogue also helps to simplify spare part selection and ordering: in fact, its card-type structure, with detailed monographs on the apparatus, means the code of the desired product can be found immediately.

Spare parts of phased-out production apparatus are available in stock and appear in a special catalogue. For further information, please consult the "Spare Parts Catalogue".



For emergency interventions, there is a rapid delivery service for spare parts active within 24/48 hours.



# Repairs

When normal maintenance is no longer sufficient, a complete overhaul of the electrical apparatus must be carried out in order to solve problems specifically connected with a particularly long or heavy use of the apparatus.

Overhauling, which must be carried out after very variable periods of time, according to the type of apparatus and the use it has been put to, consists of checking and reinstating the function of each electrical and mechanical part. Among other things, it also covers checking correct operation of the protections, to make sure and guarantee that the circuit-breakers continue to trip in the foreseen ways and times. Simply by sending them a

**2**  
year  
warranty

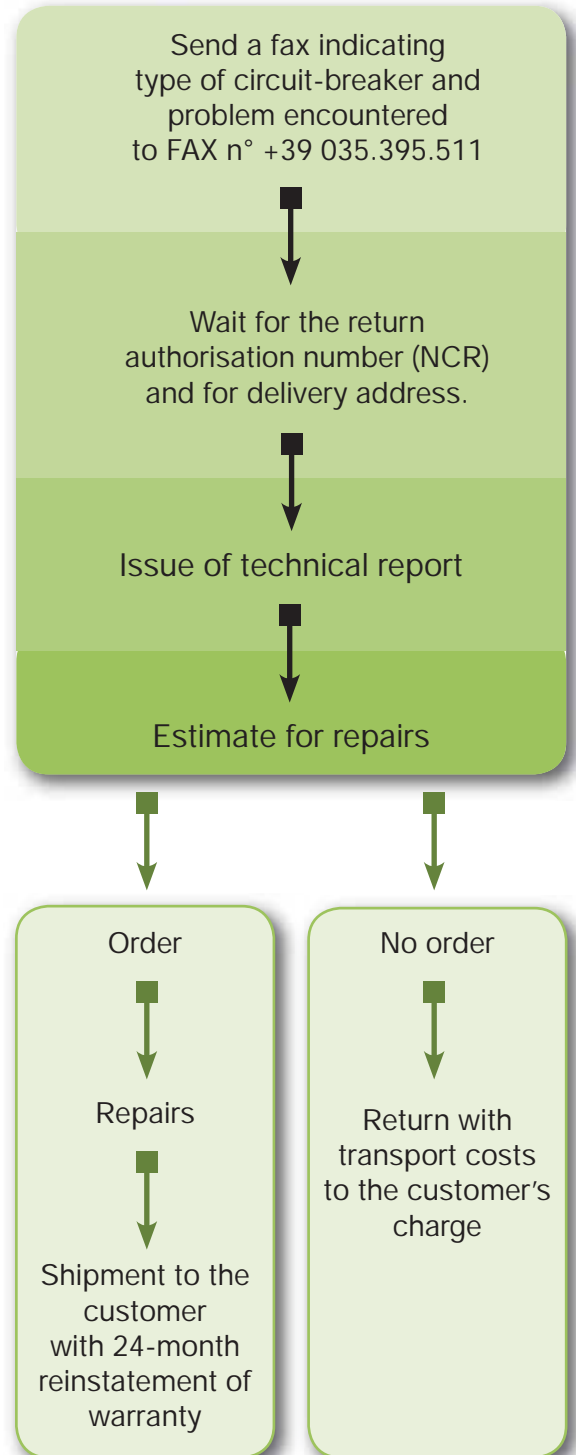
## "E-WARRANTY" SERVICE

E-warranty is the new on-line free extension service, from one to two years from delivery by ABB SACE, of the warranty covering correct operation of Emax air and Tmax and Isomax moulded-case circuit-breakers. To take advantage of this, simply enter the serial number of the product purchased and your data in the dedicated Business On Line section. The service is valid for all installers/switchgear experts, for the OEMS and for the end customers. Activation is automatic and also allows access to the use of the Business on line tools reserved for registered users: documentation, technical software, specifications, tests of the test room. Our sales network is at your disposal to make out an economic evaluation regarding extension of the warranty for periods of longer than two years.

fax indicating the type of apparatus and the problem encountered, ABB SACE's Technical Assistance is able to issue a technical report on the circuit-breaker and make out a free estimate for repairing it.

The repairs are carried out at ABB SACE's workshops, which are perfectly equipped for the purpose and use highly skilled technicians. Following a total overhaul of a piece of apparatus, the warranty is reinstated for 24 months from re-delivery.

## Instructions for the return of products:





# Maintenance operations

The only way to combat natural ageing of the installation, but still respect management requirements, is correct maintenance - which allows prevention of faults in the electrical apparatus and components installed. To prevent malfunctions and undesirable out-of-service incidents, the following are therefore fundamental:

1) a constant check on the state of efficiency of the apparatus;  
2) correct planning of maintenance interventions. As any professional in the sector knows, the most common causes of faults are:

- loss or deterioration of insulation;
- excessive wear of the contacts;
- loosening of the joint tightness;
- oxidation, corrosion of the conductive parts;
- seizure of mechanical parts;
- breakage due to deteriorated parts.

When there are accidental overvoltages or overcurrents, unexpected mechanical stresses, or adverse ambient conditions, such as pollution, dust, excessive humidity or heat, the faults

can cause even more serious damage.

To avoid these problems, suitable controls, checks and measurements must be carried out on the installation, such as:

- checking and periodical cleaning of the apparatus and electrical components;
- identification of the spare parts needed for maintenance of the apparatus according

to the need for service continuity required by the installation, by the type and amount of apparatus present in the installation and by the foreseen service conditions;

- re-integration of any spare parts used during the maintenance and/or repair operations;
- creation of a card for maintenance and repair work relative to each piece

of apparatus and updating it after each intervention.

It is also very important for the personnel in charge to be specifically competent in carrying out the operations in the best possible way. A specialised technician must, in fact:

- be well acquainted with the maintenance manuals prepared by the manufacturers of the apparatus;
- strictly follow what is indicated in them;
- be able to check the state of efficiency of the apparatus;
- know how to carry out the operations required to recover the mechanical and electrical characteristics of the apparatus in service.

It must, however, be underlined that there is a net distinction, even in terms of costs and benefits, between necessary maintenance or that following a fault, which includes all types of emergency interventions, and programmed maintenance, which, on the other hand, places priority on the combined activities of diagnosis and prevention. Only correctly programmed

maintenance guarantees considerable advantages for those who manage or use the installation:

- lower direct costs for intervention because there are no financial burdens linked to the urgent feature;
- lower indirect installation stoppage costs because normal interruptions of activity are exploited in the best way (night-time, weekends and closures).

## Routine maintenance

The aim of routine maintenance is to minimise or delay functional deterioration of the apparatus, preserving safety: carried out regularly, it allows the original installation conditions to be reinstated and to bring to light any critical areas in time.

Routine maintenance can be carried out directly by the ABB SACE Technical Assistance technicians.

The most common maintenance operations cover:

- visual checking of the state of the apparatus;
- checking mechanical and electrical functionality;







- checking and cleaning insulating parts;
- lubrication of mechanical parts;
- checking correct tightness of electrical connections;
- replacement of any faulty or worn parts.

After the on-the-spot inspections and when any necessary interventions have been carried out, the ABB SACE teams will give all the indications regarding future needs for maintenance and corrective actions to be undertaken, issuing special cards filled in during the

maintenance intervention. Among other things, these cards contain the following information:

- date of the intervention and name of the technician who carried it out;
- time intervals and checks to be carried out according to the condition the installation is in;
- state of efficiency;
- replacement of any components made during maintenance work;
- planning any future replacements.

**Multi-year programmed maintenance contracts**

Finally, should you decide to dedicate your energy to your main activity, delegating the maintenance of the electrical part to the best specialists in the sector, ABB SACE has the ideal solution for you: its multiyear programmed maintenance contracts. The interventions are carried out by our technicians on the basis of plans studied specifically for the customer. The intervals indicated are, in fact, always calculated

to minimise the need for any action outside the programme and to guarantee the minimum risk possible of unexpected installation stoppages.



# Retrofitting

Routine maintenance operations do not always completely satisfy your requirements. Problems relating to functionality, co-ordination and safety – such as the need to improve electrical and mechanical performances, to enlarge the installation or to adapt it to the standards – can, in fact, require retrofitting or revamping operations, which are needed to replace inadequate or obsolete apparatus, or addition of new pieces of apparatus to the installation. ABB SACE responds to your problems with a complete service. In fact, the Technical Assistance works alongside the customer in a consultancy capacity (identification of the inadequate or obsolete apparatus, and intervention proposals and planning) and provides operative service

(replacements/additions of apparatus, repairs). Any replacement of obsolete apparatus with ones of new design is carried out using special kits, specially studied by ABB SACE to preserve the existing switchboards and reduce the out-of-service times to a minimum. The use of the replacement kits ensure you considerable advantages:

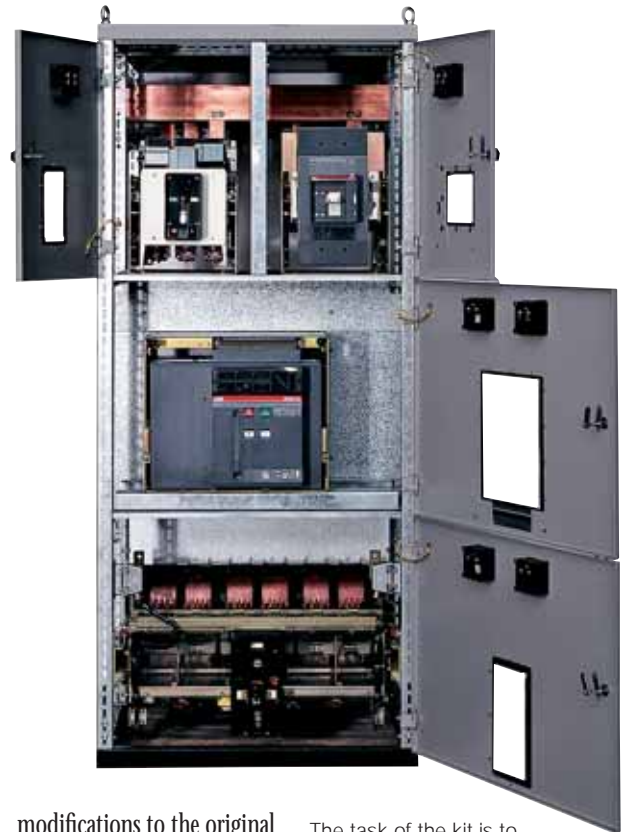
- reduced investments compared with those needed to install completely new switchboards;
- reduced assembly operation times and the possibility of spreading installation stoppages out over time, which increase the guarantee of service continuity;
- reduction in the costs for maintenance and repairs.

The Technical Assistance retrofitting offer covers the whole range of requirements

you may have, from the single component to the large and complex installation. It does, in fact, go from replacement of old circuit-breakers with others of more modern conception, to integration of new microprocessor-based protections in the circuit-breaker themselves, and to enlargement of the existing low voltage switchboards in your installation with the addition of circuit-breakers or complete cubicles.

## Replacement kits

When it is necessary to replace a model of old construction with a new piece of apparatus, ABB SACE makes special conversion kits available which ensure rapid assembly without structural



modifications to the original compartment. The kits make it possible to adapt the new apparatus to the dimensional characteristics of the existing compartments, replacing

The task of the kit is to replace the old circuit-breaker with a new compact one without modifying the switchboard. For further information, please consult the "Spare Parts Catalogue".

**For moulded-case apparatus, the solution proposed foresees mounting the new circuit-breakers on the fixed part of the obsolete models.**

all the obsolete models with products of the latest generation. They come complete with:

- circuit-breaker of new conception;
- busbars for adaptation made of silver-plated copper;
- supports, crosspieces, supporting insulators;
- metal segregations, separating partitions;

- screws and bolts;
- auxiliary connections of the electrical applications (gear motor, opening, closing and undervoltage releases);
- standard wiring diagram of the new circuit-breaker;
- drilling templates;
- assembly instructions.







# Consultancy and Global Assistance

Each installation has a story of its own. Dimensions, characteristics, use, years of service – the variations are infinite and therefore the offer made by ABB SACE Technical Assistance is varied, complete and divided up, too.

The basis of any intervention lies in knowledge of the installation conditions. ABB SACE places at your disposal a technical promotional service which carries out on-the-spot inspections which are completely free of charge.

Expert and competent technicians, both regarding systems, products and standards, are always able to advise and help you to define the following:

- the state of wear of the components;

- the list of faulty parts or those at highest risk;
- the state of the installations and apparatus in relation to the standards and Laws in force and, above all, in relation to identifying any possible forewarning signs of faults to be kept under control.

Moreover, our technicians are ready to propose maintenance programmes made to measure for your installations, divided up into several levels of completeness, from which you can choose the one most suited to your requirements. This is, of course, with our help.

The ABB SACE Technical Assistance team is always at the customer's disposal, and is capable of taking on any role required, from specialist consultancy to carrying



The on-the-spot inspections with analysis of each single piece of apparatus allows "a photograph" to be taken of the state of installation operation.

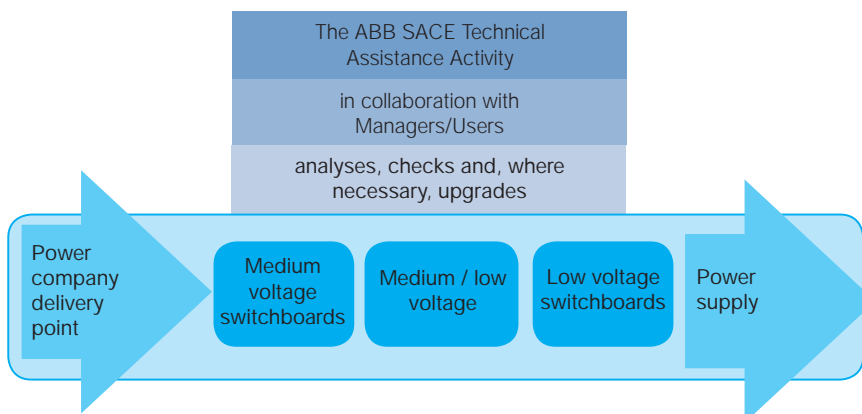
out the work directly and completely.

The Service team has a wide field of action and includes a wide range of services

for your installations and products, all kept under strict control.

To solve all your retrofitting, revamping or special maintenance needs, ABB SACE has a highly qualified internal structure able to make complete supplies with the "turnkey" formula. The Technical Assistance technicians work alongside the customer during the selection and initial estimate stage, making an accurate technical-economical

analysis of the solution. Afterward, they develop the order as far as the assembly operations and putting into service on site, constructing state-of-the-art installations.





# Fault Prevention and Thermography

The techniques for forecasting and therefore preventing faults in electrical apparatus have been characterised by rapid and significant developments over the last few years. When used constantly, diagnosis nowadays allows maintenance to be programmed in a targeted and economically advantageous manner, anticipating or delaying the interventions according to the management priority of the installation. The methods used by ABB SACE Technical Assistance are also based on advanced equipment which guarantees extremely reliable results. Some controls, measurements and tests can be carried out directly on your installation, others in

the laboratory. Thermography is one of the latest control techniques which ABB SACE's Technical Assistance makes available to ensure correct operation of the electrical installation.

The advantages of the thermographic control are:

- increase in the customer's safety index;
- reduction in unprogrammed plant down times with consequent reduction in the costs due to loss of production;
- reduction in faults and fire prevention;
- control carried out under normal operating conditions, without any physical contact;
- improvement of the



maintenance/repair programmes and of the relative associated costs;

- targeted purchase of spare parts;
- comparison of the time measurements.

The thermographic measurement, carried out using a portable FLAX CAM IMPROTEC infrared

ray thermograph, shows up any overheating of the conductive parts and of the insulating parts present during service. This must be carried out without any protection (including nets and Plexiglas sheets) being put between the measuring instrument and the item being examined.

During the initial inspections, the thermographic survey will only show up the class of defect of the materials framed, whereas by carrying out inspections repeated over time, it will be possible to signal a loss of performance or early ageing of the component. The following post-processing documentation will be issued on completion of the measurements:

- certified report of anomalies found and parts to be monitored;
- confirmation on optical support complete with thermal images and photographs.



Apart from its vast experience, with this service ABB SACE places at your disposal its own advanced testing and diagnostic structures, as well as instruments designed specifically to determine the possibility of a fault in time



# Training



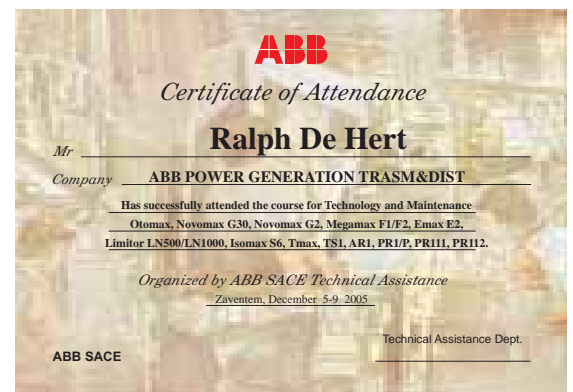
ABB SACE organises training programmes – which can be either general or personalized – with the aim of providing the personnel in charge of management/maintenance with the necessary know-how to achieve an excellent level of operating independence. In fact, in certain situations, the manager of an electrical installation can find it convenient to have certain maintenance capabilities available within his own structure. The courses mainly cover:

- operating the apparatus;

- maintenance principles;
- repairs for small faults.

On completion of the training programme, the people trained are able to carry out routine maintenance on their own. The courses are held at the ABB SACE Training Centers or directly on your installations (with practical sessions on the installed apparatus). If you want, the practical exercises can even be carried out with specialised ABB SACE personnel working alongside your technicians during routine maintenance operations carried out at

your installation. Once the installation has been updated, the maintenance technicians must be trained. ABB SACE undertakes to train your teams to deal with specific maintenance and repair operations. On the subject of maintenance, ABB SACE offers two dedicated courses. These are detailed on the following pages.







# Maintenance Course

Maintenance of the installations and carrying out electrical work in safety

## Recipients

- Personnel in charge of maintenance
- Personnel in charge of safety
- Installers
- Maintenance personnel

## Objectives

- Defining the rules for carrying out work in safety where the operator may be exposed to electric hazards (IEC/CEI 50110-1 Standard)
- Identifying the skills

required of operators (IEC/CEI 11-27/1 Standard)

- Examining the main indications given in the IEC/CEI 0-10 guide on the subject of maintenance of electrical installations, with particular reference to different types of maintenance and contracts.

## Subjects

- Legislation on safety of

electrical work

- The figures, roles and responsibilities of the people carrying out electrical work
- Selection and use of the equipment and of the DPI
- Procedures for carrying out electrical work in safety
  - De-energised electrical works
  - Electrical work in the vicinity of live parts
  - Energised electrical work
- The legal obligation of plant maintenance
- Indications regarding Standards:

IEC/CEI 0-10 guide

- Aims and limits of maintenance
- Types of maintenance
- Intervals for maintenance interventions
- Selection criteria and methods of intervention
- Direct or indirect (assignment to third parties) maintenance
- Maintenance planning criteria
- The maintenance contract
- ABB SACE's Technical Assistance





# SACE Maintenance Course

Practical installation and maintenance exercises with ABB SACE moulded-case and air type circuit-breakers

## Recipients

- Personnel in charge of maintenance

## Objectives

- Illustrating in detail all the operations to be carried out to set up a correct maintenance programme
- Providing the practical knowledge for control and maintenance operations on ABB SACE moulded-case and air

type circuit-breakers

## Subjects

- The range of ABB SACE moulded-case and air circuit-breakers
  - Electrical characteristics and performances
  - Construction and functional characteristics
  - Versions and accessories
  - Spare parts

- Installation, putting into service and operating instructions
- Control and maintenance operations
  - Preventive operations
  - Operations prior to maintenance
  - Operations during service
  - Intervals for carrying out maintenance
- Measures to be taken in the case of any service anomalies
- Practical demonstrations
- Assembly and dismantling of the main components of moulded-case and air type circuit-breakers





**Emergency Line 24 hours a day  
7 days a week**

**Tel. +39 335 397276**

**All the numbers of ABB SACE LV circuit-breaker  
Technical Assistance**

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Tel. +39 035 395.376 - 405 - 515  
Fax +39 035 395.511

Technical intervention area  
Tel. +39 035 395.512  
Fax. +39 035 395.511







Due to possible developments of standards as well as of materials, the characteristics and dimensions specified in the present catalogue may only be considered binding after confirmation by ABB SACE.

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**ABB SACE S.p.A.**

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