DIP 5000

Comprehensive universal teleprotection for power networks

Telecommunication networks and protection devices have undergone significant change in recent years, partly due to the massive deployment of optical fibre.

With that change has come an increase in complexity, which can compromise the level of control exercised over critical information such as protection signals from power utilities. It also becomes harder to identify responsibilities in the event of failure.

The solution is to specify maintenance-free equipment that is easy to commission and offers a high level of flexibility for installation within the substation.

To address this need, AREVA T&D has developed solutions that integrate with our new teleprotection DIP 5000, enabling supervision of the telecom network and enhancing the security of the protection system.

THE TASK OF TELEPROTECTION

Teleprotection is designed to transfer protection commands coming, in most cases, from distance protection relay contacts to one remote location through a communication medium. Communication between teleprotection equipment is a point-to-point communication.

Customer Benefits

- Reduced cost of ownership
- Easy to update
- Reduced cost of ownership
- Extensive monitoring features
- Easy to manage

THREE KEY CONSIDERATIONS FOR TELEPROTECTION:

>> **Transfer time:** When a fault occurs, the damage sustained by HV equipment is determined by the fault clearance time. The transfer time of the teleprotection equipment - i.e. the time between receiving a protection signal and initiating remedial action at the other end - must be kept to a minimum to minimize the damage incurred.

>> **Reliability/dependability:** Electromagnetic interference in a high voltage environment can corrupt communication signals. Therefore, it is vital to maintain the integrity of teleprotection signals and minimise the risk of losing a signal. This value is known as a Probability of missing command (P_{mc}).

>> **Security:** Teleprotection systems are frequently used to protect 'strategic' lines, where a shut-down would have serious consequences for end users. Consequently, the system must ensure that any command to disconnect an HV line is a true command and not caused by noise from the HV environment. This value is expressed as a Probability of unwanted command (P_{uc}).

AREVA T&D

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UNRIVALLED SPEED, SECURITY AND DEPENDABILITY

Using the latest digital signalling processing technology and advanced coding algorithm, the DIP 5000, offers the highest level of security (Probability of Unwanted Commands) and dependability (Probability of Missing Commands) for all protection schemes. These include direct tripping, permissive and blocking, with transmission speeds far better than international criteria

EXTENDED UPGRADE FACILITY

The DIP 5000 offers simple upgrades of both hardware and firmware. All new firmware releases from AREVA T&D can be downloaded directly to a DIP 5000 from a laptop computer with no need to return the board to the factory.

MINIMIZING COMMISSIONING AND MAINTENANCE COSTS

Areva T&D's extensive experience of telecommunication networks shows that the main costs relate to commissioning. DIP 5000 teleprotection has been designed to minimize commissioning and reduce overall cost of ownership.

LOWER COMMISSIONING COSTS

DIP 5000 includes embedded, user-friendly commissioning tools running on Windows operating systems.

All configuration can be performed off line on a PC and then downloaded to the DIP 5000 equipment on site - either via a direct connection or via a remote network connection.

DIP 5000's flexible interface provides tools for testing not only the equipment but also the communication channel, using real time BER indication. This feature provides fast verification of the communication link without the need for costly testing tools.
In addition, the software enables forcing command and loop test.

All of these actions are password protected so that only experienced commissioning engineers can access the system. Inclusion of warning messages further decreases the risk of mistakes.

MONITORING FACILITIES

Using its enhanced digital technology, DIP 5000 performs continuous testing of the equipment and the communication link. Alarms can be set to monitor parameters such as Bit Error Rate, transfer time or non-operation of fault clearance schemes. Any alarm will activate contacts for remote indication to an RTU, a Sequence of Event recorder or the possibility to send the information to a Monitoring system like the AREVA TMS 5000 by using a TCP/IP protocol converter.

The DIP 5000 also provides alarm and event recorder files with a 1ms accuracy. These files can be downloaded to a computer from local or remote equipment without interrupting operation of the equipment

MANAGEMENT FACILITIES

Since teleprotection are a key element in a protection scheme, AREVA T&D has developed the TMS 5000, a software package that allow the customer to monitor remotely the status of a DIP 5000 network on a real time basis The TMS 5000 offers the possibility to customer to represent a mapping of the teleprotection links. Any alarm occurring on a link is displayed on the screen and the customer can access by Double clicking to the equipment event and alarm list to check the status. Possibility of integration under SNMP V3 management system

TMS 5000

To SNMP management system

Intranet or internet network

Areva Teleprotection Management Network TMS 5000
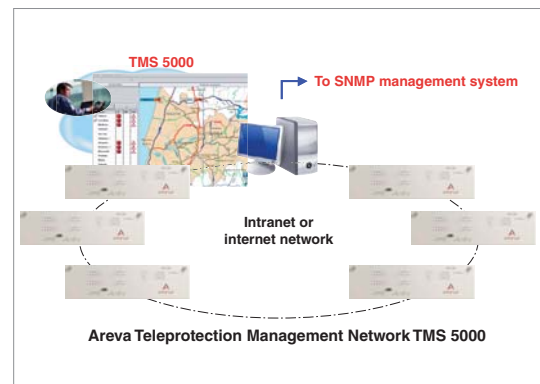
ADAPTABILITY TO CUSTOMER REQUIREMENTS

DIP 5000 includes a wide range of tools and I/O boards to cope with the specific requirements of each project. These include the ability to set temporisation on command input/output and alarm contacts as well as the capacity to perform logical combinations of inputs.

Comprehensive transmission capabilities from efficient, secure technology

GENERAL FEATURES

- Modular hardware with modules that can be exchanged by the customer.
- 2, 4 or 8 independent commands with solid state output - configurable as blocking, permissive or direct tripping.
- Large number of communication interfaces, V11, G703 64 kbps, E1 and optical interface for 1310, 1550 nm or IEEE C37.94 with backup possibility from optical to digital communication.
- Two analogue mode available single tone and dual tone coded.
  - Up to 4 independent commands, single tone on 4 kHz bandwidth.
  - Up to 4 independent commands, dual tone coded mode on 2 kHz bandwidth.
  - Up to 8 independent commands, dual tone coded mode on 4 kHz bandwidth with two units.
- Dual tone coded mode is available with standard and reinforced application
- Transfer time starting from 1mS in digital mode
- Less thant 10mS transfert time for dual tone coded mode in standard application
- Wide range of input voltage level from 24 to 250 VDC
- Dual power supply capability with the same or different voltage
- User friendly interface
- 2 x RS 232 ports for connection to a PC or dial up modem
- IP and LAN connection with optional RS232/LAN converter
- Recording more than 1700 dated events and more than 1700 alarm with 1ms time accuracy
- IRIG B (optional) for time synchronisation

COMMUNICATION INTERFACES

- IEEE C37.94 optical interface for direct link to DXC5000 or any other multiplexer equiped with this interface
- G703.1 64 kbit/s :
- E1 : 2 Mbit/s
- V11 / RS 422 / X24 from 32 to 256 Kbit/s Compatible V35 / V36
- Optical interface at 256 Kbit/s 1310 nm up to 60 km range and 1550 nm up to 110 km range
- Analogue interface 4 wire 600 ohms or high impedance programmable within 300 to 3780 Hz

INPUT / OUTPUT BOARDS

- 2, 4 or 8 commands with digital interface 2 or 4 commands with analogue interface
- 1 copy normally open contact per input and output (up to 290 VDC, 120W)
- Command acquisition by voltage (24 to 250 VDC) with optoelectronic decoupling
- Command restitution by normally open contact (up to 290 VDC, 120W, 2A)
- Security and dependability in all schemes exceeding IEC 60834-1 requirement for the worst protection scheme.

OPERATING CONDITION

- **Nominal p**ower supply voltage 24 to 250 VDC (operating from 18 to 300 VDC)
- **Nominal o**perating temperature - 10°C / +55°C as per IEC 60068-2-1 and 60068-2-2. (optional range -40°C / +70°C)
- Max relative humidity 95% at 40°C as per IEC 60068-2-3
- **Nominal s**torage Temperature - 25°C < T < +70°C (optional range -40°C / +85°C)

APPLICABLE STANDARD

> **IEC and European recommendations**

- IEC 60834-1
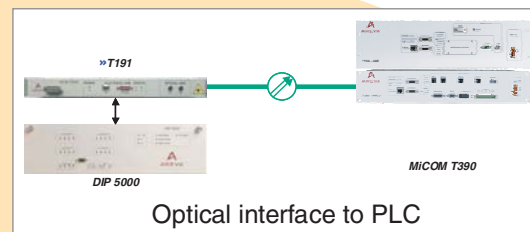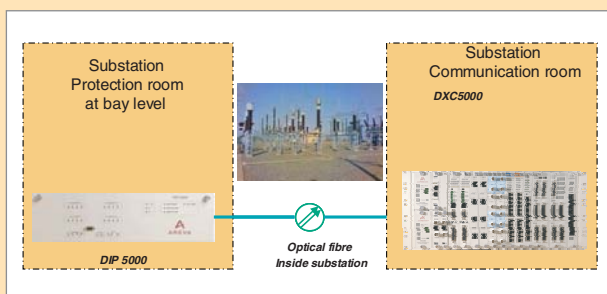- IEC 61000-6-5
- EN 60950
- EN 55011 / EN 55022
- EN 61000-6-2

> **IEEE standard (option)**

- C37.90
- C37.90.1
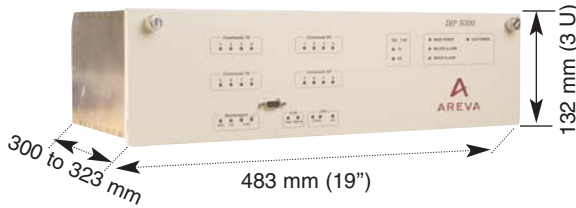- C37.90.2
- C37.90.3
- C37.1
- C37.94

The equipment is CE compliant

ACCESSORIES

- Electrical V11 to optical converter OCM 5000
- Analogue to optical converter T191 for disturbance free link to MiCOM T390 power line carrier
- IP / LAN converter to access DIP 5000 through a TCP/IP protocol
- TMS 5000, Teleprotection management system to monitor a DIP 5000 network (need IP / LAN converter)

Substation Protection room at bay level — Substation Communication room DXC5000 — Optical fibre Inside substation — DIP 5000

»T191 — DIP 5000 — MiCOM T390

Optical interface to PLC

MECHANICAL CHARACTERISTICS

132 mm (3 U)

483 mm (19")

300 to 323 mm

- Weight : 7,6 kg

UNRIVALLED EXPERTISE

- With its fifth generation of Teleprotection, AREVA T&D brings unrivalled expertise to the teleprotection market.
- DIP 5000 brings an outstanding level of reliability and quality of service to teleprotection, ensuring fast, simple and reliable installation and configuration.

WORLD CLASS EXPERTISE

- DIP 5000 brings an outstanding level of reliability and quality of service to access networks, ensuring fast, simple and reliable installation and configuration.
- Encompassing the products and service for global solutions, AREVA T&D's Telecom offering gives complete peace of mind.
- We have 50 years' experience of designing, manufacturing and supplying a complete range of telecommunication equipment. Anywhere in the world, our experts can provide the solution for all of your telecom requirements, enabling you to focus on your core business.

DIP 5000 AT A GLANCE

>> Reduced cost of ownership

>> Easy to install and commission

>> Extensive monitoring features

>> Highly modular

>> Comprehensive range of software and Hardware

>> Wide range of communication interfaces with 1+1 communication capacity

>> Secure optical link to communication equipment either in analogue (PLC) or digital (MUX).

>> Teleprotection Monitoring by using TMS 5000

>> Extended guarantee

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