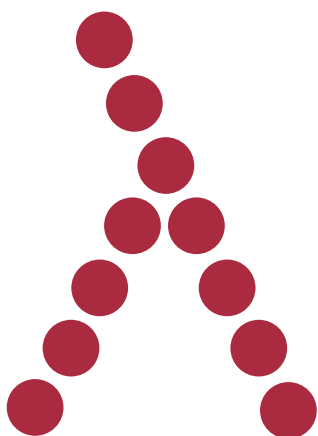# OPL-1

Analog Power-Line Carrier Terminal

High reliability and robustness

Small-sized design

A single 5 s.u. shelf for 20 and 40 W

IRIG-B port for GPS time synchronization

DIMAT ZIV

OPL-1

Key features:

- Small-sized design

- A single 5 s.u. shelf

- 20 W and 40 W PEP

- Single–channel and, optionally, twin–channel

- IRIG–B port for GPS time synchronization

- Fully programmable (full coverage of the transmission frequency range thanks to the set of capacitors)

- Internal channel for end–to–end supervision

- Local management system based on a Web interface

- Options: speech, AF transit and asynchronous programmable modem

- Optional external analog teleprotection unit

- Optional external connection by means of cabinet–mounting terminal blocks

Description

DIMAT OPL-1 technology

DIMAT's wide experience in the design of digital and analog Power-Line Carrier terminals, together with the use of the most advanced technology, has produced the 5 s.u. small-sized and functional OPL-1 analog Power-Line Carrier terminal, which provides the electrical power utilities with a reliable, cost effective and robust communications system for transmitting different types of information, mainly speech and data.

The technology used in the design of the OPL-1 is completely digital and has all the innovative aspects of its predecessor OPC–2, such as the completely digital signal modulation procedure.

Product overview

The OPL-1 analog Power-Line Carrier terminal is an small-sized equipment where all the basic operating elements are contained in only four main modules, these elements being: a power supply (FAPL), a processing and management unit with an input and output interface (PIPL), a high-frequency amplifier (AMPL), and the line filters and a high-frequency hybrid (AFPL).

The basic terminal has one standard 4 kHz channel with an output power (PEP), measured at the coaxial-connector output, of 20 W (model OPL–120) or 40 W (model OPL–140).

The effective band of the channel, ranges from 300 Hz to 3850 Hz, can be used exclusively for data transmission (D-type channel) or, if the equipment contains an optional speech module, for speech-plus transmission (T-type channel).

The twin-channel version of the OPL-1 terminal can be supplied on demand, the use of both channels having to be specified, that is to say, two channels exclusively for

data (version DD), a data channel and a speech-plus channel (version TD) or two speech-plus channels (version TT).

Both types, single-channel and twin-channel, allow the transmission of teleprotection commands proceeding from an external analog teleprotection unit.

As far as optional equipment is concerned, apart from the speech module and the external analog teleprotection unit, an asynchronous programmable narrowband modem can be added to the OPL-1 terminal. Furthermore, an AF transit option can be configured from the Management System.

The elements necessary for external connection are included in the equipment itself. However, if one wishes the external connection to be carried out through cabinet–mounting terminal blocks, they can be supplied upon request together with the necessary cables.

Management system

The OPL-1 terminal has a local management system based on a Web interface.

OPL-1 terminals can be fully programmed, monitored and managed from a PC connected to the terminal via USB. The user interface is based on Web technology and the required PC software is supplied with the terminals.

An internal data channel allows the remote terminal to be programmed and supervised from the terminal connected to the management system.

The chronological register of alarms and events in the OPL-1 terminal is carried out based on its internal real-time clock, being possible to synchronize it with the GPS system.
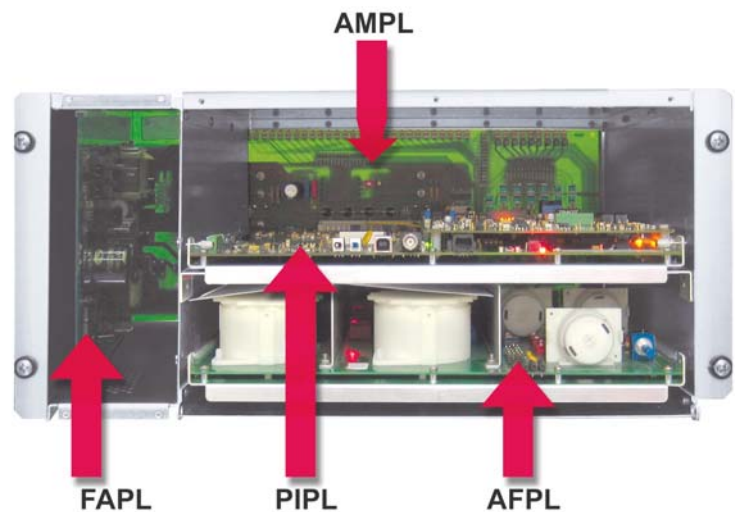
Technical specifications

General characteristics

Modulation	Single side-band (SSB) with suppressed carrier
Number of channels	1 and, optionally, 2
Basic bandwidth	4 kHz per channel
Synchronization	Synchronous or Plesiochronous (non-synchronism)
Pilot tone	150 Hz (virtual frequency), with FSK modulation for internal channel and telephone signalling. AGC control, S/N ratio estimation and link synchronization

High-frequency characteristics

Frequency range	From 40 kHz to 500 kHz
Nominal carrier frequency	Programmable in 1 Hz steps
Transmission and reception bands	Erect or inverted, adjacent or non-adjacent
Nominal impedance	Selectable among 50, 75, 125 and 140-150 Ω
Return loss	10 dB, in accordance with IEC 495, cls. 5.2.2
Tapping loss	In accordance with IEC 495, figure 5
External teleprotection input	Any whole-band input can be used for the transmission of a teleprotection signal, and can be programmed with a modulation percentage of between 10% and 100% in the command signal
Boosting control	By means of optocoupler. Input voltage between 30V and 150V

Transmitter

PEP	20 W and 40 W
Spurious emission	In accordance with IEC 495 cls. 5.2.4 and figures 7 and A.2

Receiver

Sensitivity	-30 dBm minimum pilot level for AGC threshold
Selectivity	Higher than 65 dB at 300 Hz, and higher than 75 dB starting from 4 kHz; in accordance with IEC 495 cls. 5.3.1.5

Automatic Gain Control

Dynamics	Better than 55 dB with 10% pilot modulation
Efficiency	±20dB input level variations result in variations of less than ±0.2 dB at the output

Audio-frequency characteristics

Available band	From 300 Hz to 3850 Hz
Interfaces	Two 4-wire whole-band audio interfaces per channel
Nominal impedance	600 Ω, balanced
Return loss	Better than 14 dB
Nominal level	Programmable between -20 dBm and +6 dBm

Optional speech module

Speech cut-off frequency	Programmable between 2000 Hz and 3400 Hz (5 Hz steps)
Interfaces	4-wire and 2-wire exchange-side, and 2-wire subscriber-side
Nominal impedance	600 Ω, balanced
Return loss	Better than 14 dB
Nominal level	Programmable between -20 dBm and +8dBm

AF transit option

	Four programmable band-pass filters. Other filters upon request

Other optional equipment that can be added

	Integrated asynchronous programmable modem
	External analog teleprotection unit

Alarms

	3 relays that can be programmed by the user. All of them with one voltage–free changeover contact
	Contact rating: 1 A / 250 V_{AC} / 0.4 A / 220 V_{DC}

Power supply

	48 V_{DC} ±20% Others on request

Maximum consumption

	OPL–120: 110 W (single channel) and 90 W (twin channel)
	OPL–140: 130 W (single channel) and 100 W (twin channel)

Dimensions

	482 x 222 x 370 mm (one 19"/5 s.u. shelf)

Weight

	12.5 kg (without cables and terminal block)

Operating conditions

Temperature and humidity	From -5ºC to +45ºC and relative humidity not greater than 95%, in accordance with IEC 721-3-3 class 3K5 (climatogram 3K5)
Maximum temperature	+55ºC for a period not greater than 24 hours (IEC 495 cls.3.1)

Management computer

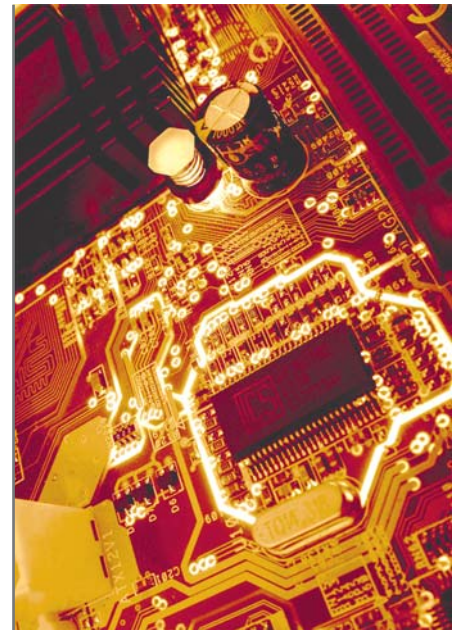|	
Type	Compatible personal computer (PC) with Pentium III 350 MHz processor or higher
Operating system	Microsoft Windows 2000 or Microsoft Windows XP
Web browser	Microsoft Internet Explorer v 5.5 or higher
Java virtual machine	Sun Microsystems version 1.4.2_03 or higher

Local management (Web interface)
USB

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