



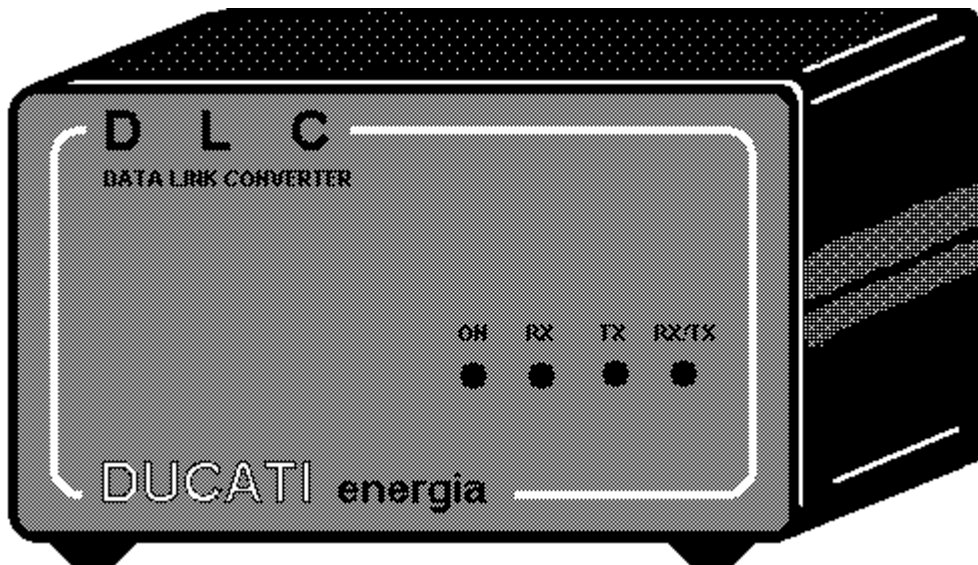
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DATA LINK CONVERTER RS 232 / RS 485

USER'S MANUAL



0798

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1. INTRODUCTION

DUCATI energia s.p.a., pursuing a program of increasing participation in the energy conservation sector, has developed a converter of RS 232 / RS 485 signals which can be used both with MACH 30 (three-phase), MACH 20 (single-phase) and MACHSMART analyzers at the panel board and as a signal converter to insert in a generic system between the RS 232 serial port of a Personal Computer and the RS 485 serial port of an instrument (oscilloscope, comparison bridge, gauge, etc.).

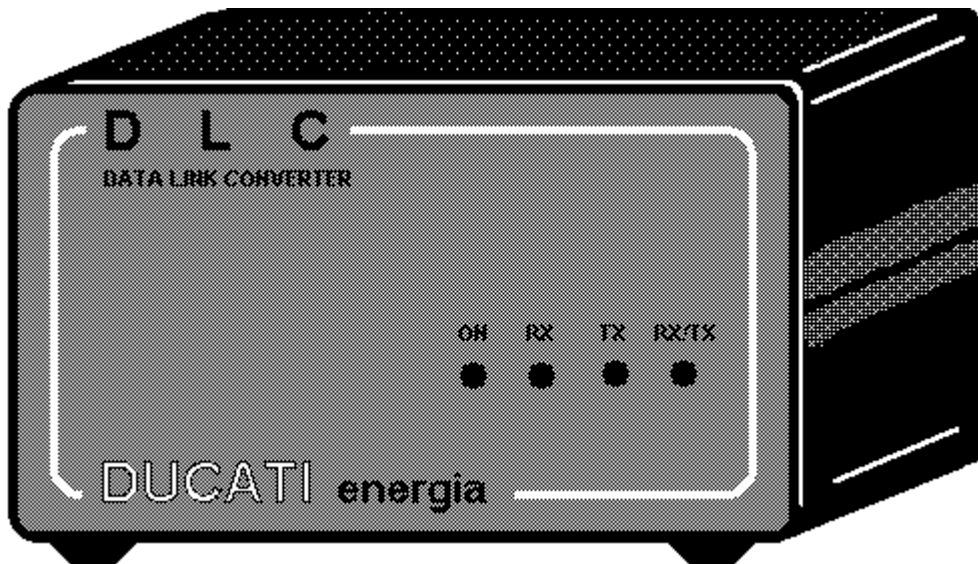
The RS 485 serial line that links the Personal Computer with the MACH or with a generic device can be up to 1500 meters in length and must consist of a Belden 9841 type shielded two-wire cable.

The main characteristics of the converter are the following:

- complete transparency of software for the user;
- opto-insulated and two-way flow of data;
- baud rate standard of 9600 bps;
- suppression of transient disturbances from the RS 485 serial line to protect the converter itself and the connected PC;
- coverage up to about 1500 meters.

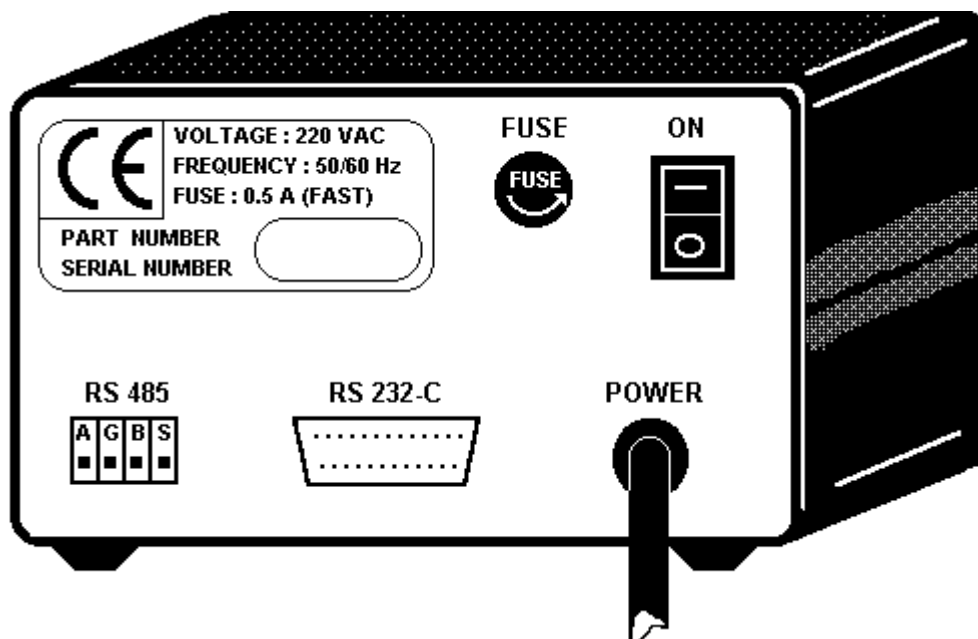
2. DESCRIPTION OF THE CONVERTER

The DLC signal converter can easily be placed near the computer destined to collect data from the network of analyzers. It is housed in a sturdy black ABS container with a double half-shell as illustrated in the figure below:



Four LEDs are visible on the front panel; the one below “ON” lights when the instrument receives a 230 V power supply, while the other three associated with the abbreviations “RX”, “TX” and “RX/TX” flash when there is the flow of data in transmission or reception.

The figure below illustrates the rear panel of the converter:



In the upper right area of the rear panel is the switch through which the 230 Volt (+5%; -15%) power supply passes to the converter.

To the left of the switch is the fuse compartment which houses a “fast” 0.5 A fuse with dimensions of 5 mm x 20 mm. The fuse compartment can be opened by unscrewing the cover in a counterclockwise direction.

In the lower left-hand corner is the terminal block with four screws relative to the RS 485 serial port.

Terminals A and B are for connecting the two-wire pair of the Belden 9841 type shielded cable which is then connected to the corresponding terminals of a MACH or other instrument equipped with an RS 485 serial port.

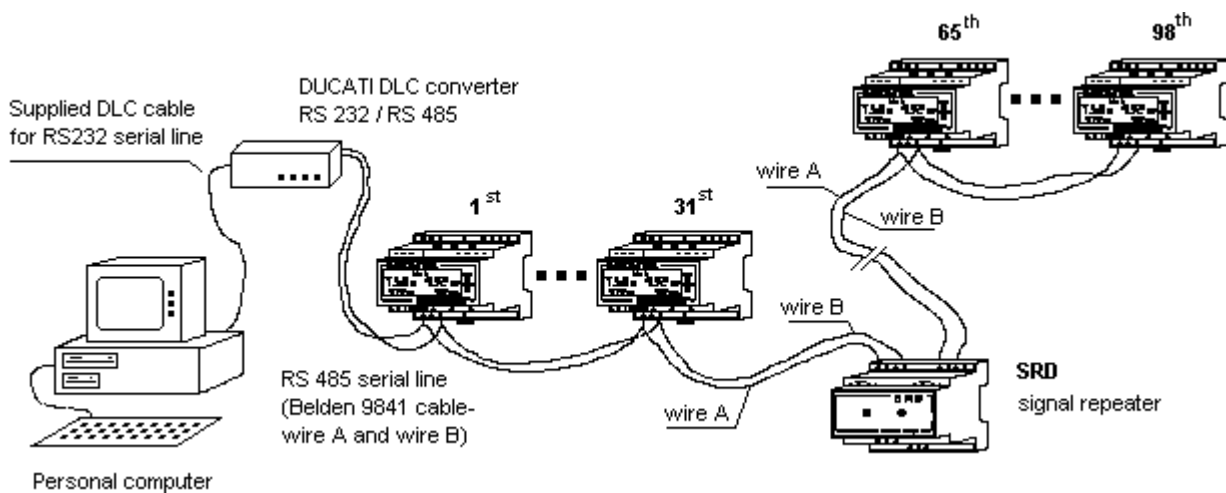
Terminal G is connected to the mass of the converter by means of a 100 ohm resistor and can be used as a voltage equalizer to be connected to the corresponding terminals of the analyzers or instruments set on very long networks (up to 1500 meters max.). The third wire or first shield of the Belden 9841 cable can be connected to this terminal.

Terminal S is connected to the mass of the converter. To this, and only to this, should the fourth wire (“copper braid”) or second external shield of the Belden 9841 cable be connected.

To the right of the RS 485 terminal block is the RS232 serial line connector to which the supplied serial cable of the converter itself is connected to then go to one of the serial ports of the Personal Computer.

3. APPLICATION IN NETWORKS OF ANALYZERS

CONSISTING OF MACH30, MACH20 and MACHSMART UNITS



The preceding figure illustrates a network of 98 analyzers connected to a serial port (usually COM1) of a personal computer.

Note that such a configuration can be reproduced for each serial port (COM2, COM3, COM4) with which the computer is equipped and which is not shared with other serial devices.

The elements that constitute the network are the following:

- a personal computer (to be installed by the user) with minimum characteristics that include a 80486 processor, a RAM memory of 16 Mbytes and an MS-DOS 6.3 operating system with Windows 3.xx or Windows '95;
- a MACHNET kit (available from **DUCATI energia**) including several 3.5" diskettes which contain the installation program as well as those which govern the network, and a hardware key to be installed by the user on the parallel port, where the printer is usually connected;

- an RS 232/ RS 485 signal converter, called DLC (available from **DUCATI energia**);
- an “RS 232 serial” cable (available from **DUCATI energia** together with the above-mentioned DLC converter) for connecting the DLC to the serial port of the personal computer;
- a shielded two-wire Belden 9841 cable (to be installed by the user) which includes wire A, illustrated in the preceding figure, connected to clamp A of the serial port of the MACHSMART(and, the same for wire B);
- one or more SRD signal repeaters (available from **DUCATI energia** with code number 468 001 021) to be inserted on the network after each group of 31 MACHSMART analyzers;
- one or more MACH30. MACH20 or MACHSMART analyzers, in a parallel connection on the above-mentioned Belden cable, up to a maximum of 98 if the **DUCATI energia** serial protocol is used, and up to a maximum of 247 if the MODBUS serial protocol is used.

4. TECHNICAL CHARACTERISTICS:

4.1 Power Supply:

- Power supply voltage: 230 V rms (toll.: +5% -15%) with frequency between 45 and 65 Hz.
- Power absorbed by the instrument: less than 2 VA

4.2 Operating Conditions:

- Operating temperature: from 0°C to 70°C;
- Relative humidity: 90% max. (without condensation) at 40°C;
- Storage temperature: from -25°C to 70°C.

4.3 Standards:

- Insulation:
the conversion section is galvanically insulated from the section that manages the RS 485. The relative trial involves the application of 2600 V rms. for one minute between the primary and secondary of the power supply transformer according to the standards EN 61010-1.
- Insulation resistance:
greater than or equal to 500 MOhms between the clamps of the RS 485 and the container.
- Insulation capacity:
application of 3000 V rms for one minute between each clamp and the container.
- E.M.C.:
conformity with EN 61000-4-4 (burst) and EN 61000-4-5 (surge).

4.4 Miscellaneous:

- Weight: 0.63 kg;
- Dimensions:
 - length: 130 mm;
 - height: 63 mm;
 - depth: 143 mm.

DUCATI energia s.p.a. denies all responsibility for any damage to people or things caused by improper or incorrect use of its equipment.

This documentation may be subject to change without prior notice.

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