

User manual

Compact Web PLC

WP240 series IEC-line

update: 16-06-2017



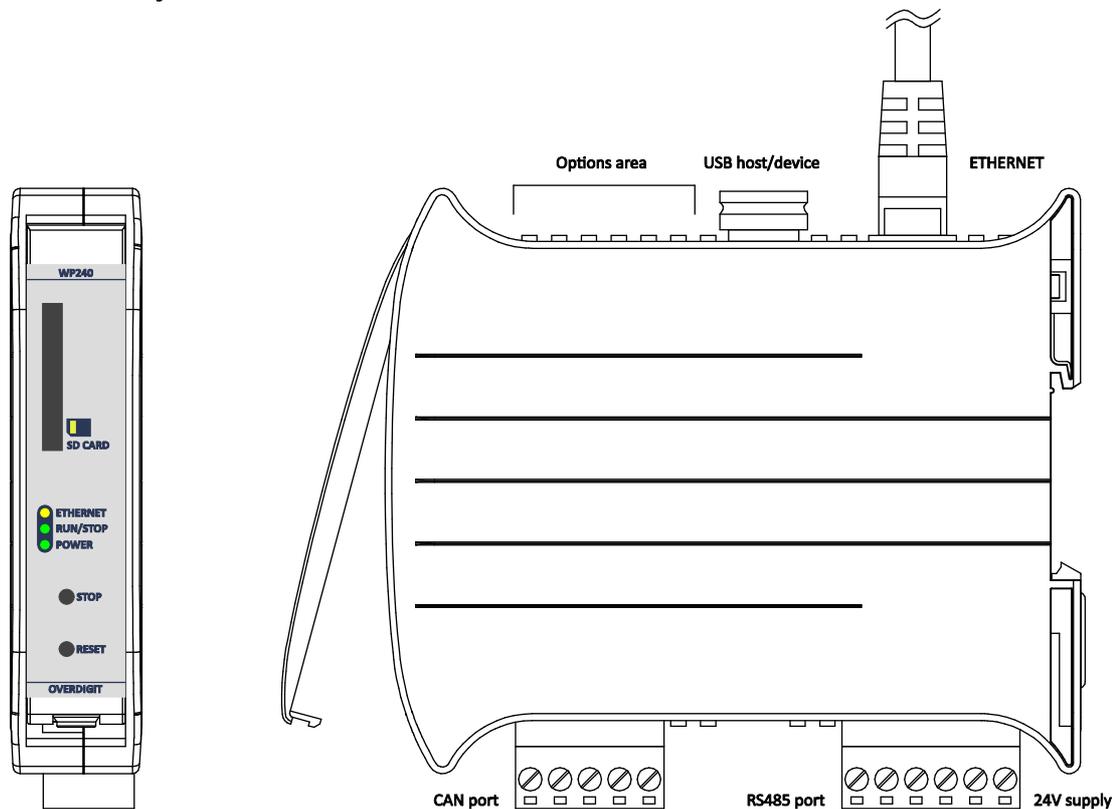
1. General description

The WP240 device is a PLC, programmable in IEC61131-3 language using CoDeSys tool, with multiple remote communication capabilities on local network and Internet. One compact product, DIN rail installable, performs all the functions of automation logic control and remote management via Ethernet or optional GPRS/HSPA modem.

The connections to the controlled system are made by remote I/O interfaces, commercial and custom, using a field-bus with CANopen protocol and/or RS485 serial bus with Modbus protocol. The WP240 communication ports are galvanically isolated and designed according to the most severe industry specifications.

The Ethernet port connects the device to a LAN for all network functions as CoDeSys programming, SCADA supervisory by OPC server, database management, sending E-mail with attached file and remote services.

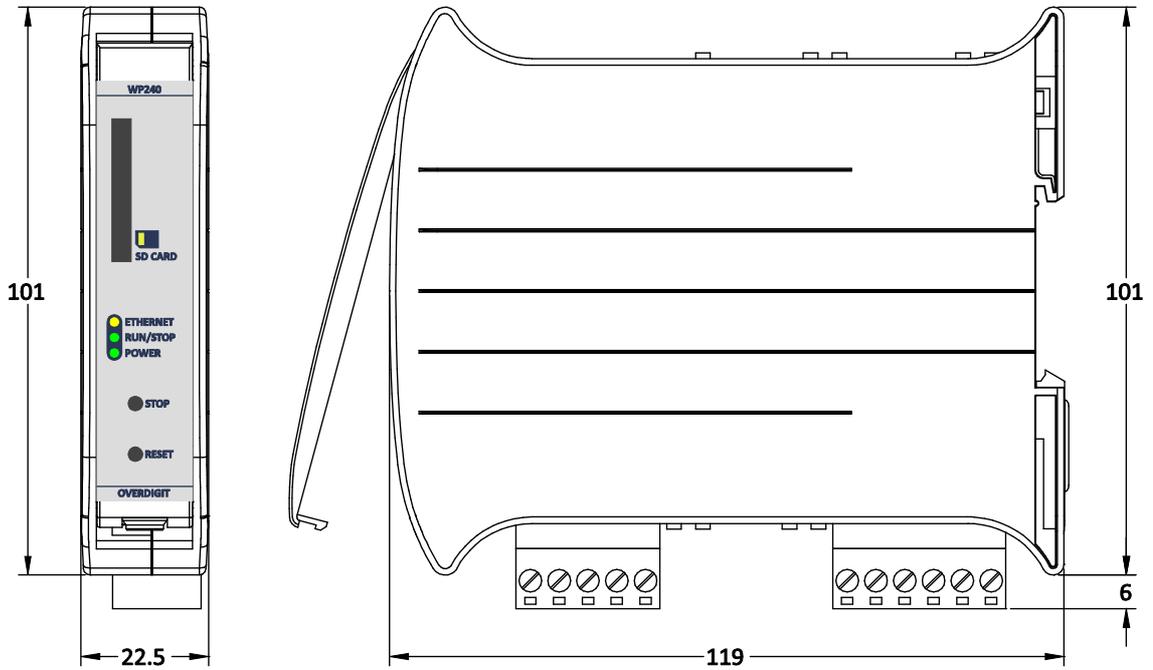
In addition to the internal memory disk can be installed two other external drives via USB and SD card, allowing storage of files for data-logger, parameters and every kind of data with Gigabytes of available memory.



Inside the compact box of WP240 is possible to install an expansion board through a connector with an additional serial port and I2C bus available. The internal board allows adding to base product some special options such as, for example, the GSM/GPRS or UMTS/HSPA modem or a second RS232/RS485 serial port. In addition for any and specific external connections of the optional board there is a dedicated area in the upper part of the box (with a maximum of 6 poles). Refer to the appropriate sections of the manual for more technical information about the different available options.

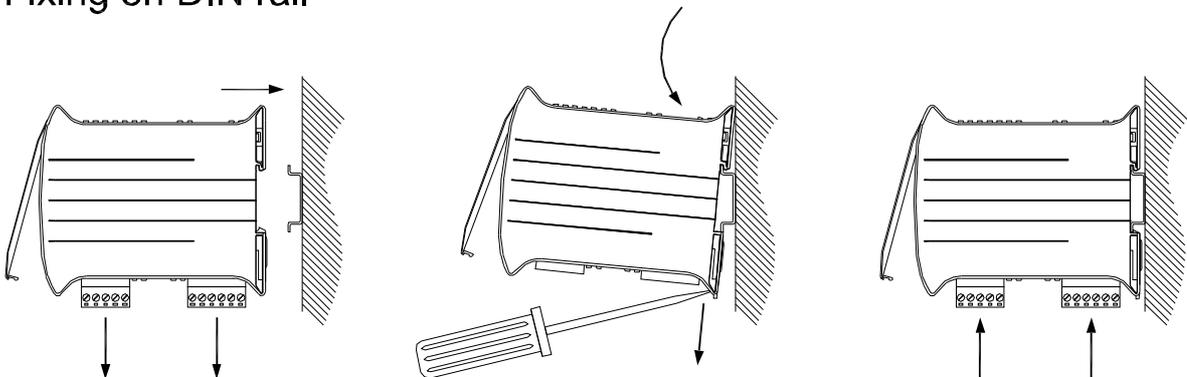
2. Installation and mechanical fixing

The compact dimensions of WP240 allow the installation into the control cabinet using only 22.5mm of DIN rail. The following figure shows the maximum mechanical dimensions of interest:



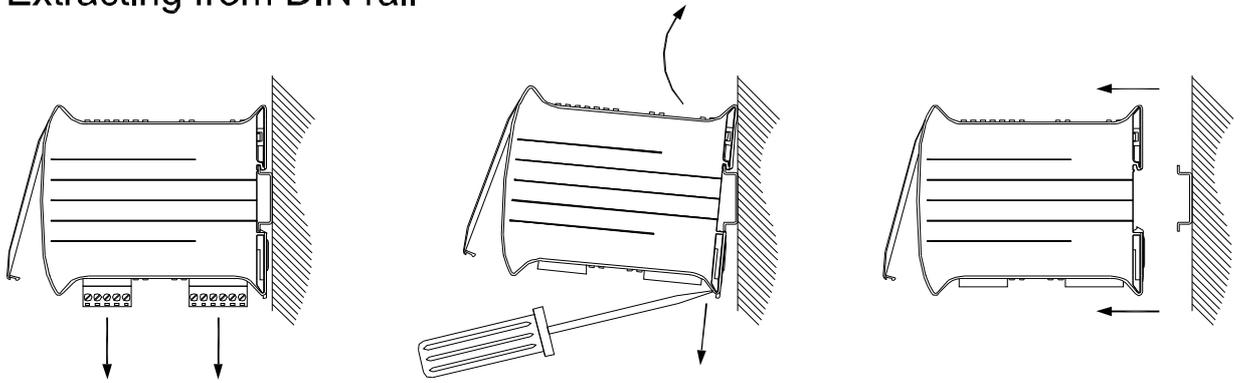
To install WP240 on the DIN rail is advisable to temporarily remove all connectors at the bottom of device and use a screwdriver to pull down the fixing hook when turning the device down:

Fixing on DIN rail



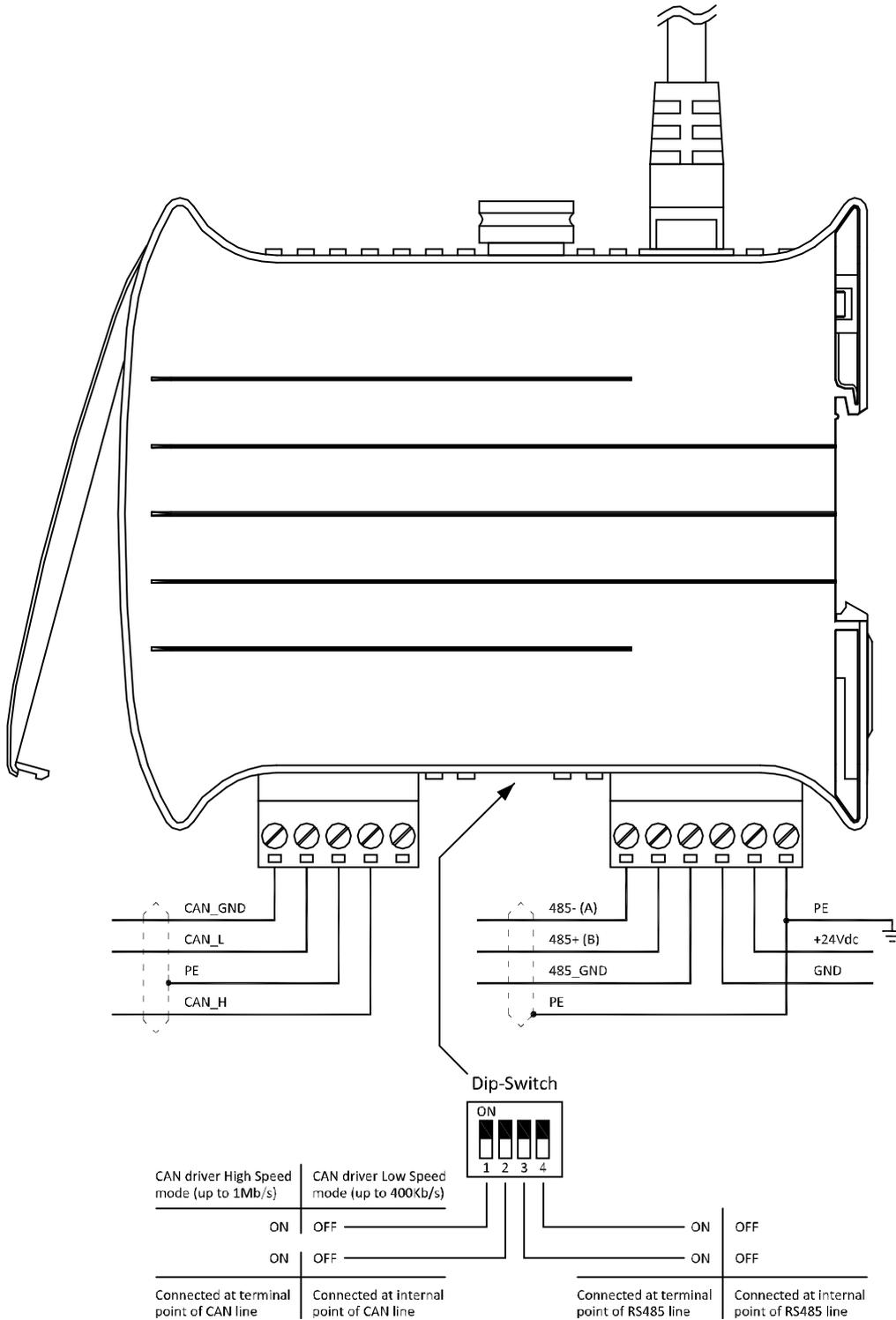
To remove WP240 from the DIN rail follow the reverse procedure for installation. After removing the bottom connections, with the aid of a screwdriver, pull down the fixing hook in the box base and rotate upward the device:

Extracting from DIN rail



3. Electrical connections

The electrical connections of WP240 are distributed on the upper and lower sides of the box. The following figure shows all the possible connections and its connectors pin assignment for field-bus and power supply of the device:



Connect, where possible, the **Protective Earth** terminal directly to the bottom of the metal framework using a short piece of cable with high section.

The **CAN** and **RS485** field-bus requires some configurations obtained by setting a **Dip-Switch** located between the two connectors. The two switches 1 and 2 are used for the configuration of CAN port and, in particular, the dip 1 sets the slew rate of the driver, depending on the maximum communication speed that will be used, while the dip 2 switches the line termination resistor required at the ends of the cable. The two switches 3 and 4 are both used in pairs for the insertion of the termination resistor of the RS485 port, also this required at the ends of the connection line. For software handling of RS485 serial must be considered **COM2** port using the appropriate CoDeSys libraries.

NOTE: The RS485 signal lines are indicated with 485+ and 485- where the polarity refers to the active state of line driving (transmission of bit to 0). In other systems the signals can be indicated by the letters A and B, and normally A=485- / B=485+ is the corresponding connection.

The **Ethernet** is linked by RJ-45 connector with the same pin-out used in the network card of a Personal Computer. To connect the device directly to a Personal Computer a crossover Ethernet cable must be used so that the transmission signals are crossed with those of reception. To connect the device to the local network using a router or a switch, a direct cable must be used because routers and switches provide the crossing internally.

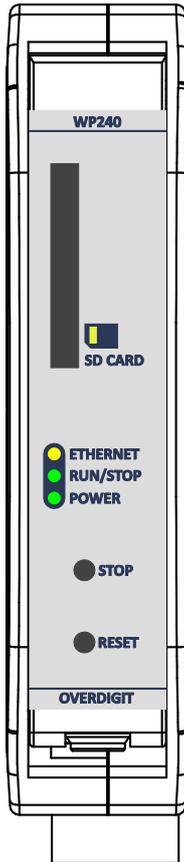
The **USB** connector can be used in either Host or Device mode. In Host mode can be inserted a USB memory stick to implement another system disk. In this case the **EXTUSB.EXE** driver program must be enabled in the autoexec.bat, specifying as a parameter the name of the disk to install (for example D). Normally the device is provided in Host mode with the software driver already installed for **disk D**.

In Device mode the USB port is defined as a virtual serial COM for direct connection to a PC using a USB cable with both ends male type A. In this case must be enabled in autoexec.bat the **USBSERD.EXE** driver program alternatively to the Host driver. On PC side the **usbserd.inf** (available inside Windows_USB_driver folder) must be installed. In Device mode an additional **COM5** serial port is available for the communication with PC.

NOTE: The pin 1 of USB connector of WP240 sources the internal +5V power supply, so is mandatory the disconnection of this pin to avoid conflicts with the +5V power supplied from the PC (Host). Inside the WP240 box there is also a jumper (normally ON) to make such disconnection.

4. Points of intervention and signalling

The front panel of WP240 has a slot for installing a **SD card** memory usable as hard-disk additional to that internal. The usable memory cards are both the normal SD card (previous generation) and the newer SDHC (high capacity) that can store many Gigabytes of data. To use the SD card the **EXTSD.EXE** driver program must be inserted into the autoexec.bat file, specifying as a parameter the name of the disk to install (for example B). Normally the device is provided with the driver already installed for the **disk B**. To insert the SD card take it according to the position and orientation indicated on the panel and insert it in the slot after rotating 90 degrees.



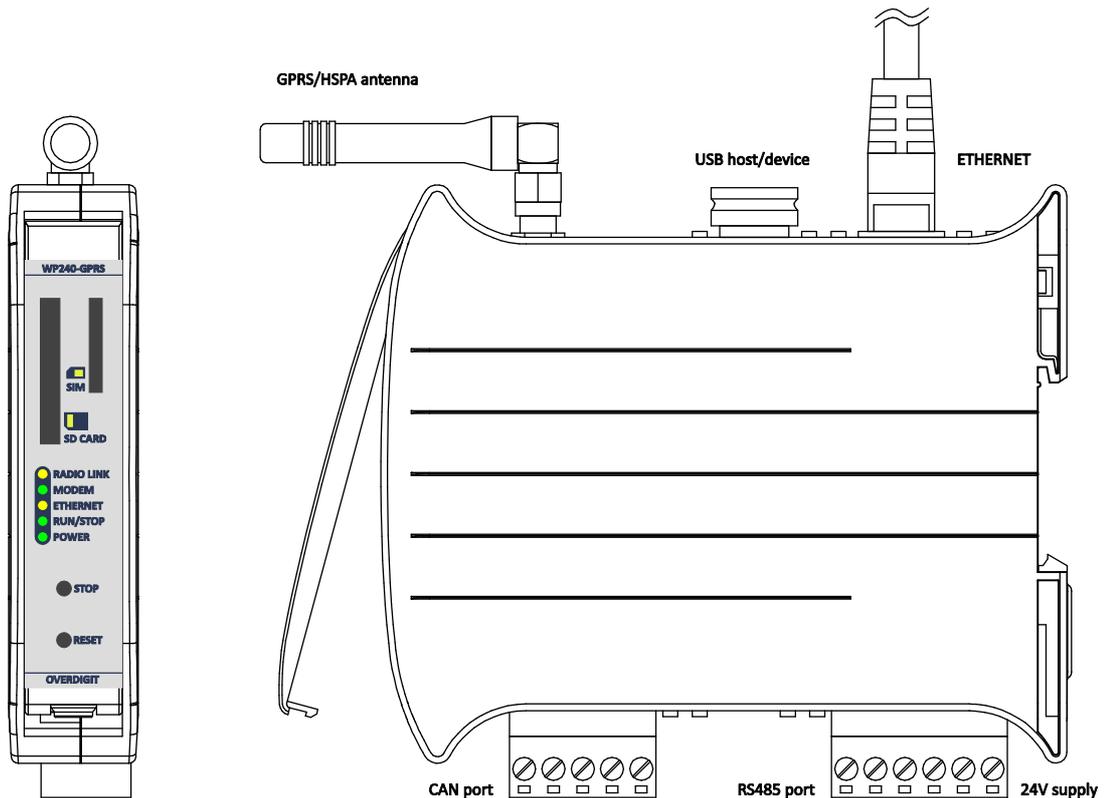
On the WP240 front panel there are also three **LEDs** that indicate the correct power supply of the device, the RUN/STOP state of the IEC program and the activity of Ethernet link.

For the management of the **START/STOP** for the IEC application program a push-button on the front panel is accessible via a thin tool with a diameter of about 1-2mm. Each press of the button the RUN/STOP state of the program is toggled. This function can also be used to stop the execution of a bad IEC program. In this case, power on the device with the button down until the STOP state is reached. Then a new download must be executed with a correct IEC program.

The **RESET** push-button restarts the software execution and also this can be pressed, within the hole, using a pointed object.

5. Radio gateway information (GPRS and HSPA options)

A radio gateway (GPRS or HSPA) is available as internal option for the WP240 base product. So, for the Internet connection, can also be used the 2.5G technology (GPRS on **WP240-GPRS** version) or 3G technology (HSPA on **WP240-HSPA** version). Both radio gateway versions can establish a permanent Internet connection using a common data SIM or send and receive SMS messages that can be handled by the IEC application program.



Inside the WP240-GPRS/HSPA versions is installed a modem board of **GM01** type that uses the **COM3** serial port available in the internal connector for the optional board. The antenna of the radio modem must be installed through the **SMA** female connector located at the top side of the box.

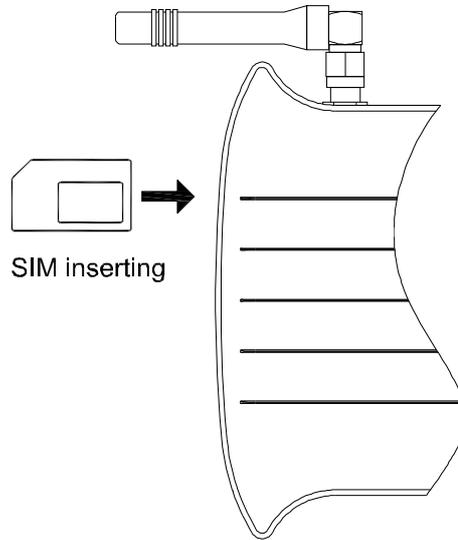
The antenna is not supplied with the product because different types of commercial antennas can be used as well ones available as accessory with the following codes:

- ANT-RA-SMA** GSM/UMTS antenna with right angle to be mounted on the box
- ANT-2M5-SMA** GSM/UMTS antenna magnetic base and 2.5m cable for remote installation

In any case the antenna should be placed as far away from metal objects or other equipments. Also make sure to fully tighten the SMA antenna connector.

The radio gateway version requires the insertion of the **SIM card** on the front panel.

Place the SIM card as shown in the figure below and insert it into the slot keeping it perpendicular to the panel until it is firmly seated:



NOTE: The installation of the SIM card must be done when the device is not powered. It is available, on request, a second SIM connector for the installation of the card inside the box. On the WP240-GPRS/HSPA front panel there are two additional **LEDs** to indicate the condition of modem power supply and the connection status for GPRS/HSPA radio link. To configure GM01 modem refer to the **GM01-Modem-Configuration_IT.pdf** manual while for the management inside the IEC application program use the specific function blocks documented in the **Target-CoDeSys-Reference-Manual_EN.pdf** manual or in the online help integrated, for the specific target, into CoDeSys tool.

The serial port associated to the internal option is the **COM3** with reference to the CoDeSys libraries for the management of serial communication. The specifications and functions of the COM3 port are equivalent to that of COM2 standard port.

The RS485/RS232 dual interface on a single serial port can be described as follows.

Each data transmitted on COM3 port is sended simultaneously from both drivers. Any data received from RS485 interface or from RS232 interface is returned as input to COM3 port. For this reason it is also possible to use a mix of both types of connections, as long as the protocol associated to COM3 port is Half-Duplex type, such as occurs for the Modbus RTU protocol.

For example on the RS485 interface can be connected some Modbus slaves, while the RS232 interface can be connected to another slave with this type of port. When the master CPU will send the command frame this will be received by all the slaves. Only the one addressed will replay for which only one of the two receive paths (RS485 or RS232) will be used without overlap problems.

NOTE: In order to avoid possible echo reception of the transmitting data, due to the crossover effects within the multi-core cables, it is recommended not leave floating cable connected to the RS232 interface (if not used by some device at the other end).