

## **MRTi & MRSi printers with Modbus protocol over Serial**

MRTi & MRSi printer families can be delivered with Modbus over serial protocol on RS422/RS485 hardware layer.

These products are developed to offer a printing solution for automates which have only a « Modbus over serial » connection.

This manual apply only for MRSI or MRTi printers with firmware F210v1.50 !

### **MODBUS protocol :**

- **Slave Address** : Every ModBus device uses a single Slave Address. On our printers, the user can select a slave address with the printer configuration menu. (see chapter « Configuration Menu » in the printer manual)
- **CRC** : calculated with polynomial value A001h
- **Supported Services** :
  - 06h or 6      « Single Word Write »
  - 10h or 16    « Multiple Words Write »  
          maxi 123 words by frame (i.e. 246 useful bytes)
  - 03h or 3     « Status Read »

*Starting address are not useful, bytes to write are directly inserted in the reception buffer.*

**Hardware Layer :** The physical layer is based on the RS485 standard in half duplex mode. The printer listens by default and takes control of the line only in response to a request from the master.

**Parameters selectable with configuration menu :**

**Serial :**

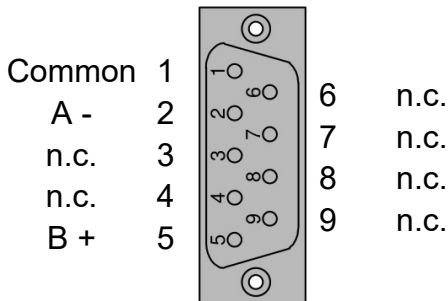
Baud : from 110 to 115200 Baud ( with 9600 & 19200)  
 Databits : 8 databits or 7 databits  
 Parity : None, Even, Odd  
 Xon : Not used in modbus

**Modbus :**

ON/Slave : Disabled (without ModBus protocol)  
 Slave 01 to 30, 252 (with ModBus protocol)  
 Latency: Frames latency: Auto 3.5 characters, 2msec,  
 5msec, 10msec, 20msec, 50msec, 0.1sec, 0.2sec

**Connection :**

with Sub-D Female- 9 pins:



with HE10 male connector:

**J6**

	n.c. ■	1	2	■ n.c.
B / + / Non inverted		3	4	■ n.c.
	n.c. ■	5	6	■ n.c.
A / - / Inverted		7	8	■ n.c.
	GND	9	10	VCC

**Protocol :**

Characters transmission to print is done with function **06h** (2 bytes) or with function **10h** (from 1 to 246 bytes). The starting address is not managed and can be left at 0.

Note : the « Words » are transmitted on 2 bytes : **MSB/LSB**, excepted the CRC word which is transmitted **LSB/MSB**.

If the response frame does not return an error, the data has been accepted by the printer and stored in the receive buffer. You can continue to output the following data frames.

If the response frame returns an error , exception code is used to select the action to follow.

- If it is 06h (Busy, Rejected Message), the printer reports that data in the last transmitted frame could not be stored. You should query the printer status with function 03h and correct the trouble.  
The last frame can then be retransmitted.
- Any other exception value will not resume printing . The function 03h can help diagnose the trouble. But the intervention of a user will probably be necessary

**Examples** : with slave address 1

Send of <CR> and <LF>

fn 06h : 01 06 00 00 **0D 0A** 0D 5C

fn 10h : 01 10 00 00 00 01 02 **0D 0A** 22 C7

Send of the string **Hello** <CR><LF>

fn 10h : 01 10 00 00 00 04 07 **48 65 6C 6C 6F 0D 0A** 00 D4 08

*Frame examples are written in hexadecimal values*

Notes : If a CRC error, the frame is assumed to be corrupted and is completely ignored, no response frame is then returned to the master. Similarly, if the slave address does not match , the frame is ignored.

## How to know the printer status :

Function 03h allows to read the printer status.

The address is irrelevant and can be left at 0.

The quantity of read registers must be 1 (i.e.: 1 word) , bits 15 to 8 are always at 0.

Bits 7 to 0 indicate a particular state when they are at 1 !

- **Bit 7 : Information : Paper default.**  
This information is sent whatever the setting of the paper handling.
- **Bit 6 : Information : Data are waiting for printing.**
- Bit 5 : Busy : Memory defect.
- Bit 4 : Busy : Initialization of the printer.
- Bit 3 : Busy : Programming Flash memory phase.
- **Bit 2 : Busy : Reception buffer full**
- **Bit 1 : Busy : Configuration menu currently running.**  
The user actually uses the printer configuration menu
- **Bit 0 : Busy : Paper default.** If printer is set to be Busy if a paper default occurs.

You should only use the bits in bold in normal use of the printer.

## **Example :**

Status Request

fn 03h : 01 03 00 00 00 01 84 0A