TTS

Installation and Maintenance

16.06.2004
Vers. 2.6

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CONTENTS

Wiring

Bus wiring

The TTS is designed and built for use in complex and hybrid environments. Thanks to its great versatility, the TTS makes it possible to build and install the network in the fastest way possible and without particular operations during the assembly stage.

Maintenance is also simplified.

The topology of the TTS network is of the bus type; that is, all the apparatuses are physically connected to the same means of transmission.

The network creates a multipoint channel for connecting a master and a maximum of 255 slaves; the master controls the activity of all the slaves and communications take place in a bidirectional manner.

Bus typology
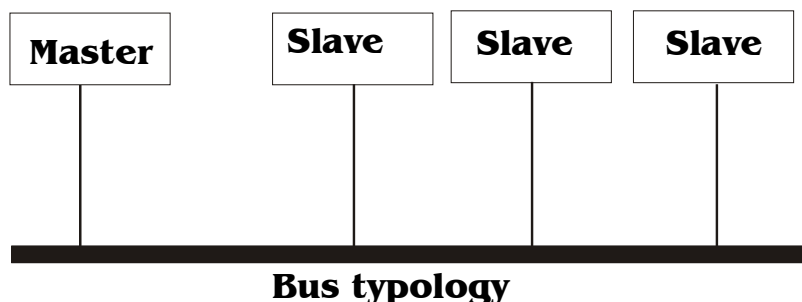
By means of an appropriate cable (we recommend a shielded AWG22 cable with two twisted poles, impedance 150Ω, linear resistance 10Ω/100m), the TTS network can reach a distance of over 1500 metres (you can use a type 1A IBM CR6204 cable from CEAM Cavi Speciali SpA).

The regulations relating to structured wiring regarding data transmission systems must be respected when installing the network system.

The most important of these are:

- cables for data networks must be transported in special raceways
  separately from power networks (the minimum distance between the
  telecommunications cables and the power lines is 152 mm when they are
  running parallel);
- the shielding of the cable must be connected to a clean ground at one end only;
- the maximum stretch tension applicable to the cables and the minimum
  permitted curvature radius must be respected;
- the untwisted part of the cable at the end must not exceed 25 mm.

- the network must terminate (beginning and end) with two termination resistances with 220 Ohm ratings;

- if the network has several backbones, the termination must be calculated in accordance with the following tables:

n	RT
3	470
4	560
5	680
6	1K
7	1K
8	1K
9	1K
10	1,2K
11	1,5K

n is the numbers of backbones plus the master.

- When creating branches you must ensure that you maintain the continuity of the shield.

.
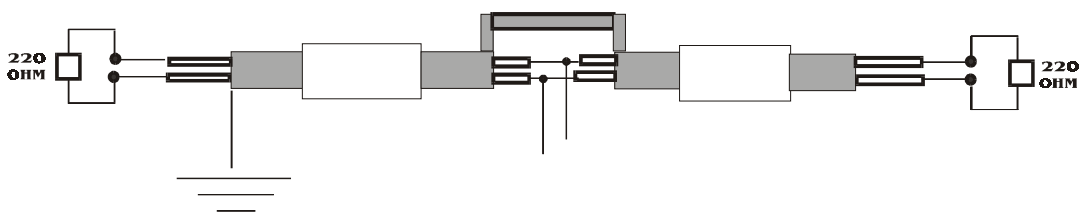
The figure below shows an outline diagram of the TTS system with reference to the BOX RS 485.

TTS30M

FIRST BOX RS 485

TTS40S

MIDDLE BOX RS 485

TTS40S

TTS40S

LAST BOX RS 485

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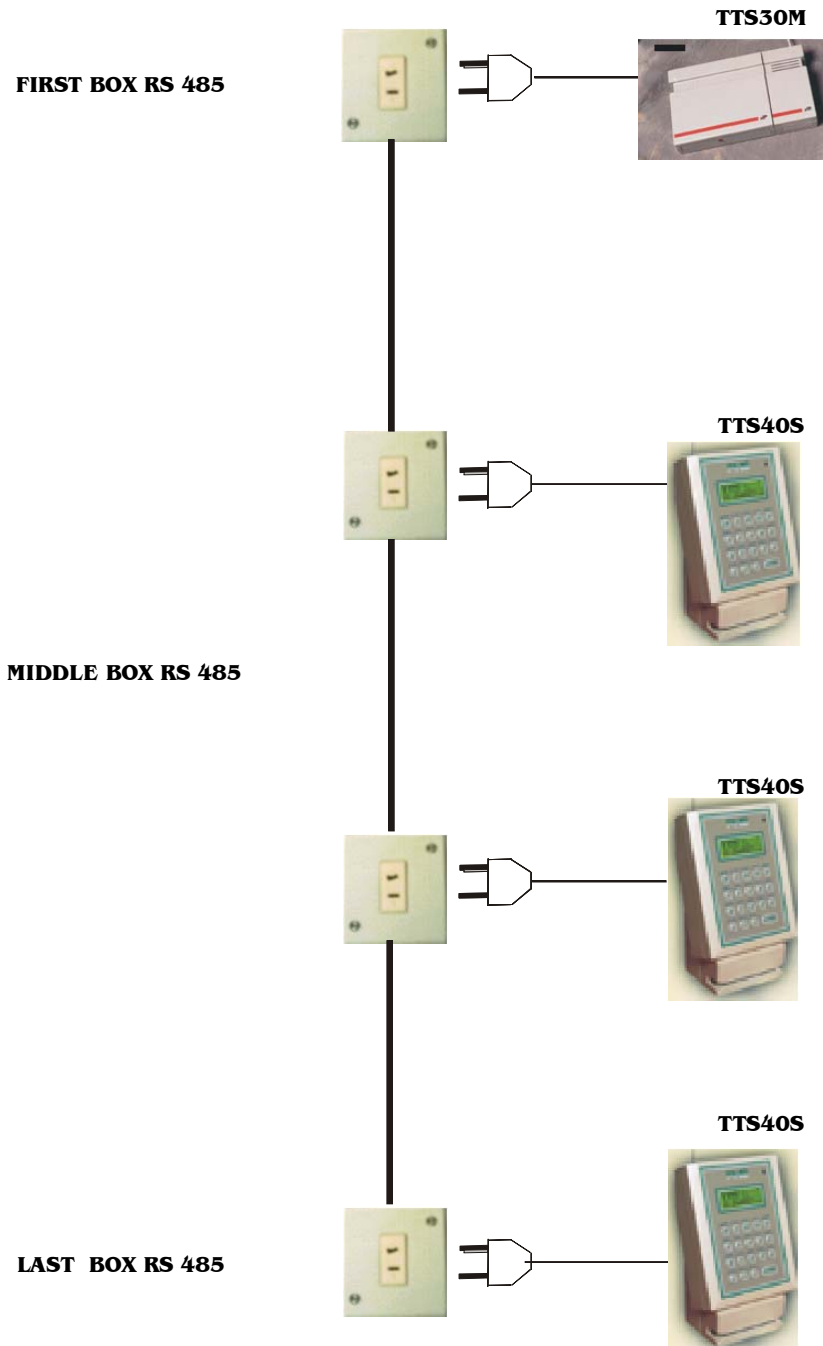
The wiring of the various boxes is shown be.

First box RS 485

220 Ω

\+

\-

S+ S-

Protective
ground

shield

Last box RS 485

shield

S- S+

\+

\-

220 Ω

Middle box RS 485

shield

S- S+

\+

\-

S+ S-

shield
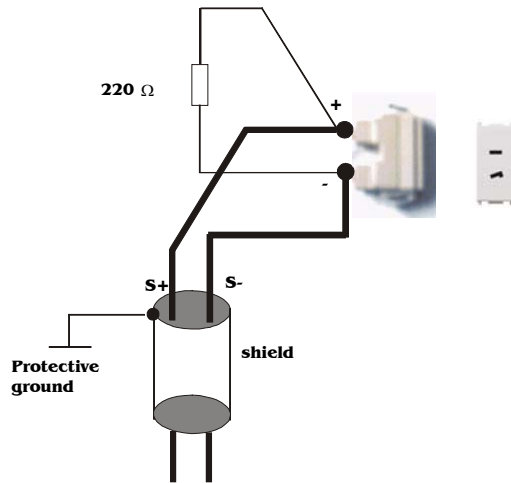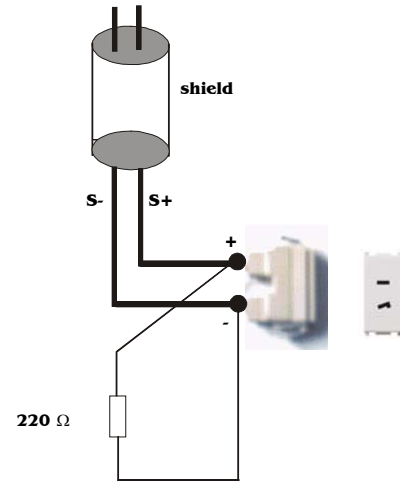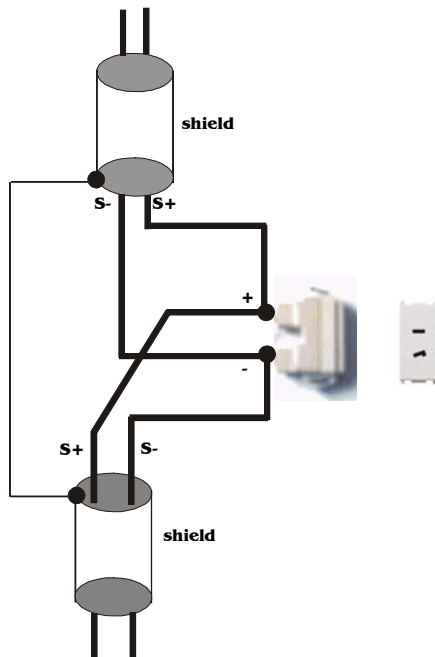
TTS in a structured wiring system

The TTS can be inserted in a structured wiring system using the TTSHUB accessory.

The TTSHUB is provided with 24 RJ45 ports (CAT.5, 568° standard), and a ground wire for the shield.

The TTSHUB should be installed, along with the TTS30M, in the cabinet the wiring converges in; according to the following plan:

Devices

General features

Emulation of an SNA (3270) or TCP/IP session (the whole TTS network employs HOST resources relating to a single terminal);
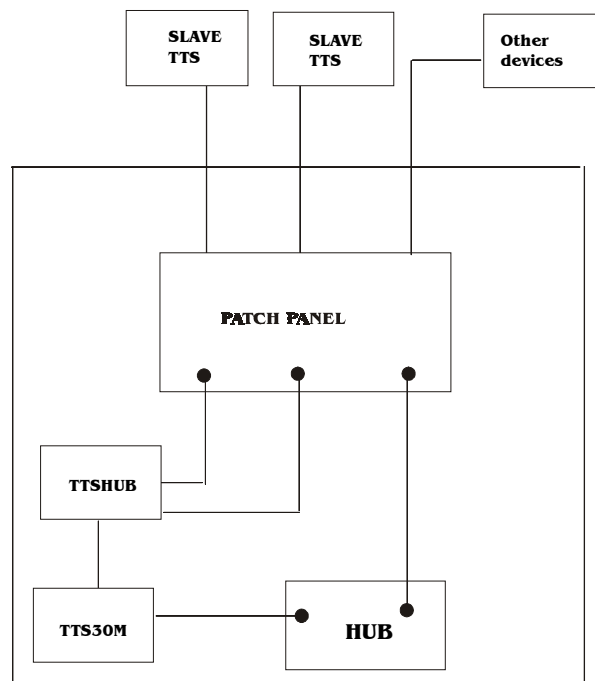
Connectability by communications port (RS232C SDLC), asynchronous RS232C, ETHERNET;

Distance (by RS485) between host and TTS units, 1.5 km;

Maximum number of units, 255;

Configurability of all the units by host-resident applications.

Fireproof plastic casing;
Weight 650 g;
Dimensions 188 mm x 113 mm x 35 mm;
Working temperature 0-50°C;
Rel. humidity 90%;
Power supply 5V dc +/- 5%
Dissipated power max 3W

Models

TTS10M: Master for AS/400 on SDLC
TTS20M: Master for RS232C
TTS30M: Master for Ethernet TCP/IP

TTS01S: Slave serial channel only

TTS02S: Slave 16 input +16 output digital/Os

TTS10S: Slave without keyboard and display

TTS30S: TTS slave complete with keyboard,
2-line x 16-char. display with connector
for external magnetic badge reader

TTS40S: TTS Slave, complete with keyboard,
4-line x 20 char. display and badge reader,
provided with barcode port, RS232C, digital I/O

TTS50S: TTS Slave, complete with keyboard,
16-line x 16 char. display and badge reader,
provided with barcode port, RS232C, digital I/O

Features of the TTS slave

Every apparatus is supplied with its own power supply unit +5V, max 1A, which must be housed close to the TTS.

Every device connected to the TTS must respect the correct interface specifications with its ports (maximum consumption, signal quality, wire length).

The only operation to carry out during the installation stage is the assignment of univocal addresses to the individual slave units; this can be done by means of dipswitch settings.

The master will automatically recognize the units connected.

The slave TTS permits the connection of:

- a standard EIA RS232C asynchronous serial device;
- a laser reader or pen;
- two external expansion devices through two input and two
  output ports, CMOS/TTL compatible;

Furthermore, inside it is a relay with normally open or normally closed contact; an acoustic buzzer; a clock with calendar; a 19-key alphanumerical keypad; and a display (2 lines x 16 characters, 4 lines x 20 characters or 16 lines by 16 characters). The TTS40S and the TTS50S also have a badge reader (optical or magnetic) or a tag reader.

All the devices can be programmed and managed by the host.

PKAL05 power supply for the TTS

There is a female connector as in the figure for the power supply of the TTS (except for the TTS40S which is powered internally):
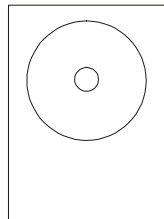
in:+5V DC max 1A

internal socket:positive

External socket:ground

the PKAL05 power supply unit with male plug must be connected to this:

external diameter: 5,5 mm
internal diameter: 2,1 mm
length: 9 mm
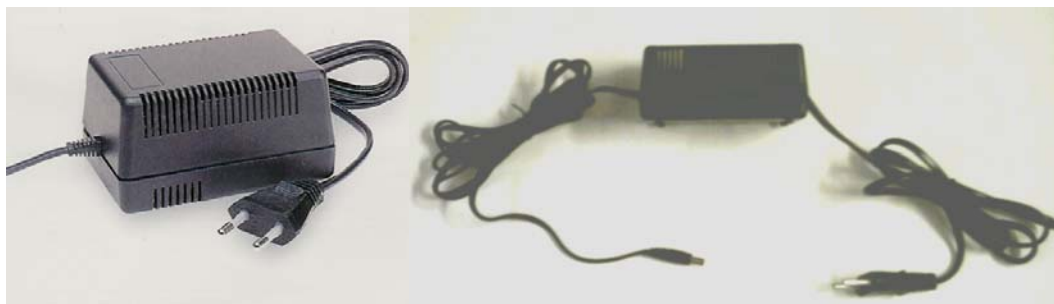
RS 232C port

The interface is compatible with the EIA RS 232C, DCE, full duplex standard and has a female 25 or 9-way connector:

(25-way, female) - RS 232C DCE

1. **Protective ground**
2. **Transmit date**
3. **Receive date**
4. **Request to send**
5. **Clear to Send**
6. **Data Set Ready (close with 20)**
7. **Signal ground**
8. **Carrier detect**
20. **Date Terminal Ready (close with 6)**
22. **Ring indicator (fixed to ground)**
25. **+5v DC max 100mA**

N.B.: the pin arrangement refers to the EIA RS 232C DTE standard.

(9-way, female) RS 232C (DCE)

1. **N.C.**
2. **Transmit date**
3. **Receive date**
4. **Date Terminal Ready (close with 6)**
5. **Signal ground**
6. **Data Set Ready (close with 4)**
7. **Clear to Send**
8. **Request to send**
9. **N.C.**

N.B.: the pin arrangement refers to the EIA RS 232C DTE standard.

Barcode port

A laser reader or a pen reader (digital output) can be connected indifferently to the port.

The TTS automatically recognizes the reader connected and manages the associated signals as required.

The connector is a 9-pole male:

1. **N.C.**
2. **Digitized Bar Pattern**
3. **Decode Led**
4. **N.C.**
5. **Trigger Switch**
6. **Laser Enable**
7. **GND**
8. **GND**
9. **+5v DC max 100mA**

I/O port

There are 2 input lines and 2 output lines on the 9-way female connector; three internal relay contacts and the possibility of powering an external device at +5V DC, max 100mA.

Digital I/Os and relay (9-way female connector)

2	IN 1	**Electrical characteristics:**	**CMOS-TTL compatible;**
4	IN 2	**Output: 0 5V max 20mA; 15 LS-TTL; (output drive);**	
7	OUT 1	**Input: 0 - 5v; I,n max 1uA; pullup 10K.**	
8	OUT 2		
9	+5v DC		
6	GND		

These lines can be used for interfacing standard compatible CMOS-TTL devices.

Relay (9-way female connector)

1	NA= Normally open
3	C= Central
5	NC= Normally closed

The electrical specifications of the contacts are 46V and 500 mA max.

For software management of the relay, refer to the TTS data stream, logic unit 5 (relay).

Digital I/Os (15-way female connector)

The 15-way female connector has two (optoinsulated) pairs of pins for the two input lines and two (optoinsulated) pairs of pins for the two output lines; three internal relay contacts and the possibility of powering an external device at +5V DC, max 100mA.

8	IN1+	
10	IN1-	**input**
7	IN2+	**180**
11	IN2-	IN +
5	OUT1+	
13	OUT1-	IN -
4	OUT2+	
14	OUT2-	**output**
15	+5V DC, 100 mA	OUT +
9	GND	OUT -
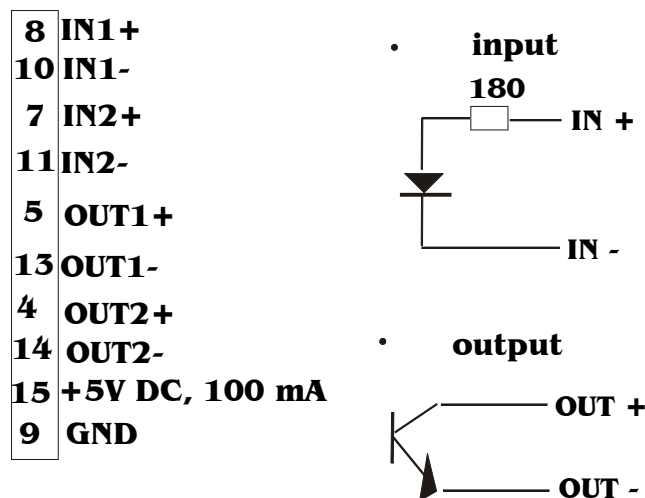
Relay (15-way female connector)

1	NA= Normally open
2	C= Central
3	NC= Normally closed

The electrical specifications of the contacts are 46V and 500 mA max.

Other devices

TTS Slave expansions

External devices can be connected by means of the expansion port for the purpose of expanding the interfacing capacities of the TTS.

The expansion devices made today include boxes for reading the status of sensors, and boxes for managing controllers, relays or PLCs.

Boxes can be designed and made on the customer's order for special needs, in order to provide the best solutions for all the problems relating to interfacing in hybrid environments or those which are not standard in any case.

Acoustic buzzer

The acoustic device is integrated in the TTS. It consists of a piezoelectric buzzer; the typical output signal is a continuous 3.7 kHz tone with a sound pressure level of about 80dB at 1 metre.

Refer to the TTS data stream, logic unit 6 (buzzer) to control it.

Clock with calendar

The clock with calendar is integrated into the TTS. It manages perpetual calendar functions (it counts seconds, minutes, hours, days, date, month and year). It can be calibrated by software and can include an optional battery for maintaining the time count even in the event of power failure.

Refer to the TTS data stream, logic unit 2 to control it.

Display

The display is mounted on the cover of the box and is rear-lit to facilitate visibility even in poor light conditions. Its dimensions are 2 lines x 16 characters, 4 lines x 20 characters, or 16 lines x 16 characters and it can display alphanumeric characters, and envisages two types of cursor: large for the numerical mode and small for the alphanumerical mode.

Refer to the TTS data stream, logic unit 3 for the controls.
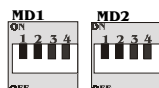
Keypad

The keypad is in Mylar with high mechanical strength and has 19 keys. It envisages numerical and alphanumerical input modes and has four program functions keys.

See logic unit 4 of the TTS data stream.

DIP SWITCH

TTS30M

PHYSICAL ADDRESS SELECTION (MD2,MD1)

MD2				MD1				IND.
1	2	3	4	1	2	3	4	HEX
ON	ON	ON	ON	ON	ON	ON	ON	00
ON	ON	ON	ON	OFF	ON	ON	ON	01
ON	ON	ON	ON	ON	OFF	ON	ON	02
ON	ON	ON	ON	OFF	OFF	ON	ON	03
ON	ON	ON	ON	ON	ON	OFF	ON	04
ON	ON	ON	ON	OFF	ON	OFF	ON	05
ON	ON	ON	ON	ON	OFF	OFF	ON	06
ON	ON	ON	ON	OFF	OFF	OFF	ON	07
ON	ON	ON	ON	ON	ON	ON	OFF	08
ON	ON	ON	ON	OFF	ON	ON	OFF	09
ON	ON	ON	ON	ON	OFF	ON	OFF	0A
ON	ON	ON	ON	OFF	OFF	ON	OFF	0B
ON	ON	ON	ON	ON	ON	OFF	OFF	0C
ON	ON	ON	ON	OFF	ON	OFF	OFF	0D
ON	ON	ON	ON	ON	OFF	OFF	OFF	0E
ON	ON	ON	ON	OFF	OFF	OFF	OFF	0F
OFF	ON	ON	ON	ON	ON	ON	ON	10

It is possible to select the addresses in hexadecimal in the range (00-FF)

SNA USER SELECTION (MD1) - (16 users)

MD1	USER
0	TTS
1	TTS1
F	TTS15

IP USER SELECTION (MD2 MD1) - (128 users)

MD2/1	USER
00	IPTTS
01	IPTTS1
0F	IPTTS15
7F	IPTTS127

The switch MD2-4 is not considered

SNA SESSION CONFIGURATION

XID	:	017000 (MD2, MD1)
ADAPT_ADR	:	000D820000 (MD2,MD1)
USER	:	(MD2/1)

TCP/IP SESSION CONFIGURATION

MAC_ADR	:	000D820000 (MD2,MD1)
IP_cabled	:	140.150.20.(MD2, MD1) dec
TCP_PORT	:	Telnet, Ftp, 99, HTTP

TTS30S

ADDRESS SELECTION (MD1, MD2)
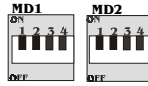
MD1				MD2				IND.	IND.
1	2	3	4	1	2	3	4	HEX	DEC
ON	ON	ON	ON	ON	ON	ON	ON	00	0
ON	ON	ON	ON	OFF	ON	ON	ON	01	1
ON	ON	ON	ON	ON	OFF	ON	ON	02	2
ON	ON	ON	ON	OFF	OFF	ON	ON	03	3
ON	ON	ON	ON	ON	ON	OFF	ON	04	4
ON	ON	ON	ON	OFF	ON	OFF	ON	05	5
ON	ON	ON	ON	ON	OFF	OFF	ON	06	6
ON	ON	ON	ON	OFF	OFF	OFF	ON	07	7
ON	ON	ON	ON	ON	ON	ON	OFF	08	8
ON	ON	ON	ON	OFF	ON	ON	OFF	09	9
ON	ON	ON	ON	ON	OFF	ON	OFF	0A	
ON	ON	ON	ON	OFF	OFF	ON	OFF	0B	
ON	ON	ON	ON	ON	ON	OFF	OFF	0C	
ON	ON	ON	ON	OFF	ON	OFF	OFF	0D	
ON	ON	ON	ON	ON	OFF	OFF	OFF	0E	
ON	ON	ON	ON	OFF	OFF	OFF	OFF	0F	
OFF	ON	ON	ON	ON	ON	ON	ON	10	10

It is possible to select 256 addresses (0-255) in hexadecimal, or 100 (0-99) in decimal.

Accessories

TTS accessories

- TTSHUB:

  The TTSHUB permits insertion of the TTS in a structured wiring system in copper.

- TTSAC01:

  The TTSAC01 adaptor is a splitter for the RS 232C port of the slave and makes it possible to connect two devices which do not communicate simultaneously; selection is made by the software application.

- TTSAC02:

  The TTSAC02 adaptor makes it possible a serial device and a magnetic badge reader with TTL output simultaneously to the RS 232C port.

- TTSAC03:

  The TTSAC03 adaptor is a bidirectional deviator for serial ports.

- TTSI8, TTSI32:

  The two devices make it possible to connect 8/32 digital inputs to the I/O port of the slave.

- TTS08, TTS032:

  The two devices make it possible to connect 8/32 digital outputs to the I/O port of the slave.

Configuration of the Master by Telnet

The first configuration envisages the use of the IP-cabled address; the structure is:

140.150.20. (MD2,MD1)

(MD2,MD1) is a hexadecimal number given by the switches (see TTS30M); for example for:

(MD2,MD1) = 80

we get

140.150.20.128

it is then necessary to connect by means of the command:

telnet 140.150.20. (MD2,MD1)

Behaving as a telnet server, the master will then reply:

PHS srl Mentana (RM) * telnet server *
TTS system vers. MTCPXX of dd/mm/yyyy

■

At this point it is possible to enter the configuration strings; the sequence for a connection to the AS/400 in a remote system is shown below:

a) Configuration IP_MASTER (TTS30M address)

???1WCxxx.yyy.zzz.www

(reply ???2WC)

b) Configuration IP_HOST (AS/400 address)

???1WFxxx.yyy.zzz.www

(reply ???2WF)

c) Default gateway configuration (router address)

???1WIxxx.yyy.zzz.www

(reply ???2WI)

d) Customer configuration

        ???1WE1

      (reply ???2WE)

e) keep_Alive configuration (4 minutes)

        ???1WJ02

      (reply ???2WJ)

f) TCP port configuration

        ???1WG0023

      (reply ???2WG)

Configuring the TTS system by browser

   The first configuration envisages the use of the IP-cabled address; the structure is:

     140.150.20. (MD2,MD1)

(MD2,MD1) is a hexadecimal number given by the switches (see TTS30M); for example for:

     (MD2,MD1) = 80

we get

     140.150.20.128

it is then necessary to connect by means of the command:

     http://140.150.20.(MD2, MD1)/

   The master, behaving as a web server, will reply with HTML pages clearly showing the parameters. The HTML pages show the link to the help available on the site www.phsnet.it.