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APE25 T1000MIL
MATCHING UNIT

Description
A22717-U327-A100-1-7618 Sh. 1

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APE25 T1000MIL
A22717-U327-A100-1-7618 Sh. 2

General

The matching unit APE25 serves for directly connecting the Teleprinter Model 1000 to external transmission facilities without a local cable via a 4-wire polar current, low-level, point-to-point circuit. The send line is fed from an internal source. The low-level interface is according to MIL-STD-188C and contains two wires each for the send and receive loops and two wires for the call loop.

The APE25 allows working in the half-duplex and full-duplex operating modes. By means of an additional call line, information prepared in the teleprinter can be called down character-by-character.

The APE25 also permits the teleprinter to be operated in the local mode. Local mode working with or without forced deactivation upon reception of an incoming call can be set with a switch. In both operating modes, an incoming call is indicated visually and audibly. When operating with forced deactivation, the local mode is immediately interrupted (manual transmission inhibited) and the teleprinter is automatically connected to the line.

The APE25 comprises the following modules:

Control module STT10/A101

Manual communications controls BET4/A102

Line adapter LAT28/A100 and

Protector SST20/A100

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Technical data

Voltage for the telegraph loops and the call loop: ± 6 V

The polarity for the start pulse (start polarity) and the call pulse can be freely selected by soldering on the connecting cable as appropriate.

Line current (in the send, receive and call loops):

1 mA (rated value)

Send distortion (start-stop distortion with rated current)

Send distortion of the complete teleprinter: $\leq \pm 3\%$

Receive margin (start-stop margin with rated current)

Receive margin of the complete teleprinter: $\geq \pm 46\%$

Output filter in the send loop

Pulse flattening by 1st order filter as per MIL-STD-188C
or 3rd order filter (selectable with
DIL switch)

Permissible noise pulses

Noise pulses with a length of ≤ 2.1 ms or ≤ 0.5 ms
(selectable with DIL switch) are suppressed.

Interface to the connecting cable

The interface (SO) to the connecting cable (send, receive and call loops) satisfies the conditions of MIL-STD-188 C.

Connection to devices with an interface as per CCITT Recommendation V.28 and as per DIN Std. 66020, Sheet 1, is also possible.

3 Functional characteristics

- 3.1 Operation with T1000 connected to a point-to-point circuit; activation of the teleprinter via start pulse
- Half-duplex or full-duplex operation -
Activation of the on-line mode by:
start pulse on the send line in response to pressing the call button (250-ms pulse), by pressing button A... on the keyboard of the teleprinter or after reception of a start polarity pulse.
Deactivation of the on-line mode:
automatically by the electric time-out switch approx. 32 s, 64 s, 8.5 min or 12.75 min (selectable with DIL switch) after the transmission of the last telegraph character or manually by pressing the disconnect button.
- 3.2 Operation with T1000 connected to a point-to-point circuit; activation and deactivation of the teleprinter by switching the power on and off
- Half-duplex or full-duplex operation -
- 3.3 Operation without automatic deactivation of the on-line mode by the electric time-out switch (activation of the on-line mode as per 3.1). The on-line mode remains activated regardless of message transmission; the electric time-out switch is ineffective (deactivation of the continuous on-line mode by pressing the disconnect button).
- 3.4 Character call operation
The additional receiver in the APE25 permits character-by-character call-down of a message prepared in the teleprinter.

- 3.5 Local mode with forced deactivation in response to an incoming call.
- 3.6 Local mode without forced deactivation in response to an incoming call
- 3.7 Monitoring the data media
Deactivation of the on-line or the local mode at the end of a data medium
The teleprinter paper is continuously monitored, the punched tape is only monitored when the punch is activated.
- 3.8 Monitoring the top cover in the standby condition
Activation of the on-line and the local mode with open top cover is not possible.
- 3.9 Monitoring the line current
Deactivation of the on-line mode with start polarity > 1 s in the receive loop

Operating principle

The functional principle of the APE25 is outlined in the following. The functions and their timing are shown in the functional descriptions

STT10/A100 and BET4/A102 as per A22717-B109-A100-*-7618 and LAT28/A100 and SST20/A100 as per A22717-B232-A100-*-7618 with the aid of flowcharts and signal timing diagrams.

4.1 Message transmission (on-line mode)


4.1.1 Activation of the on-line mode via a start pulse

On-line mode working is started after transmission or reception of a start pulse (start polarity) by pressing button A... on the teleprinter keyboard, by pressing the call button \odot ¹⁾ or by a transmission from the distant station. The lamp in the disconnect button \circ lights. Approx. 200 ms after activation of the on-line mode the teleprinter is ready to operate. The on-line mode is deactivated automatically approx. 32 s, 64 s, 8.5 min or 12.75 min (adjustable with DIL switch) after the last transmitted telegraph character or by pressing the disconnect button \circ . The lamp in the disconnect button goes out. The standby state is established. If the on-line mode is to remain activated regardless of a message transmission, button \textcircled{L} for the continuous on-line mode must be pressed (the electric time-out switch is inhibited); the lamp in this button is lit. The automatic inhibition of the electric time-out switch upon activation of the on-line mode can also be selected via the DIL switch. In this case the continuous on-line mode is not indicated visually.

The continuous on-line mode can only be deactivated by pressing the disconnect button.

- 1) Pressing the call button results in the transmission of a 250-ms start polarity pulse both in the standby state and when the on-line mode is activated.

4.1.2 Activation of the on-line mode after switching on the ac power

This switch-on procedure is selected with a DIL switch. After the power has been switched on and the operating voltages and the clock become available ("power ready" signal) the on-line mode is activated. The lamp in the disconnect button  lights.

With this procedure, on-line mode working can only be deactivated again by switching off the power.

4.2 Half-duplex/full-duplex operation

The APE25 can be switched over from half-duplex to full-duplex operation.


In half-duplex operation, the transmitted telegraph characters are monitored. Break-in detection takes place. The tape reader is deactivated by break-in.

Switchover from half-duplex to full-duplex operation is accomplished by actuating the duplex switch DX. The lamp in switch DX lights when the on-line mode is activated. Full-duplex operation can also be permanently set with the aid of DIL switches. In this case there is no visual indication.

In full-duplex operation, the transmitted telegraph characters cannot be monitored. Deactivation of the tape reader by break-in is not possible.

4.3 Local mode

The local mode is activated by pressing the local button | . The lamp in the local button lights. Approx. 200 ms after the activation of the local mode the teleprinter is ready to operate.


To terminate the local mode the disconnect button  must be pressed. The lamp in the local button goes out and the standby state is established.

When a call arrives during local mode working, an audible signal sounds for about 3 s and the lamp in the disconnect button lights.

In local mode working with forced deactivation in response to an incoming call, the local mode is interrupted immediately (manual transmission inhibited). The teleprinter is automatically connected to the line after printout of the telegraph characters written into the keyboard buffer. The teleprinter is ready to receive after about 0.5 s. Approx. 3 s after arrival of the incoming call, the transmitters are enabled and, at the same time, the lamp in the local button goes out.

In local mode working without forced deactivation in response to an incoming call, an audible signal also sounds for about 3 s. The lamp in the disconnect button lights until the local mode is terminated by pressing the disconnect button.

4.4 Monitoring the data media

At the end of a data medium the on-line mode or local mode is automatically deactivated. The fault condition is indicated by the lamp in the call button  flashing (flashing frequency approx. 2 Hz, signal : pause = 250 : 250 ms).

If a data medium is not present, neither the on-line nor the local mode can be activated.

If the distant station transmits a start pulse for setting up a connection, a 250-ms start polarity pulse is automatically returned to indicate the fault condition; in half-duplex working, this is recognized by the distant station as break-in.

4.5 Monitoring the top cover

Neither the on-line nor the local mode can be activated when the top cover is open. The fault condition is indicated as with the end-of-data-medium condition by the lamp in the call button (⊙) flashing. Transmission of a start pulse from the distant station has the same effect as the end of a data medium. Opening the top cover during the on-line or the local mode has no effect. An incoming call is accepted during local mode working (with forced deactivation).

4.6 Monitoring the line current

If required, a line current monitor can be activated in the APE25 with the aid of a DIL switch.

The line current monitor causes an intermittent visual signal (lamp in the call button (⊙)) and audible signal to be switched on approx. 500 ms after continuous start polarity has been applied to the receive line. The visual and audible signals have a frequency of $f \approx 1$ Hz (signal : pause = 500 ms : 500 ms).

With start polarity on the receive line for more than 1 s, on-line mode working in progress is deactivated. Activation of the on-line mode is not possible when continuous start polarity is applied to the receive line.

During local mode working the line current monitor is not effective (no fault condition signals). When the local mode is activated, the signals are interrupted. After termination of the local mode the signals are switched on again, if the fault condition persists.

5. Special information

5.1 Connecting the teleprinter to the terminal access line

The telegraph loops and the call loop are connected to the access line via a 6-wire shielded cable with a special Amphenol connector.

5.2 Information on the operating mode "Local mode without forced deactivation in response to an incoming call"

This operating mode requires that the teleprinters connected to the point-to-point circuit be equipped with an answerback module. Before a message is transmitted the operator must request the answerback code from the distant station, as otherwise the calling station cannot recognize whether the call has been accepted.

5.3 Half-duplex full-duplex mode switchover

To ensure correct message exchange, the two teleprinters connected to the point-to-point circuit must be switched either to the half-duplex or to the full-duplex mode. When switching over from the half-duplex to the full-duplex mode and vice versa, it must be ensured that the corresponding switchover takes place at the distant station, too.

5.4 Control behavior of the electric time-out switch

The electric time-out switch is reset when telegraph characters are transmitted in the send or receive direction. The on-line mode is automatically deactivated both with stop polarity and start polarity¹⁾, which exceeds the switch-off time set on the electric time-out switch (32 s, 64 s, 8.5 min or 12.75 min). This ensures that the on-line mode is always deactivated after the set period has elapsed, also in the case of a wire break.

- 1) During operation with line current monitoring (see section 4.6) the on-line mode is deactivated independently of the electric time-out switch with start polarity on the receive line > 1 s.

5.5 Fault location

For fault location and measuring purposes, test jacks and test pins X...(P) are provided on the LAT28. Details are given in the corresponding circuit diagrams. If required, it must be possible to make measurements on the send, receive and call loops outside the teleprinter on the signal connector, e.g. with the aid of an adapter.

Ex-works version of the APE25

In the following, the ordering numbers (GU item number) of the APE25 and the associated modules as well as the functional characteristics as per section 3 are listed. In addition, information is given on the mode switches in the control module STT10 and in the line adapter LAT28.

Designation	GU item no.	Functional characteristics as per section 3
APE25/A100	63255	3.1, 3.3, 3.4, 3.5, 3.7, 3.8, 3.10
STT10/A101	63426	
BET4/A102	63716	
LAT28/A100	63552	
SST20/A100	63631	

In the STT10 variant used in the APE25/A100, the following switches are closed at sockets X5 and X6:

socket X5: S1.4, S1.7

socket X6: S2.2, S2.3, S2.4, S2.5

In the LAT28/A100 switches S1.5 and S1.8 (socket X4) are closed.

The listed switch settings correspond to the ex-works condition of the modules. If necessary, the switch settings can be changed in the field, e.g. for the switch-off time of the electric time-out switch. Details are given in the following tables.

Mode switches in the STT10

Explanations concerning the brief text in circuit diagram
STT10/A100 A22717-B109-A100-*-11

Switch	Operating mode
S1.1	Line current monitoring Intermittent visual and audible signals with start polarity on the receive line > 0.5 s. Deactivation of the on-line mode with start polarity on the receive line > 1 s.
S1.2	Time-out switch ineffective Inhibition of the visual signal if continuous on-line mode has been permanently set (see also switch S2.7)
S1.3	Switch-off time of the electric time-out switch 32 s
S1.4	Switch-off time of the electric time-out switch 64 s
S1.5	Switch-off time of the electric time-out switch 8.5 min
S1.6	Switch-off time of the electric time-out switch 12.75 min
S1.7	After testing STT10, switch is closed.
S1.8	Local mode without forced deactivation in response to an incoming call An incoming call arriving during local mode working is indicated visually and audibly, the local mode remains activated.

- S2.1 Full-duplex operation permanently set
Inhibition of the visual signal if full-duplex operation has been permanently set (see also switch S2.8)
- S2.2, S2.3 Manual communications controls effective
Feeding of the 0 V and +12 V voltages to the manual communications controls via interface S3
- S2.4 Full-duplex operation via duplex button
Signal from duplex switch DX can be effective
- S2.5 Character call operation
The basic electronics is programmed to transmit a paper tape-stored message character by character on the reception of call pulses
- S2.6 Activation of the on-line mode by switching on ac power
Activation and deactivation of the on-line mode by switching ac power on and off, e.g. via a circuit terminating unit. With switch S2.6 closed local mode working is not possible.
- S2.7 Time-out switch ineffective
Automatic inhibition of the electric time-out switch upon activation of the on-line mode
- S2.8 Full-duplex operation permanently set
In the STT10 the same signal is generated as is present with the duplex switch DX closed.

Mode switches in the LAT28

Explanations concerning the brief text in circuit diagram
LAT28/A100 A22717-B232-A100-*-11

Switch	Operating mode
S1.5, S1.8	With 1st order output filter as per MIL-STD-188C Edges of the transmitted telegraph signals flattened with 1st order filter.
S1.5, S1.6 S1.7	With 3rd order output filter Edges of the transmitted telegraph signals flattened with 3rd order filter.
S2.1	'A' polarity in the receive loop in the case of a wire break When the receive loop is interrupted, continuous start polarity ('A' polarity) is transmitted to the STT (= requirement according to CCITT Recommendation V.28).
S2.3, S2.8	With input sensitivity > 0.15 mA The input threshold in the receive loop and the call loop is raised from approx. 0.1 mA to > 0.15 mA by closing switches S2.3 and S2.8.
S3.8	Suppression of noise pulses < 0.5 ms The time for suppression of noise pulses on the receive line is shortened from < 2.1 ms to < 0.5 ms by closing switch S3.8.

Assignment of the telegraph connectorswith a 10-pin circular connector:

A and B: send loop
C and D: receive loop
E and F: call loop

with an 8-pin signal connector:

1 and 2: send loop
3 and 4: receive loop
7 and 8: call loop

List of documentation

Designation	Document	Item code number
APE25 Matching unit	Schematic circuit diagram	A22717-U327-A100-*-12
	Description	A22717-U327-A100-*-7618
STT10/A100 Control module	Circuit diagram	A22717-B109-A100-*-11
	Wiring diagram	T22717-B109-A100-*-2
	Installation instructions	A22717-B109-A100-*-7631
	Description	A22717-B109-A100-*-7618
BET4/A102 Manual communications controls	Circuit diagram	A22717-Q4-A102-*-11
	Wiring diagram Description 1)	T22717-Q4-A100-*-2
LAT28/A100 Line adapter	Circuit diagram	A22717-B232-A100-*-11
	Wiring diagram	T22717-B232-A100-*-2
	Installation instructions	A22717-B232-A100-*-7631
	Description	A22717-B232-A100-*-7618
SST20/A100 Protector	Circuit diagram	A22717-B324-A100-*-11
	Wiring diagram Description 2)	T22717-B324-A100-*-2

- 1) contained in A22717-B109-A100-*-7618
- 2) contained in A22717-B232-A100-*-7618

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