Equipment Documentation

Transmitter Control Unit KBS 1300

Type 1493.142

We reserve the right to make modifications to the construction and design which serve the technical improvement and further development of our equipment without prior notice.

Order-No. of the Equipment Documentation: 1493.142-01702 Eu (4)
Edition 2/1982

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I. SPECIFICATION

Photograph of the equipment

1. Application

The transmitter control unit KBS 1300 is suitable for the control of automatic short-wave transmitters in the field of commercial communication engineering.
The arrangement and execution of the input keyboard in clear text for each single instruction and each instruction group allows efficient and speedy control by operators without special qualification.
The unit can be either employed as a single unit or incorporated into a radio operator's position. With the brought out bus, which also contains the information in clear text, additional equipment such as a modulation control unit, can be controlled automatically and in a simple way during transmitter control. Furthermore, the bus permits the operation of peripheral equipment which meet the requirements for bus operation such as the aerial tuning unit KTA 1300 for testing purposes.
In conjunction with its international conventional interfaces for the peripherals, the unit is an automatic control terminal which can be employed in all conventional transmitting systems. The transmitter control unit KBS 1300 is equally suitable for both fixed and mobile application.

2. Construction

The unit is accommodated in a splash-proof table casing. The keyboard as well as the displays are arranged on the front side. The rear side of the unit takes up the connectors for the telegram lines and the battery connection as well as an unlosable mains cable with plug. Furthermore, on the rear side, the connector for the BUS output is provided under a cover. When the BUS connector is connected the cover is removed and a facility on the cable takes over the sealing effect.
After having loosened the 4 red-marked screws on the front side, a plug-in, which contains the individual subassemblies of the unit, can be withdrawn on the handles provided.
On it are arranged the pushbuttons with display on the subassemblies "keyboard and display 1 and 2" and the associated electronics on the subassembly "input and display logic".
The subassembly "data store" contains the pushbutton and check-back store as well as its modification logic. On the remote-control section are accommodated a parallel-serial converter for

the control telegrams and an associated up-date store as well as a serial-parallel converter for the check-back telegrams. This circuit-board group is combined via a wiring circuit board and forms a mechanical unit.
The plug-in also contains the "numerical display" for the frequency, an LED display panel and the mains section.
The plug-in, to which access is given from all sides, can be operated for servicing work separately from the table casing via adapters. The unit is equipped with the keyboard for application on the transmitter KSG 1300.
For application with the control unit KCS 1400 (for transmitter KN 5-E and KN 20-E) an appropriately modified keyboard is supplied together with the accessories for the control unit KCS 1400.

3. Technical data

The guaranteed values for equipment acceptance are to be taken from the Technical Terms of Delivery 1493.142-00001 TLB.

3.1 General technical data

Weight	15 kg
Dimensions (width x height x depth)	540 x 182 x 345 mm
Degree of protection	IP 54 per TGL/RGW 778 (dust and splash-proof)
Protection class	I per TGL 21366 (protective conductor connection)
Temperature range	
- operable	-25 °C to +55 °C
- transport	-40 °C to +85 °C
- storage	+ 5 °C to +35 °C
Admissible relative humidity	≤ 95 % at +40 °C
Max. application altitude	3000 m
Shock load	max. 15 g
Operating time	continuous 24 h/d
Kind of control	remote by serial telegram
Interfaces V24/V28 or VFT equipment	
V24/V28	
- load resistance	R_L = 3 - 7 kohm/C_L ≤ 2500 pF

VPT

- loop resistance	≤ 200 ohm
- line current	10 - 20 mA

Power supply

- mains connection	1-phase/neutral 50-60 Hz 220 V
admissible voltage tolerance	+10 %, -15 %
admissible frequency tolerance	47 to 63 Hz
power input	45 VA
- battery connection	2 to 24 V
admissible voltage tolerance	+9 V, -3 V
battery current	approx. 80 mA (for store support in case of mains failure)
	1.1 A (for battery operation)
- changeover in case of mains failure to battery supply	automatic

3.2 Special technical data

3.2.1 Possible commands to the transmitter

3.2.1.1 Transmitter KSG 1300

Instruction group	Number of instructions	Kind of instructions
Control position selection	4	x) 1 x control by operator 3 x control by extension
Operating state selection	9	• Preparatory work for operation • Tuning with carrier (or without carrier for operation without aerial tuning unit KTA)

x) Any control unit can be used as the operator control unit by means of a soldering bridge.

- Power stage 0 P
- Power stage 0.1 P
- Power stage 0.25 P
- Power stage 1.0 P
- Tuning without carrier (quite tuning)

Instruction group	Number of instructions	Kind of instruction
		• Reception with adapted aerial
		• Reception with direct aerial
Frequency selection	2 840 000	7-digit transmitting frequency adjustment
Program selection	16	1 complete transmitter working program
		15 complete stored programs
Aerial selection	4	Aerial-No. and/or No. of aerial tuning unit KTA
Selection of class of emission	14	Telegraphy A1, J2 ($A2J_{1000}$), H2 (A2H), $F1_{85}$, $F1_{170}$, $F1_{340}$, $F1_{250}$ $F1_{500}$, F7BD ($F6_{200}$) Telephony R3 (A3A), H3 (A3H), J3 (A3J), B_R8 (A3Ba), B8 (A3Bj)
Channel selection A	6	Transmission, volume unregulated
		Transmission, volume regulated
		Transmission with a VFT equipment
		1000-Hz set up of the radio link
		DC keying
		Tone keying
Channel selection B	4	Transmission, volume unregulated
		Transmission, volume regulated
		Transmission with a VFT equipment
		1000-Hz set up of the radio link

3.2.1.2 KN 5-E, KN 20-E with control unit KCS 1400

Instruction group	Number of instructions	Kind of instruction
Control position selection	4	x) 1 x control by operator 3 x control by extension
Operating state selection	9	• Preparatory work for operation • Writing in of program • Power stage 0 P • Power stage 0.1 P • Power stage 0.25 P • Power stage 1.0 P • Tuning with carrier • } Transmitter OFF • }
Frequency selection	2 840 000	7-digit transmitting frequency adjustment
Program selection	16	1 complete transmitter working program 15 complete stored programs
Aerial selection	4	Aerial-No.
Selection of class of emission	14	Telegraphy A1, J2 ($A2J_{1000}$), H2(A2H) $F1_{85}$, $F1_{170}$, $F1_{340}$, $F1_{250}$ $F1_{500}$, F7BD ($F6_{200}$) Telephony R3(A3A), H3(A3H), J3(A3J), B_R8 (A3Ba), B8 (A3Bj)
Channel selection A	6	Transmission, volume unregulated Transmission, volume regulated Transmission with a VFT equipment 1000-Hz set up of the radio link DC keying Tone keying

x) Any control unit can be used as the operator control unit by means of a soldering bridge.

Instruction group	Number of instructions	Kind of instruction
Channel selection B	4	Transmission, volume unregulated Transmission, volume regulated Transmission with a VFT equipment 1000-Hz set up of the radio link

3.2.2 Messages from the transmitter

Message	Kind of display
Control position	Pushbutton illumination
Operating state	Pushbutton illumination
Frequency	7-digit LED numerical display
Program-No.	Pushbutton illumination
Aerial-No.	Pushbutton illumination
Class of emission	Pushbutton illumination
Channel A	Pushbutton illumination
Channel B	Pushbutton illumination
Transmitting power	LED display of the power stages in % 0-1.5/1.5-7.5/7.5-15/15-25/25-40/ 40-58/58-80/80-110
End of tuning	LED display
Radiation checking	LED display
Power reduction	LED display
Transmitter disturbance	LED display
Mains failure on the transmitter	LED display

3.2.3 Internal instructions and displays

Instruction	Display
Display changeover	The complete check-back display of the pushbuttons and the frequency changes over to the instructions stored in the

Instruction	Display
	control unit and put out to the transmitter. (Compare: input/check-back)
Mains of the control unit ON	Point in the frequency display
Buzzer ON	Acoustic control demand by buzzer/ pushbutton illumination

3.2.4 Transmission speed

Adjustable by soldering bridge:

50, 100, 200, 300, 600 or 1200 bit/sec. $\pm$ 1 x 10^{-4}.

3.2.5 Interface designation

Designation	Connection
Serial instruction telegram (V24)	Level according to CCITT/V28 Lines according to CCITT/V24: Line 102, 103, 105, 106, 108
Serial check-back telegram (V24)	Level according to CCITT/V28 Lines according to CCITT/V24 Line 102, 104
Serial instruction telegram (WT-0) (VFT)	Level as for VFT local circuit Line a/b (two core)
Serial instruction check-back telegram (WT-0) (VFT)	Level as for VFT local circuit Line a/b (two core)
Parallel check-back telegram (V28)	Level according to CCITT/V28 8 lines (8 bit) + synchronizing line

3.2.6 Telegram structure acc. to 1614.011-00001 Wp Sh. 3
1644.018-00001 Wp Sh. 3

cf. supplement.

4. Scope of delivery

4.1 Standard scope of delivery

1	Transmitter control unit KBS 1300	Type 1493.142
1	Accessories, packed	1493.142-01800 ZL
1	Equipment documentation	1493.142-01702 Bu
1	Test certificate	
1	Factory acceptance certificate	
1	Guarantee certificate	

4.2 Additional delivery

Against separate order and extra costs, the following items can also be agreed upon in the contract:-

-	Additional copies of the equipment documentation	1493.142-01702 Bu
-	Service documentation	1493.142-01702 Su
-	Spare parts, packed	1493.142-01810 E1 1493.142-01870 E7
-	Rail, complete (2 pieces per unit for mounting in vehicles)	1340.032-01050

II. OPERATING INSTRUCTIONS

1. Preparatory work for operation and operation

Carry out the following checks after every form of transport:

- Check the fastening of the plug-in (red-marked screws).
- Check the pushbuttons. All pushbuttons must take up the initial position again after having being depressed.
- The unit is set to a certain mode of operation which is marked with an x) in the following description. Correspondingly, every other adjustment can be carried out. In the supplement (functional diagram 1493.142-00001 Wp Sh. 1) the soldering bridge distributors and the switch positions for the respective mode of operation are shown. In the following description the soldering of the corresponding bridge is called in general "fixing".

1.1 Fixing the control position number

The control position number (0 to 3) is to be fixed in case of operation with several control units. Correspondingly, the green pushbutton cover is changed as well.
All control units are of equal authorization as regards the check-back.

x) The unit is fixed by the manufacturer to control position "0".

1.2 Fixing the control priority

One of the control position numbers can be fixed as the distributor so that only this unit is in the position to determine the control authorization (operation with operator).

x) The control position "0" is fixed by the manufacturer as the distributor.

1.3 Operating voltage

1.3.1 Operation with 220-V mains

The check-back always has the up-dated level (continuous indication). The input store loses its information in case of mains failures or inadmissible mains reductions.
However, a faulty transmission does not take place (checking of the input-output-comparison in case of malfunctioning of the system is not possible).

1.3.2 Operation with 220-V mains and support battery +24 V

x) Check-back always has the updated level (continuous indication). The input store is supported (checking of the input-output-comparison in case of faults in the system is possible at all times).
In case of mains disconnections by the equipment mains switch, the battery is disconnected as well.

1.3.3 Mains operation and automatic take over by 24-V battery in case of mains failures

In this case uninterruptable operation is carried out with store support. Permanent loading of the battery with full power of the unit in case of mains failure.
With mains disconnection by the equipment mains switch, the battery is disconnected as well.

1.4 Fixing via the frequency input facility

1.4.1

x) The frequency input is allowed for the controlling unit.

1.4.2 The frequency input is not allowed for the controlling unit

This is the case when the controlling unit is only granted a single program operation, and the free frequency selection and tuning are only to be performed by the operator.

1.5 Fixing via the program input facility

1.5.1

x) The program input is allowed for the controlling unit.

1.5.2 The program input is not allowed for the controlling unit

This measure is expedient in conjunction with the interlocking of the frequency input so that every single frequency adjustment is carried out by the operator.

1.6 Fixing via the frequency display facility

1.6.1

x) The transmitting frequency is displayed.

1.6.2 The transmitting frequency is not displayed

This is the case when the transmitting frequency is to be kept secret.

1.7 Adjustment of the transmitting frequency for the control and check-back serial telegrams

The transmitting frequency is adjusted in accordance with the system conception. Pay attention that the counter-station is fixed with the same transmitting frequency. This also applies for units in the transmission path such as modems and similar. For transmission via postal equipment, the permission for taking into operation must be present from the respective Postal Authorities in which also the transmitting frequency is stipulated.
In case of operation on special lines, pay attention that the transmitting frequency corresponds with the conditions for V24/V28 and VFT local-circuit lines.

1.8 Fixing the type of interface

The type of interface can be adjusted with the aid of the interface selector which is provided on the rear side of the unit. The selector is lettered.

1.9 Cabling of the installation and connection

The interface cable is to be firmly screwed into position on the unit in accordance with the position of the interface selector.
If a battery is used, connect the battery cable to the marked connector. This line must be fused with ≙ 4 A between the battery and the unit.
The mains plug is to be inserted into a 220-V ac socket-outlet which must be fused with ≙ 10 A.
The unit is ready for operation and can be switched on.

2. Control

- The instruction input is effected by depressing the corresponding pushbutton. The pushbutton returns to the initial position when released.
- In the transmitter control unit KBS 1300 the instructions entered directly reach a pushbutton store and from this position they are put out to the transmitter as the latest in-

structions.
The dependent conditions for control are shown in the tables
"Dependent conditions for control KSG 1300 (transmitter)" and
"Dependent conditions for control KCS 1400 (control unit)".
Any other form of control is interlocked and does not result in failures.
The take over of the instruction can be seen in the check-back which is effected in the pushbuttons by luminous indication and in the luminous panel for the frequency as numerical display.

- The action of the instructions in the transmitter is indicated by the check-back of the operating state and the power in the LED panel.
- If, over the check-back bus connector, a modulation unit - e.g. KBM 1300 - is connected to the transmitter control unit, the AF lines and modulation units required as a result of control handling are automatically selected in it.
- For the explanation of the instruction groups of the transmitter control unit KBS 1300, the operational sequence in the transmitter is also mentioned in order to aid understanding.
The control is explained on the basis of a single unit which has all forms of freedom or the input and display are fixed.

2.1 Instruction group/control position

In case of single control, it is not necessary to select the control position. Any pushbutton can light up.
In case of multiple control the corresponding control position pushbutton is depressed and the corresponding control unit determined. For the called station, the green pushbutton lights up which corresponds to its control position number, and a buzzer signal sounds.
The acoustic control demand can be cancelled by means of the cancellation pushbutton.

2.2 Instruction group/operating state

2.2.1 Preparatory work for operation

This operating state serves for the preparation of transmitting

operation or the preparation of a program.
The mains sections of the power stages in the transmitter are switched off. Carrier radiation does not take place.
The complete scope of instructions of the transmitter can be put in or changed as required (e.g. frequency, class of emission etc.). In this operating state a program can also be called. Outside this operating state, the frequency, program and number of the aerial cannot be changed.
The check-back confirms the instruction transfer to the transmitter and the final signals.

2.2.2 Tuning with carrier

2.2.2.1 Tuning with carrier when employed on transmitter KSG 1300

This operating state serves for tuning the transmitter. With simultaneous fixing of Program-No. 0 the program remains in the data store so that operation is maintained even in case of mains failures.
When fixing the Program-No. 1 to 15, the program is kept in the data store and in the corrrsponding program store or automatically written in during tuning.
All instructions entered are taken up in the corresponding program.
When this operating state is keyed in a start instruction reaches the transmitter automatic system. The automatic organizers of the transmitter and the aerial tuning unit carry out the adjustment or the tuning with radiation of the tuning power. After a time period of < 5 seconds, the display "end of tuning" confirms this procedure. The carrier is blocked. If the transmitter is operated without an aerial tuning unit, the program is entered without the carrier being radiated.
This procedure lasts for < 1 second.

2.2.2.2 Tuning with carrier when employed on control unit KCS 1400

This operating state serves for tuning the transmitter and always follows the operating state "preparing for operation". When this operating state is keyed in a start instruction reaches the transmitter automatic system. The automatic organizer of the transmitter carries out the adjustment or tuning with radiation of the tuning power. After a certain time, which

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is typical for the transmitter (approx. 15 to 30 sec.), the display "end of tuning" confirms this procedure.
During the tuning procedure, the display "end of tuning" flashes.

2.2.2.3 Program writing when employed on control unit KCS 1400

If the program set in "preparing for operation" is to be stored, as soon as this operating state is actuated, the operating state "program writing" must be actuated, whereby the Program-No. is previously fixed by keying in, From this operating state as well switching can be made to the operating state "tuning with carrier".

2.2.3 Power stage 0 P

Following successful tuning or during intervals in transmission, this position can be used as "standby". In this case the power sections of the power stages are switched off.
The carrier is not radiated.

2.2.4 Power stages 0.1 P; 0.25 P; 1.0 P

Following successful tuning, the corresponding power stage can be called for herewith.
After an automatic levelling the transmitter is ready to emit in less than 1 second.
The power is indicated on the transmitter control unit. Furthermore, for a power greater than 1.5 %, this is indicated by the lamp for emission control. The provision of the power stages without previous tuning is not possible.

2.2.5 Tuning without carrier when employed on transmitter KSG 1300

If, with the operating state instruction "tuning with carrier", a program has been written in, this program can be used under the corresponding Program-No. to bring the transmitter into the tuning position without causing emission.
In this case the mains sections of the power stages are switched off. Following pushbutton actuation, tuning lasts less than 1 second.

2.2.6 Reception with adapter aerial when employed on transmitter KSG 1300

A 50-ohm output for a receiver is provided on the transmitting/reception changeover switch KUF 1300.
If a program is written-in in the known manner, the aerial tuning unit serves in this operating state for matching the aerial to the receiver after the appropriate program has been called. In this case the power mains sections of the transmitter are switched off. The transmit-receive relay has switched off the transmitter output, and switched the receiver to the aerial via the adapted aerial tuning unit. Thus an optimum reception of the stored frequency is guaranteed.
(2nd extension stage of the system KSS 1300.)

2.2.7 Reception with direct aerial when employed on transmitter KSG 1300

With a switched-through aerial tuning unit, the receiver is directly connected to the aerial.

2.2.8 "OFF" when employed on control unit KCS 1400

This operating state serves for "switching off" the transmitter, viz., with the exception of the auxiliary mains of the transmitter, the power supply of the transmitter is switched off.
However, for repair work on the transmitter, the binding safety regulations are still applicable for the transmitter (system earthing etc.).

2.2.9 Simplex operation when employed on transmitter KSG 1300

With the transmitter tuned, simplex operation can be carried out in each of the positions 0.1 P; 0.25 P and 1.0 P by also connecting the receiver to the aforementioned receiver output and adjusting it to the transmit/receive frequency. Both transmitting and receiving are effected in this case with optimum aerial matching.

2.3 Instruction group/frequency selection

This instruction group serves for the input of the transmitting frequency. Following actuation of the cancellation pushbutton the 7-digit frequency is put in via a tens keyboard (subsequent-

ly automatic interlocking of the input is effected). Writting in is carried out from left to right (cf. telephone number input). This instruction group is only effective in the operating state "preparing for operation".

2.4 Instruction group/program selection

This instruction group is actuated when a transmitting program number is put in or called (cf. operating state "preparing for operation" and transmitter KSG 1300 "reception with tuned aerial").
15 different and complete transmitting programs can be stored.

2.5 Instruction group/aerial selection and/or selection of aerial tuning unit KTA

In this case the required aerial or the required aerial tuning unit KTA is selected.
This instruction group is only effective in the operating state "preparing for operation".

2.6 Instruction group/class of emission

This instruction group can be freely selected for all operating states. However, during a tuning procedure in the operating state "tuning with carrier", the existing class of emission is automatically switched off and the tuning level applied.

2.7 Instruction group/channel selection

This instruction group can be freely selected for all operating states. The selection of both modulation lines (AF channels) as well as those of the channel procedure (type of keying, limitation etc.) follows.

2.8 Control example 1 when employed on transmitter KSG 1300

In the program, 8 subsequently following and always recurrent transmitting modes are to be stored:

Frequency	23.49271 MHz
Class of emission	A3J
Aerial	2
Channel	1 pressed
Channel	2 pressed

Proceed in the following way:

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- Depress pushbutton "preparing for operation"
- Depress pushbutton "program 8"
  (In this case the previous program contents appears on the display)
- Now enter the transmitting mode in optional sequence of the instruction group.
- Depress pushbutton "tuning with carrier"
  (The carrier power is emitted for a short time when matching is made with an aerial tuning unit KTA)

The display "end of tuning" confirms the tuning procedure. The program is written in and can only be cancelled again by overwriting it in the position "preparing for operation".

- The transmitter is ready for operation; the power stage can be selected (0 P; 0.1 P; 0.25 P or 1.0 P).

2.9 Control example 2 when employed on transmitter KSG 1300

A program under the program-no. 8 shall be called and the transmitter "quietly" tuned. Proceed in the following way:

- Depress pushbutton "preparing for operation"
- Depress pushbutton "program 8"
- Depress pushbutton "tuning without carrier"
  (Carrier is not emitted)

The display "end of tuning" confirms the tuning procedure. The program has been entered without failure.

- The transmitter is ready for operation; the power stage can be selected (0 P; 0.1 P; 0.25 P or 1.0 P).

2.10 Control example 3 when employed on control unit KCS 1400

In program 8, the subsequently following and always recurrent transmitting mode is to be stored:

Frequency	23.49271 MHz
Class of emission	A3J
Aerial	2
Channel	1 pressed
Channel	2 pressed

Proceed in the following way:

- Depress pushbutton "preparing for operation"
- Depress pushbutton "program 8"
  (In this case the previous program contents appears on the display)
- Now enter the transmitting mode in optional sequence of the instruction group.
- Depress pushbutton "program writing in"
  (Carrier power is not emitted)

The program is written in immediately and can only be cancelled again by overwriting in the position "preparing for operation"; otherwise, the program selected always appears when the program pushbutton 8 is depressed in the position "preparing for operation".

- Following actuation of the operating state "tuning with carrier" transmission can be performed (0.1 P; 0.25 P; 1.0 P) or the transmitter can be switched to the standby position 0 P.

3. Checking of the operating function

3.1 Self-checking of the control unit

This checking work can be carried out in the system on the looped-in unit. In this case, the equipment connected to the brought out check-back bus are misadjusted. The transmitter remains in its position.

Checking sequence:

- Set the interface selector on the rear side to V24 or WT-0 (VFT) short-circuit testing.
- Subsequently, the keyboard keys are actuated one after the other.
  In this casethe pushbuttons actuated last of all must light up. An exception are the pushbuttons for frequency which are not illuminated and whose indication is performed via the "numerical display".
  Switching on by the mains pushbutton can be checked by the luminous dot in the numerical display. The buzzer pushbutton lights up intermittently when depressed.
- When no pushbuttons are depressed for roughly 3 seconds, the lamp for "transmitter malfunction" lights up. (The reason is

that the signal pulse is missing from the transmitter.)"
This display is correct.

- Following this checking work, the interface selector is once more switched to the operating position and the test push-button depressed for a short time.
- Consequently, the actual transmitter state is signalled back again.

3.2 Checking of the power and operating state displays

Connect the transmitter to the dummy aerial. Set the corresponding states.

3.3 Checking of the store support with appropriately selected mode of operation

This check is carried out in an optional setting of the unit by withdrawing the mains plug for a short time from the socket-outlet. Subsequently, all displays of the transmitter must reappear.

3.4 Checking of the mains/battery changeover with appropriately selected mode of operation

This check is carried out in an optional setting of the unit by withdrawing the mains plug from the socket-outlet. The unit must remain operable in just the same way as for mains operation.

4. Operational disturbances and remarks on disturbance elimination when employed on transmitter KSG 1300

4.1 Lighting up of display "summation fault"

4.1.1 Lighting up of display "summation fault" when employed on transmitter KSG 1300

In this case the disturbance is in the transmitter or in one of the peripherals monitored by the transmitter.
This disturbance could mean the failure of a subassembly which must be either repaired or exchanged in accordance with the documentation associated with the transmitter (cf. Equipment Documentation for the Transmitter).
The message is also given when the transmitter is overloaded under unusual operating conditions, e.g. extreme heating of the modules. If their temperature has sunk once more, the transmitter steps up automatically again and the disturbance lamp goes out.

The carrier is blocked during the display of the summation fault. The regeneration of all appropriate disturbance stores is effected in the operating state "preparing for operation".

4.1.2 Lighting up of display "summation fault" when employed on control unit KCS 1400

In this case it is a fault which has occurred in the control unit KCS 1400 or its peripheral units.
In case of temporary faults, e.g., in the aerial range of the transmitter, the fault indication can be cancelled again by switching the control to "OFF", and stepping up once more of the transmitter over "preparing for operation" and "tuning with carrier".
If the fault indication cannot be cancelled it is a permanent fault which can be localized after opening the door of the control unit KCS 1400 and reading the "fault display" (cf. disturbance table of control unit KCS 1400).

4.1.3 Flashing of display "summation fault" when employed on control unit KCS 1400

The transmitter connected to the control unit has been switched to "self-checking" by the servicing personnel and is not available at the moment.

4.2 Lighting up of display "disturbance of readiness for operation"

In this case it is fault which is mainly caused by the missing mains voltage in the transmitter or by the interruption of the check-back path.
This message can be delayed up to 3 seconds. Switch on the mains for the transmitter and check the transmission path.

4.2.1 Checking of the transmission path

- Check the switch positions of the interface selectors in the control unit KBS 1300 and at the counter-station, e.g. KSG 1300 or KCS 1400 for agreement.
- The transmission path and the transmitting units are to be tested with the associated testing facilities.
- The control unit KBS 1300 can be switched to self-checking (cf. Section 3.1). Thus, checking is carried out to see whether the fault lies in the inherent unit.

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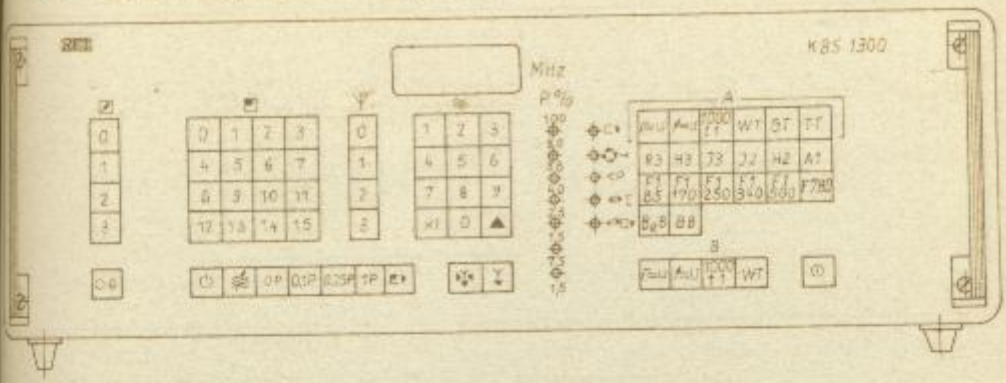
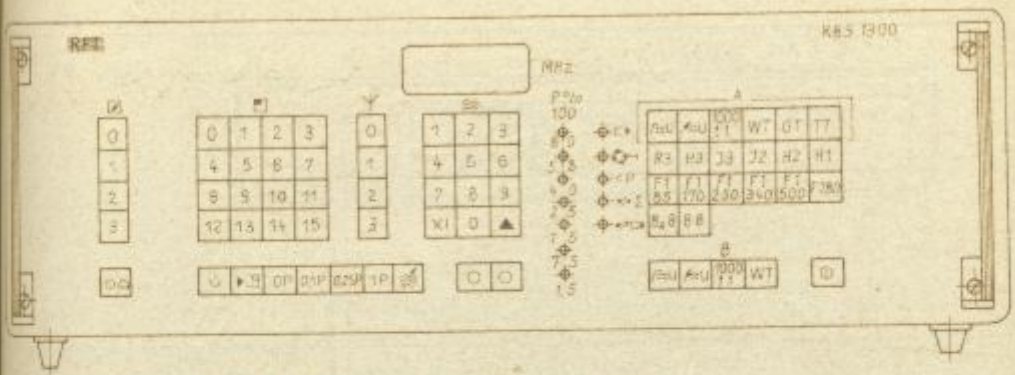
5. Explanation of the symbols



When employed on transmitter KSG 1300

	Control position selection	GT	DC keying
	Program selection	TT	Tone keying
	Aerial selection		Buzzer OFF/ON
	Frequency selection		Preparing for operation
P %	Power indication		Tuning with carrier
	Radiation check	0 P	Power stage 0
	End of tuning	0.1 P	Power stage 10%
< P	Power reduction	0.25P	Power stage 25%
Σ	Summation fault	1 P	Power stage 100%
	Disturbance of readiness for operation		Tuning acc. to program (without carrier)
A	AF channel A		Reception with adapted aerial
B	AF channel B		Reception with direct aerial
≈U	with volume control		Mains ON/OFF
≈U	without volume control	X	Frequency, cancel
1000 ±1	Set up of radio link	▲	Testing
WT	VFT operation	MHz	Dimension of the frequency indication

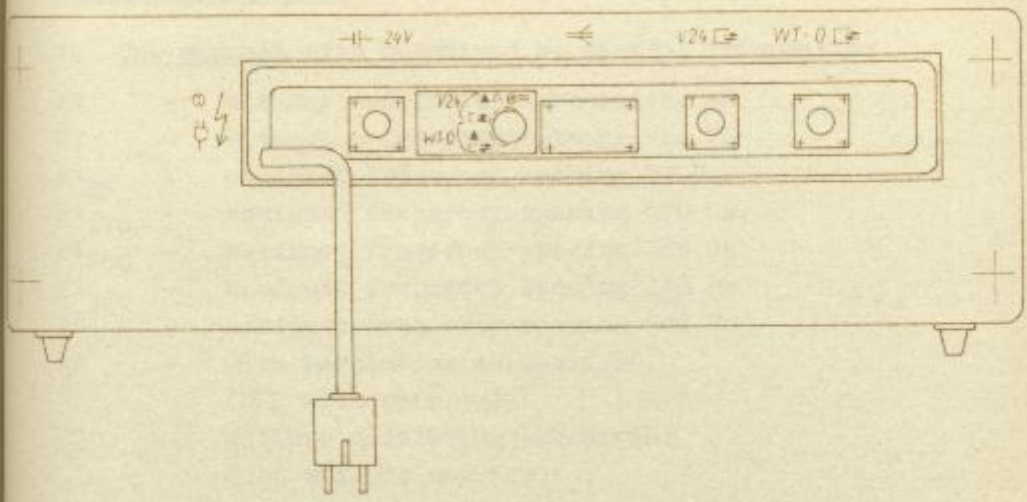
Explanation of the classes of emission R3/H3/J3/J2/A1/ $F1_{85}$/$F1_{170}$/$F1_{250}$/$F1_{340}$/$F1_{500}$/F7BD/B_R8/B8: cf. page 30



When employed on control unit KCS 1400

	Control position selection	GT	DC keying
	Program selection	TT	Tone keying
	Aerial selection		Buzzer OFF/ON
	Frequency selection		Preparing for operation
P %	Power indication		Writing-in of the program
	Radiation check	0 P	Power stage 0
	End of tuning	0,1 P	Power stage 10%
< P	Power reduction	0,25P	Power stage 25%
Σ	Summation fault	1 P	Power stage 100%
	Disturbance of readiness for operation		Tuning with carrier
A	AF channel A		Transmitter OFF
B	AF channel B		
≈U	with volume control		Mains ON/OFF
≈U	without volume control	X|	Frequency, cancel
1000 ±1	Set up of radio link	▲	Testing
WT	VFT operation	MHz	Dimension of the frequency indication

Explanation of the classes of emission R3/H3/J3/J2/A1/ $F1_{85}/F1_{170}/F1_{250}/F1_{340}/F1_{500}$/F7BD/$B_R$8/B8: cf. page 30



When employed on control unit KCS 1400 and transmitter KSG 1300

	Mains connection
24V	Battery connection
	Check-back bus
V24	Interface V24
WT-0	Interface WT-0 (VFT)
	Modem operation with V24
▲	Testing
	Operation

Classes of emission

1. One channel with quantized or digital information

A1 - without modulating subcarrier, AM
F1 - without modulating subcarrier, FM
$F1_{85}$ - assigned frequency spacing 85 Hz
$F1_{170}$ - assigned frequency spacing 170 Hz
$F1_{250}$ - assigned frequency spacing 250 Hz
$F1_{340}$ - assigned frequency spacing 340 Hz
$F1_{500}$ - assigned frequency spacing 500 Hz
H2 - with modulating subcarrier
(SSB with carrier)
J2 - without modulating subcarrier
(SSB without carrier)

2. One channel with analog information

H3 - SSB with carrier
R3 - SSB with residual carrier
J3 - SSB without carrier

3. Two or more channels with quantized or digital information

F7BD - without modulating subcarrier, FM

4. Two or more channels with analog information

B8, B_R8 - independent sidebands

III. SERVICING INSTRUCTIONS

1. Servicing work

- It is recommended after longer transport periods to loosen the red-marked screws on the front panel, to withdraw the plug-in, and to check by visual inspection the unit for damage which could possibly have occurred as a result of incorrect transport.
  When the unit is in an unobjectionable state, insert the plug-in again and screw firmly in position; otherwise, repair the unit.
  The outer parts of the unit are also to be checked; proceed correspondingly.
- Within certain periods, according to the degree of contamination, the pushbuttons are to be cleaned with a soft cloth or brush, best of all with spirit, freed from dust, and rubbed dry with another cloth.

2. Periodic functional tests

In order to have continuous certainty about the operating readiness of the unit, servicing cycles can be carried out which consist of functional checks.
It is recommended to take partial checks from the Section dealing with "Checking of the operating function" and to elaborate these together with the operational sequencies and features of the station to form a testing and servicing plan.

IV. ASSEMBLY INSTRUCTIONS

1. General remarks

The control unit KBS 1300 is operated as a table-top set in an EGS box-type plug-in and does not require special assembly. The unit can be operated as a single unit and in a stack with other EGS units having the same depth. When the units are stacked the bottom unit is to be provided with 8 bores on the upper side of the casing. The arrangement of the bores is to be taken from the spacing bushings on the upper chassis runner. The control unit is connected in accordance with the connection diagram 1493.142-00001 Ap (4) and taken into operation according to the Equipment Documentation.

1.1 Mobile application

In case of mobile application (on ships or in road vehicles) it is necessary to screw down the unit. Instead of the plastic base pieces, the support for incorporation into road vehicles (rail, compl. 1340.038-01050) is to be mounted.
In order to guarantee access to the connection sockets at the rear side of the unit in the mounted state, a minimum spacing of 100 mm is to be observed between the unit and the wall (cf. Section 1.5).

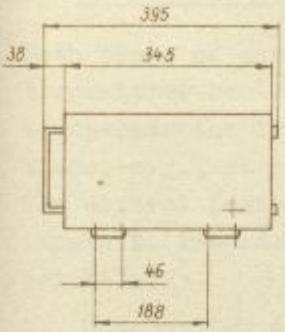
1.2 Standards and regulations

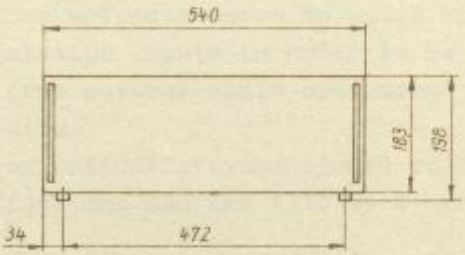
The binding regulations and standards for assembly and taking into operation of electrical installations and those for industrial safety are to be observed.
For assembly work, instructed personnel with suitable qualification are necessary for the installation of low-voltage electrical plants 220 V/380 V.
The control unit is only to be opened for servicing and maintenance work.
The industrial safety is guaranteed according to ASVO § 3/1.
Proof of labour, health and fire protection is available in VEB Funkwerk Köpenick under Drwg.-No. 1493.142-00001 GAB.

1.3 Cables and cable accessories

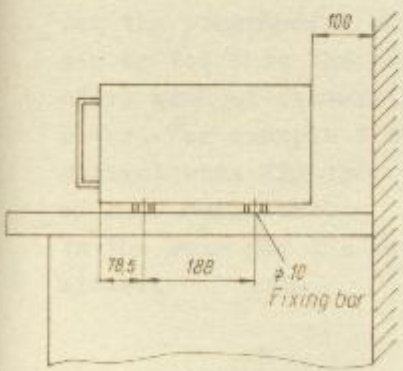
The necessary cables do not form part of the scope of delivery of the unit. The connectors and cable lead-ins are adapted to the types of lines and cables.
The assembly of the connectors and the cables is carried out according to the Assembly Instructions (cables) 1614.011-01610 Mv 02.
The connectors and associated accessories necessary for cable assembly are to be taken from the accessories of the unit.

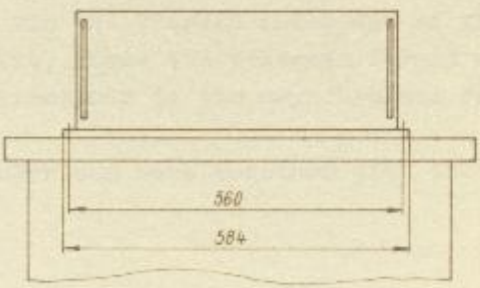
4 Dimensions





5 Assembly for mobile service





V. ADDITIONAL EQUIPMENT

1.	Control position selector KWB 1300	1493.145-00001 (under development)
	Control position selector KWB 1310	1493.146-00001 (planned)

Both types of control position selector serve to split up the transmitter control and modulation inputs in order to be able to operate the transmitter from several radio operators' positions, e.g., remote and in-situ.
The control position selector extends aforementioned control inputs to two working positions and the KWB 1310 to 4 working positions.

2. Modems, VFT equipment, computers

Telegrams in the dc position are delivered by the control unit KBS 1300 at its interfaces V24/V28 and WT-0 (VFT).
These signals can be routed further to modems or VFT equipment for processing in the AF position. Consequently, signals originate which can be transmitted via normal telephone lines.
With the modem of type MD 101, for example, switchable CB or LB telephone operation or data operation can be executed.
Modems are also suitable for point-to-point circuits.
With the VFT equipment VWT 24, for example, 24 control and/or check-back channels can be simultaneously further transmitted over an AF channel. This corresponds to the transmitter control and check-back of 12 transmitting installations.
For the programming of software of computers, the telegrams can be fed into the serial input circuit of the computer periphery without conversion via the V24/V28 interface of the computer, for example Z 80 Sio, since the telegram format of the control unit KBS 1300 corresponds to the asynchronous format of such computers.
In the same way the computer can work together with the transmitter.

VEB Funkwerk Köpenick

List of Data and Addresses of Transmitter KSG 1300

Nr. 1614.011-00001 Wp (4) 02

Page: 1 No. of pages: 21

	Address	Data 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
KTA-No./ Aerial-No.	0	0	1	2	3												
Frequency 10^7	1	0	1	2	3	4	5	6	7	8	9						
10^6	2	0	1	2	3	4	5	6	7	8	9						
10^5	3	0	1	2	3	4	5	6	7	8	9						
10^4	4	0	1	2	3	4	5	6	7	8	9						
10^3	5	0	1	2	3	4	5	6	7	8	9						
10^2	6	0	1	2	3	4	5	6	7	8	9						
10^1	7	0	1	2	3	4	5	6	7	8	9						
Operating state	8		Preparing for operation	Tuning with carrier	0 P	0.1P	0.25P	1 P	Tuning without carrier	Reception/ adapted aerial	Reception/ direct aerial						
Program-No.	9	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Class of emission	10	A3A	A3H	A3J	A2J	A2H	A1	F1 85	F1 170	F1 250	F1 340	F1 500	F6	A3 Ba	A3 Bj		
Channel A	11		⌐	⌐	1000 Hz	WT	GT	TT									
Channel B	12		⌐	⌐	1000 Hz	WT											
Control unit	13	0	1	2	3					xxx)							
RF power xx)	14	0	1	2	3	4	5	6	7								
Operating x) state xx)	15 ▼	2^0 End of tuning				2^1 Radiation check				2^2 Power reduction				2^3	Summation fault		

x)
xx) cf. page 1a
xxx)

x) This telegram, except for changes in the operating state of the transmitter, is compulsorily transmitted at three second intervals from the transmitter to the control unit in order to indicate the readiness for operation of the transmitter.
When the pushbutton "testing" (▼) is actuated on the control unit, a check-back cycle is indicated from the transmitter.

xx) Real-value check-back.

xxx) Values in brackets ≙ power values in percent.

VEB Funkwerk Köpenick

Control Unit KCS 1400.List of Data and Addresses

1644.018-00001 Wp (4) 02

Page: 1

		Data																
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Address																
KTA-No./Aerial No.	0	0	1	2	3												
Frequency 10^7	1	0	1	2	3	4	5	6	7	8	9						
10^6	2	0	1	2	3	4	5	6	7	8	9						
10^5	3	0	1	2	3	4	5	6	7	8	9						
10^4	4	0	1	2	3	4	5	6	7	8	9						
10^3	5	0	1	2	3	4	5	6	7	8	9						
10^2	6	0	1	2	3	4	5	6	7	8	9						
10^1	7	0	1	2	3	4	5	6	7	8	9						
Operating state	8		Preparing for operation	Programming	0 P	0.1 P	0.3 P	1 P	Tuning with carrier	Off	Off						
Program-No.	9	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Class of emission	10	A3A	A3H	A3J	A2J	A2H	A1	P1 85	P1 170	F1 250	F1 340	F1 500	P6	A3 Ba	A3 Bj		
Channel A	11				1000 Hz	WT	GT	TT									
Channel B	12				1000 Hz	WT											
Control unit No.	13	0	1	2	3												
RF output XX)	14	0	1	2	3	4	5	6	7								
Operating state XX)	15	2^0 End of tuning				2^1 Radiation check				2^2 Power reduction				2^3 Summation fault			

X) This telegram, except for changes in the operating state of the transmitter, is compulsorily transmitted in the spacing of seconds from transmitter to control unit in order to indicate the readiness for operation of the transmitter. XX) Real value check-back

Relationship between operating state and possible control, check-back and internal switching states on KSG 1300.

Operating state	Release of the input commands															Check-backs								Internal switching states		
	Aerial tuning unit No. or aerial No. 0-3	Frequency 10^7	Frequency 10^6	Frequency 10^5	Frequency 10^4	Frequency 10^3	Frequency 10^2	Frequency 10^1	Operating state	Programm-No. 1-15	Classes of emission	Channel A	Channel B	Control unit No. 0-3	Check-back of input commands	Check-back of operating state	Check-back of RF power	Check-back of mains units ON	Power mains units ON	Logic & control	Carrier release
Preparing for operation; program selection and calling	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-	-	-	x	-
Tuning with carrier Program writing	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	sw	x	x	x	sw
0 P (standby)	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	-	x	x	x	-
0.1 P	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	x	x	x	x	x
0.25 P	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	x	x	x	x	x
1.0 P	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	x	x	x	x	x
Tuning without carrier	-	-	-	-	-	-	-	-	x	-	x	x	x	x	x	x	-	x	x	-	-
Reception with adapted aerial	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	-	x	x	-	-
Reception with direct aerial	-	-	-	-	-	-	-	-	x	x	x	x	x	x	x	x	-	x	x	-	-

sw = temporary; X = possible; - = not possible

Note: Operation in the power stages 0 P to 1.0 P is automatically blocked when a tuning procedure was not previously carried out.

Relationship between operating state and possible control, check-back and internal switching states on KCS 1300.

Operating state	Release of the input commands: Aerial No. 0-3	Frequency 10^7	Frequency 10^6	Frequency 10^5	Frequency 10^4	Frequency 10^3	Frequency 10^2	Frequency 10^1	Operating state	Program-No. 1-15	Cl. of emission	Channel A	Channel B	Control unit No. 0-3	Check-back of input commands	Check-back of RF power	Check-back of operating state	Check-backs: Carrier release	Logic & control mains units ON	Internal switching states: Power mains units OFF
Preparing for operation; program selection and calling	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	-	X	-
Programming	-	-	-	-	-	-	-	-	X	-	-	-	-	X	X	-	X	-	X	-
0 P (standby)	-	-	-	-	-	-	-	-	X	-	X	X	X	X	X	-	X	-	X	-
0.1 P	-	-	-	-	-	-	-	-	X	-	X	X	X	X	X	X	X	X	X	X
0.25 P	-	-	-	-	-	-	-	-	X	-	X	X	X	X	X	X	X	X	X	X
1.0 P	-	-	-	-	-	-	-	-	X	-	X	X	X	X	X	X	X	X	X	X
Tuning with carrier	-	-	-	-	-	-	-	-	X	-	X	X	X	X	X	zw	X	zw	X	X
OFF (transmitter)	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	-	X	-	XX	-
OFF (transmitter)	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	-	X	-	XX	-

zw = temporary; X = possible; - = not possible; XX = only KCS 1400

Note: Operation in the power stages 0 P to 1.0 P is automatically blocked when a tuning procedure was not previously carried out.

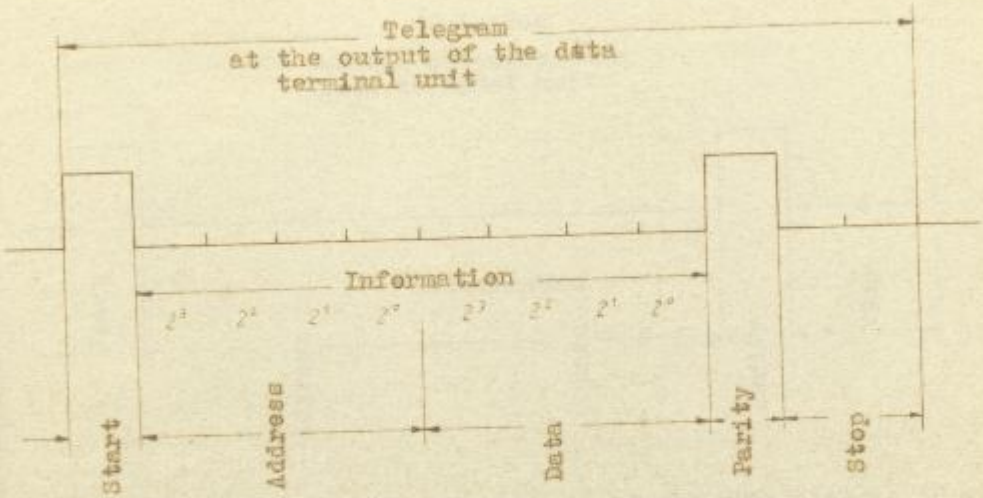


Figure 1: Representation of a telegram with address 15 and data 15

Start bit	≙	Begin of telegram
Address bits	≙	Instruction group of the transmitter
Data bits	≙	Instruction word of the corresponding instruction group
Parity bit	≙	Parity of address + data bits
Stop bit	≙	End of telegram

Adjustable speed:

50, 100, 200, 300, 600, 1200 bit/second.

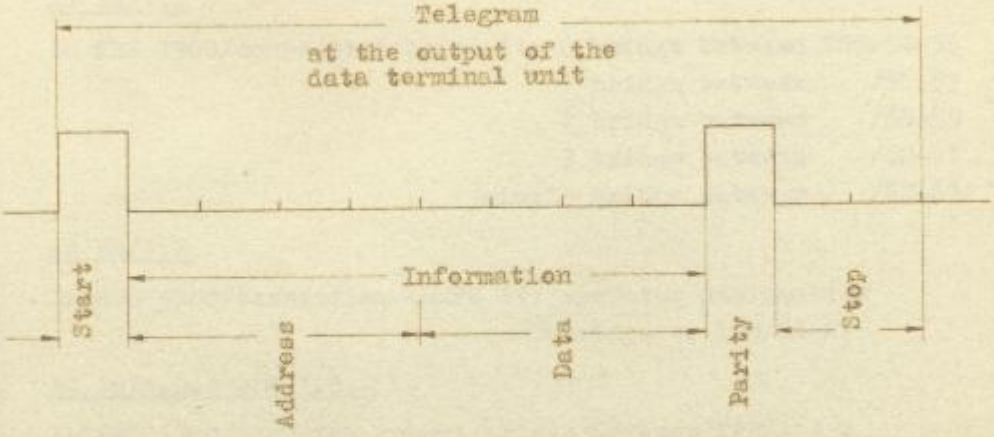


Figure 1: Representation of a telegram with address 15 and data 15

Start bit	≙	Begin of telegram
Address bits	≙	Instruction group of the transmitter
Data bits	≙	Instruction word of the corresponding instruction group
Parity bit	≙	Parity of address + data bits
Stop bits	≙	End of telegram

Adjustable speed:

50, 100, 200, 300, 600, 1200 bit/second.

Modification of control unit KBS 1300

Ad Ba/1.1

In KBS 1300/connection board 11: 0 bridge between X09/54-55
1 bridge between /56-57
2 bridge between /58-59
3 bridge between /60-61
single bridge between /62-63

Ad Ba/1.2

In KBS 1300/connection boafd 11: operator designation
bridge to X09/66-67

Ad Ba/1.3.1 and 1.3.2

In KBS 1300/plug-in: remove bridge between X22/1 - 2

Ad Ba/1.3.3

In KBS 1300/plug-in: bridge between X22/1 -2

Ad Ba/1.4.1

In KBS 1300/connection board 11: remove bridge between X09/15-16

Ad Ba/1.4.2

In KBS 1300/connection board 11: bridge to X09/15-16

Ad Ba/1.5.1

In KBS 1300/connection board 11: bridge to X09/64-65

Ad Ba/1.5.2

In KBS 1300/connection board 11: remove bridge between X09/64-65

Ad Ba/1.6.1

In KBS 1300/connection board 11: bridge to X09/68-69

Ad Ba 1.6.2

In KBS 1300/connection board 11: remove bridge between X09/68-69

Ad Ba/1.7

In KBS 1300/remote control section:
50 Bd bridge between point 18-21
100 Bd bridge between point 17-20
200 Bd bridge between point 16-19
300 Bd bridge between point 15-18
600 Bd bridge between point 14-17
1200 Bd bridge between point 13-16

DDR M 31.325 VV Freiberg Ag 307/78 III/15/4 358/9 179

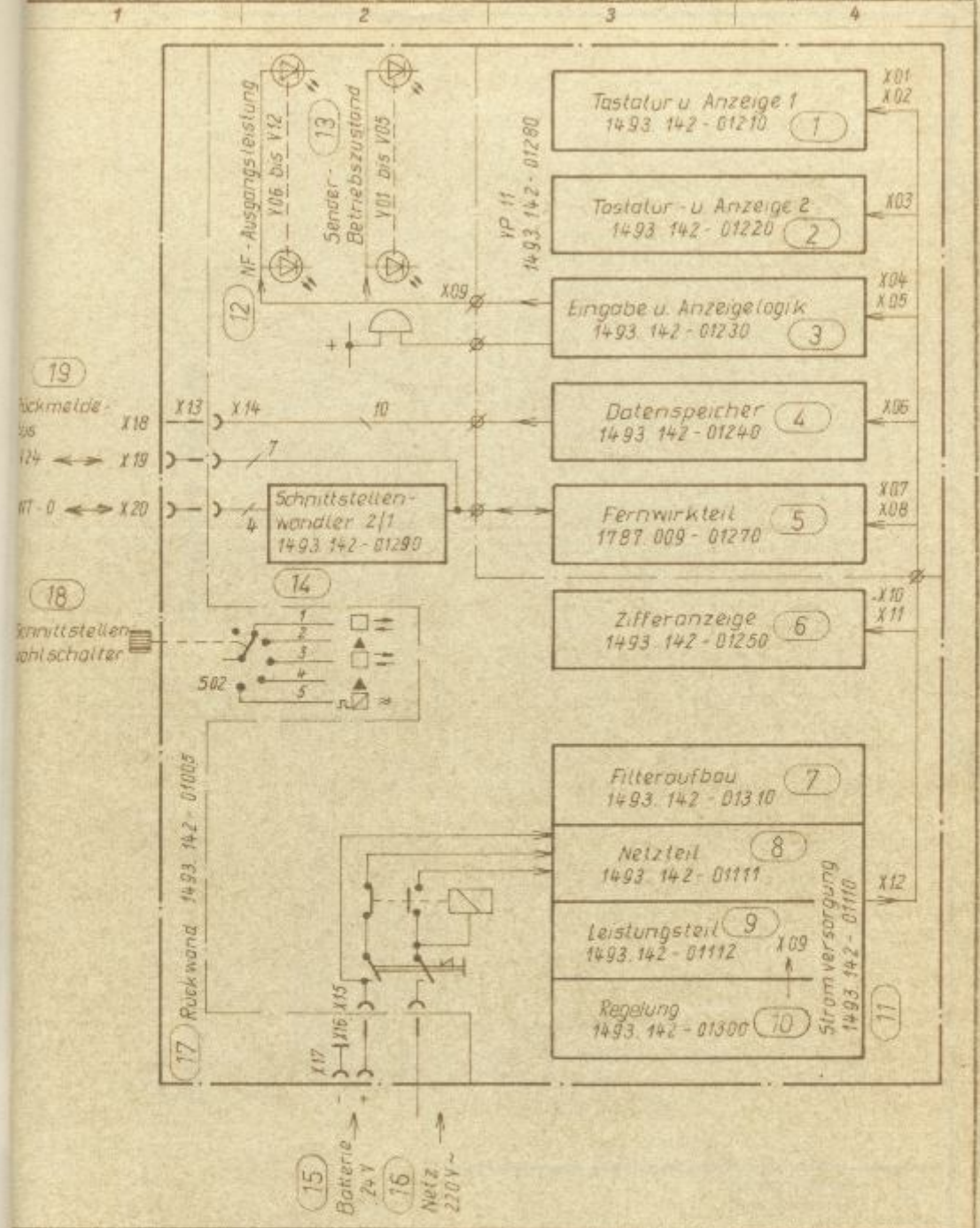
List of terms translated for Drwg.-No. 1493.142-00001 Up (4)

1) Transmitter control unit KBS 1300 Keyboard and display 1
2) Keyboard and display logic
3) Input and display logic
4) Data store
5) Remote control section
6) Numerical display
7) Filter assembly
8) Mains section
9) Power section
10) Printed circuit
11) Power supply
12) AF output power V06 to V12
13) Transmitter operating state V01 to V05
14) Interface converter 2
15) Battery 24 V
16) Mains 220 V ac
17) Rear panel
18) Interface selector
19) Check-back bus

List of terms translated for Drwg.-No. 1493.142-00001 Ap (3)

1) Transmitter control unit KBS 1300 (connection diagram)
2) Transmitter control unit KBS 1300
3) Peripheral units
4) Control telegram, line 103
   Check-back telegram, line 104
   Modem - transmission, line 105
   Operating earth, line 102
   Modem - On, line 106
   line 108
   Operating earth, line 102
   Control telegram, line a
   Control telegram, line b
   Check-back telegram, line a
   Check-back telegram, line b
   Battery +24 V
   Battery 0 V

5) to transmitter KSG 1300 or control unit KCS 1400 or transmitting equipment
6) Battery cable
7) Mains 220 V ac
8) Data 2^{0}
   Writing rate
   Addresses
9) Check-back bus
10) Bus processing
11) 1) cf. transmitting system KSS 1300
    Interfaces between KBS 1300 KSG 1300
    1524.019-00001 Wp (31g)



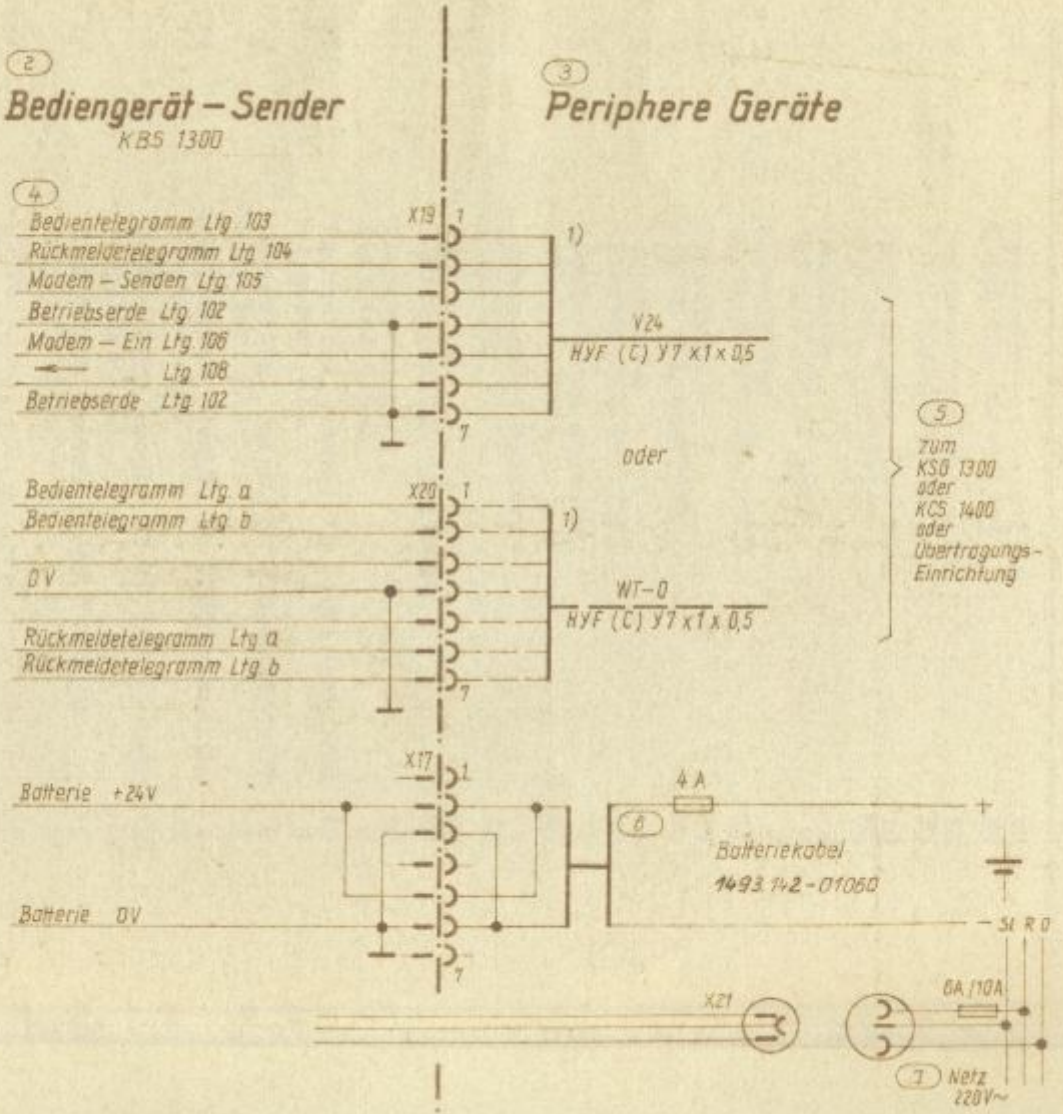
				Dargestellt auf		
				81	Tag	Name
				Gez.	14.5.	Boldt
				Gepr.		
01	0705/90	4.83	Bo	St. gepr.		
Änderung	Änd.-Mitt.-Nr.	Tag	Name	EFK		
W3	K5			VEB Funkwerk Köpenick		

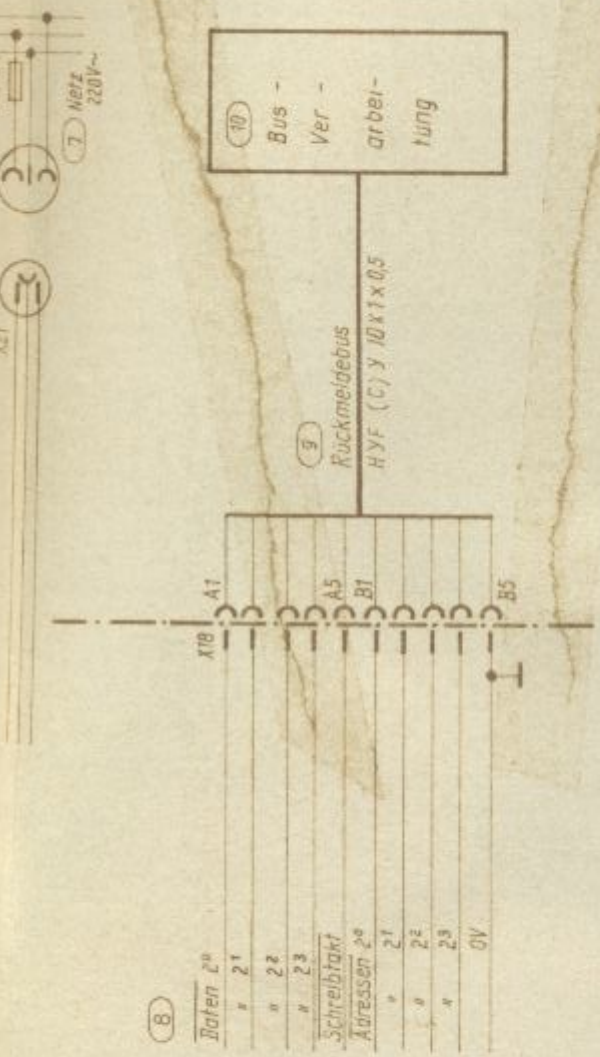
Benennung
Bediengerät - Sender
KBS 1300

1493.142 - 00001 Üp (4)

Ersatz für Orig gl. Nr. vom 19.7.79

Bo/IM 21-300 VV Freiberg Ag 307/76 III/15/6 1516 276
484 710 5401


2
Bediengerät – Sender
KBS 1300
3
Periphere Geräte
4
Bedientelegramm Ltg. 103
Rückmeldetelegramm Ltg. 104
Modem – Senden Ltg. 105
Betriebserde Ltg. 102
Modem – Ein Ltg. 106
Ltg. 108
Betriebserde Ltg. 102
X19
1
7
1)
V24
HYF (C) Y7 x1 x 0,5
oder
Bedientelegramm Ltg. a
Bedientelegramm Ltg. b
0 V
Rückmeldetelegramm Ltg. a
Rückmeldetelegramm Ltg. b
X20
WT-0
HYF (C) Y7 x1 x 0,5
5
zum
KSG 1300
oder
KCS 1400
oder
Übertragungs-
Einrichtung
X17
Batterie +24V
Batterie 0V
4 A
6
Batteriekabel
1493.142-01060
St R 0
X21
6A /10A
7
Netz
220V~



⑪

1) Siehe Sendesystem KSS 1300
Schnittstellen zwischen
KBS 1300 KSG 1300
1524.819 – 00001 Wp (3lg)

				Halbzeug/Werkstoff	zul. Abw. für Maße ohne Toleranzang. K6
				Benennung **Bediengerät – Sender** ① KBS 1300 (Anschlußplan)	Maßstab 1 Blatt-Nr. 1
					Masse
AZ	Mitteilung	Datum	Name		
82		Datum	Bus. Name	Zeichnungs-Nr. **1493.142 – 00001 Ap (3)**	EFK VEB Funkwerk Köpenick
Bearb.		7.7.	Boigt		
Konstr.					
Techn.					
Stand.				Ers. für	Ers. durch

Parts List 1493.142-00001 ZL for Control Unit KBS 1300

Item	Designation	Qty.
1	Power-current fuse link T 500 TGL 0-41571/03	30 NS
2	Power-current fuse link P 1.6 TGL 0-41571/01	10 NS
3	Power-current fuse link T 35 TGL 0-41571/03	10 NS
4	Extractor 1493.142-02062 (Wt)	2 E
5	Screwdriver A0.8x100 TGL 48-73503	1 NS
6	Screwdriver A1x125 TGL 48-73503	1 NS
7	Screwdriver A1.2x150 TGL 48-73503	1 NS
8	Double-ended spanner 8x10 TGL 37411	1 NS
9	Double-ended spanner 12x14 TGL 37411	1 NS
10	Bulb MSKF 6 V 0.05A TGL 10449	20 NS
11	Plunger element 1493.142-01050	10 B
12	Pushbutton, compl. fl 21054.000-0088 Supplier: KBL	10 N
13	Pushbutton, compl. gn 21054.000-0087 Supplier: KBL	2 N
14	Pushbutton, compl. ge 21054.000-0086 Supplier: KBL	2 N
15	Pushbutton, compl. bl 21054.000-0085 Supplier: KBL	2 N
16	Pushbutton switch 21050.011-1500 Supplier: KBL	10 N
17	Label 1493.142-02044	2 E
18	Label 1493.142-02045	2 E
19	Battery cable 1493.142-01060	1 B
20	Fuse link A4 TGL 11135	10 NS
21		

Item	Designation	Qty.
22		
23		
24	Connector 2RMT 18 KPN7 G1W1 TGL 32855	1 NS
25	Bag FOS-PE 220x330 TGL 22115 for Item-No. 17,18	1 NS
26		
27	Case 1030.092-02020 for Item-No. 1-3, 10-15, 20	1 E
28	Adapter cable (26-core) 1614.011-01157	1 B
29	Test cable 20-core 1399.035-01040 (Wt)	1 B
30	Ring 1614.011-02521 (Wt)	1 E
31	Female multipoint connector 222-10 TGL 29331/04	1 NS