



Alphanumeric Printer

USES:

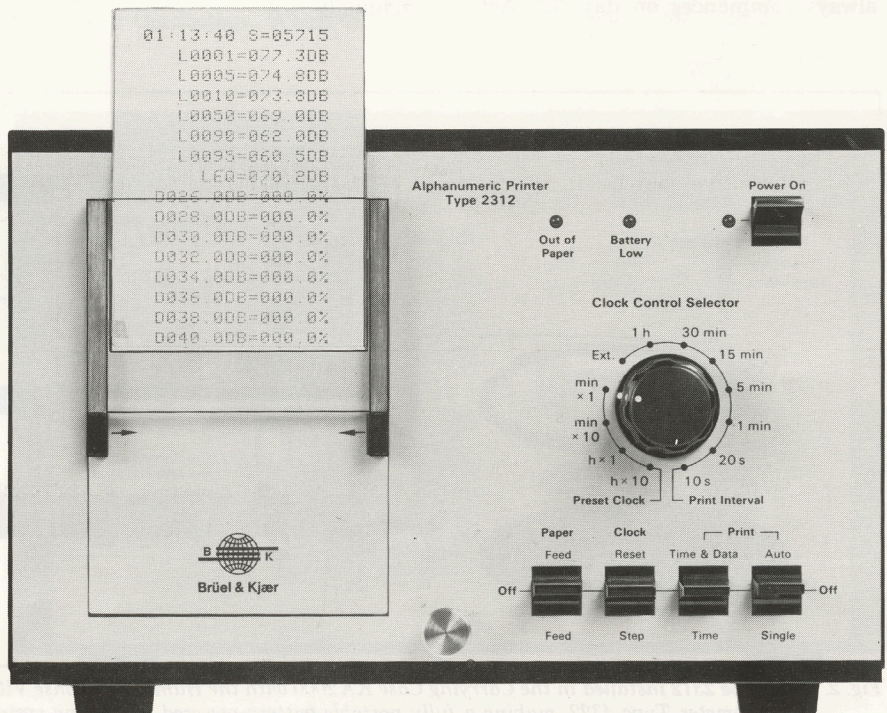
- Direct print-out of measurement results and explanatory text from the Human-Response Vibration Meter Type 2512
- Direct print-out of measurement and calculation results from the Building Acoustics Analyzer Type 4418
- Direct print-out of centre frequency and sound level via the built-in interface of a Digital Frequency Analyzer Type 2131
- Direct print-out of data from any instrument with an IEC/IEEE Interface using ASCII data coding

FEATURES:

- Up to 5 weeks operation from the internal battery power supply
- First data line at top of print-out

- 16 characters per line on 60mm wide paper roll
- Printing rate up to 24 characters per second
- 64 alphanumeric characters from ASCII upper case set
- Switch selection of left- or right-justified print-out
- Non-impact thermal printing system for quiet operation and low power consumption
- Easy paper loading
- Built-in IEC 625-1/IEEE-488 Interface
- Automatic print-out at pre-determined intervals using the internal crystal clock or external clock control
- Automatic print-out of day, hour, and minute
- "Low Power" setting reduces battery drain for long term applications
- Operates on mains power using ZG0199 Power Supply

The Alphanumeric Printer Type 2312 accepts incoming ASCII coded data, resolves them into alphanumeric characters, and prints them out on a paper roll. It functions as an output device to give a hard copy of measurements made with instruments that have an ASCII coded digital output. These include the Digital Frequency Analyzer Type 2131, the Human-response Vibration Meter Type 2512 and the Building Acoustics Analyzer Type 4418. Battery operation makes the Type 2312 especially suitable for portable applications allowing analyzed data to be printed out immediately in the field.





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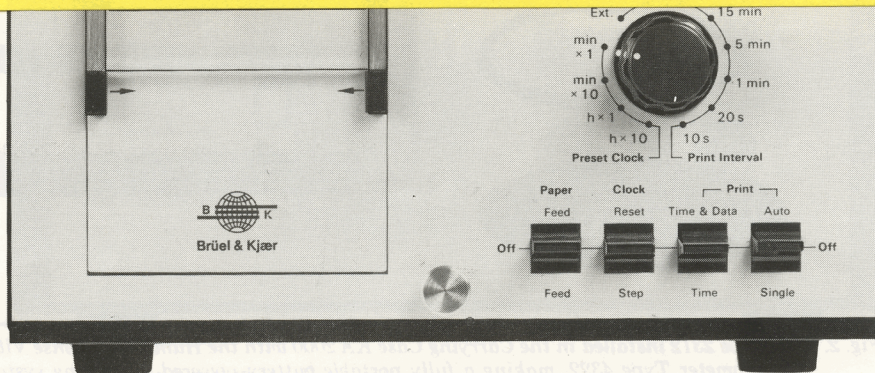
REVISION(S)

Product Data — Type 2312 Alphanumeric Printer (BP 0256-13)

A Revision based on the previous Product Data (2-044 0256-2A/BP 0256). References to the now obsolete Noise Level Analyzer Type 4426, the Strain Measurement System and the Paper Winder Unit Type WB0333/WH01270 have been deleted. Use with the Building Acoustics Analyzer Type 4418 and the Human-Response Vibration Meter Type 2512 is illustrated.

Dept. 3, August 1985

Digital Frequency Analyzer Type 2131, the Human-response Vibration Meter Type 2512 and the Building Acoustics Analyzer Type 4418. Battery operation makes the Type 2312 especially suitable for portable applications allowing analyzed data to be printed out immediately in the field.



Description

The Type 2312 is equipped with an IEC 625-1 digital interface (fully compatible with IEEE-488) which can operate in two different modes:

Addressable mode, the digital interface operates as a standard IEC/IEEE interface and the 2312 prints no data until addressed to Listen by a Controller device on the IEC/IEEE bus. The address is set on a switch array on the rear panel.

Listen Always mode, no addressing facility is required since the Printer prints any information transferred on the Bus.

A third operating mode is also available, B & K Low Power Interface mode, a low-power interface system specially designed by Brüel & Kjær for operation with battery powered equipment.

All internal time sequences are regulated by a built-in crystal controlled clock generator that has an overall accuracy better than ± 2 minutes per month in the full temperature range (-10° to $+50^{\circ}\text{C}$). The clock measures in days, hours, and minutes, which are recorded at the head of each data file to establish the time of origin for identification purposes. By means of a simple "Reset" and "Step" procedure, it is possible to set the clock to the actual time of day before recording a series of measurements. The recording always commences on day "0". Acti-

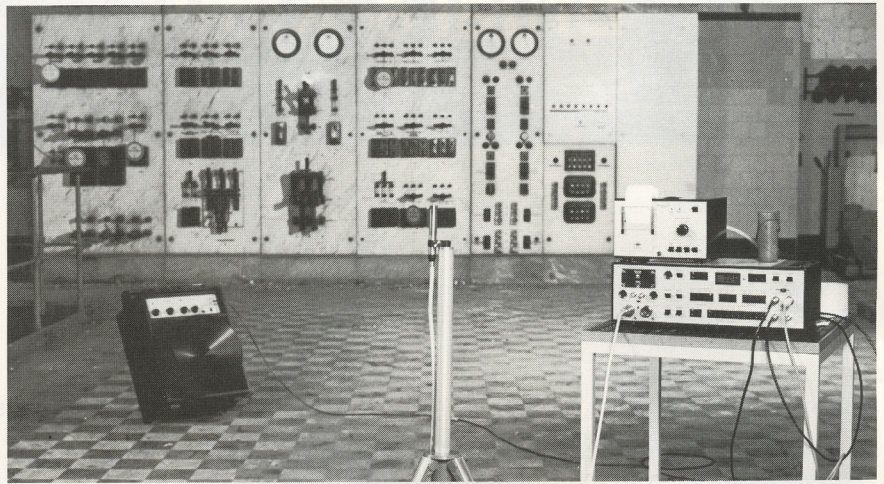


Fig. 1. The Type 2312 providing a hard-copy record of reverberation time measurements made using the Building Acoustics Analyzer Type 4418 and the Sound Source Type 4424

vating the test button "Print Time" provides a print-out of date and time alone.

The internal clock can also be used to start an automatic print-out of data at pre-selected intervals, in steps from 10 seconds to 60 minutes. When it is necessary to use intervals other than those provided by the instrument setting (to obtain intermediate values or longer intervals) the Type 2312 can be externally controlled by the transmitter, or by an external clock circuit. When under external control, the Printer still records the day and time as indicated by the internal clock at the head of each data file. A print-out of a single data file can also be started manually.

The paper feed geometry ensures that the first line of data printed always appears at the top of the print-out. To further simplify reading the printed data, the Type 2312 has a changeover switch that aligns the data lines with either the left-hand or the right-hand margin of the paper. Left-margin alignment is usual when printing alphanumeric information while right-margin alignment is chosen for pure numerical printouts, like noise measurements where all dB values can be aligned for easy comparison.

A data **string** consists of one or more characters followed by a Line Feed, or Carriage Return plus Line Feed, or with the single-line command "EOI" simultaneous with the last byte.

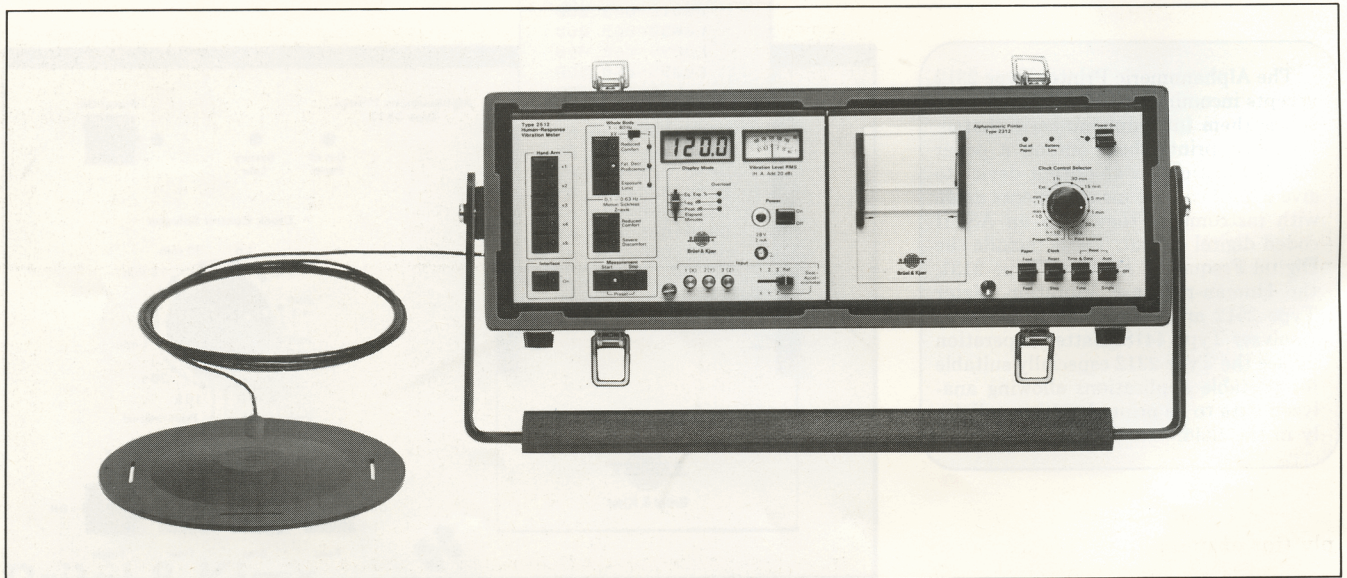


Fig. 2. The Type 2312 installed in the Carrying Case KA 2000 with the Human-Response Vibration Meter Type 2512 and the Triaxial Seat-Accelerometer Type 4322, making a fully portable battery-powered measuring system for in-the-field investigations

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0123456789:;<=>?
@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_
!"#$%&'()*+,-./

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Fig. 3. The Type 2312's character set — 64 characters from the ASCII upper-case set

A data **line** is a string with a maximum of 16 characters, while a **file** is composed of one or more lines forming a group.

Data bytes are received and stored before print-out of each line. When a data string contains more than the 16 characters that can be accommodated on the 60mm paper width, transmission is automatically interrupted and the first 16 characters printed. Then the following characters are transmitted and printed on the next line etc.

A thermal-printing system using heat-sensitive paper is employed. It can print 64 different characters in the ASCII upper case series in a 5×7 dot matrix as shown in Fig. 3. The line speed depends on the number of characters per line. With a full 16-character line, the printer will print 24 characters per second (1,5 lines per second). With one character per line, line speed will be six lines per second. The paper roll length of 25 m (82 ft) is sufficient for 5000 lines of data. When the paper magazine is empty, the "Out of Paper" lamp blinks and further print-out is inhibited.

The Printer can be powered from four alternative sources. In the standard configuration (as supplied), power is derived from a plug-in Battery Box ZG 0146 containing six 1,5 V Alkaline "D" cells (IEC type R20). The Battery Box can be replaced by the plug-in Power Supply ZG 0199 so that the instrument can be operated from line voltages between 100 V and 240 V, 50 to 400 Hz. Alternatively, the cells in the Battery Box can be replaced by rechargeable nickel-cadmium accumulators, which can be charged by a ZG 0199, or by a Battery Charger ZG 0113. The Printer can also be powered by an external 12 V DC supply (for example the ZG 0113) via the recharging socket, provided that the instrument contains rechargeable cells.

During print-out the Type 2312 draws an average current of 1A, between print-outs the demand falls to 30mA. A selector switch enables a "Low Power" mode to be chosen (only when operating with B&K interface) so that the standby demand is reduced to 4mA. This gives a lifetime on standby of approximately 5 weeks on fully charged NiCd cells.

When the battery output is not sufficient to drive the Printer, the "Battery Low" lamp blinks, and the print-out is inhibited until the cells have been replaced or recharged.

Paper Winder Units Types WB 0333 & WB 0334

In measurement installations where the Printer is set to print data at regular intervals it is necessary to collect the printed paper after it has been fed from the printer. For this purpose the B&K System Engineering Group has developed a Paper Winder Unit which can wind and hold a full roll of printed paper. The Paper Winder Unit is available in two different versions.

WB 0333

Illustrated in Fig. 5. The Paper Winder Unit is mounted on the front of 2312 on the sliding rails of the 2312 paper outlet.

The motor in the unit is supplied from the 2312 via a cable, requiring a minor modification of the 2312 using Modification Kit Type WH 0948. When WB 0333 is ordered together with the 2312, the modification is carried out at the factory. When ordered

separately the user or the local B&K representative is requested to perform the simple modification.

WB 0334

Illustrated in Fig. 6. Similar to WB 0333, but with its own battery supply (1,5 V alkaline battery type LR6, US/GB "AA" size). Modification of the 2312 is therefore not required before installation. A new battery has enough capacity to wind four rolls of paper.

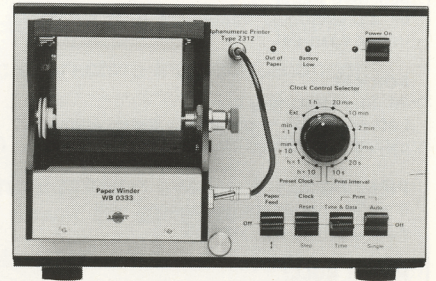


Fig. 5. Paper Winder Unit Type WB 0333 mounted on the Type 2312

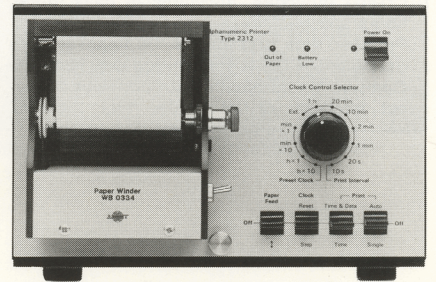


Fig. 6. Paper Winder Unit Type WB 0334 mounted on the Type 2312

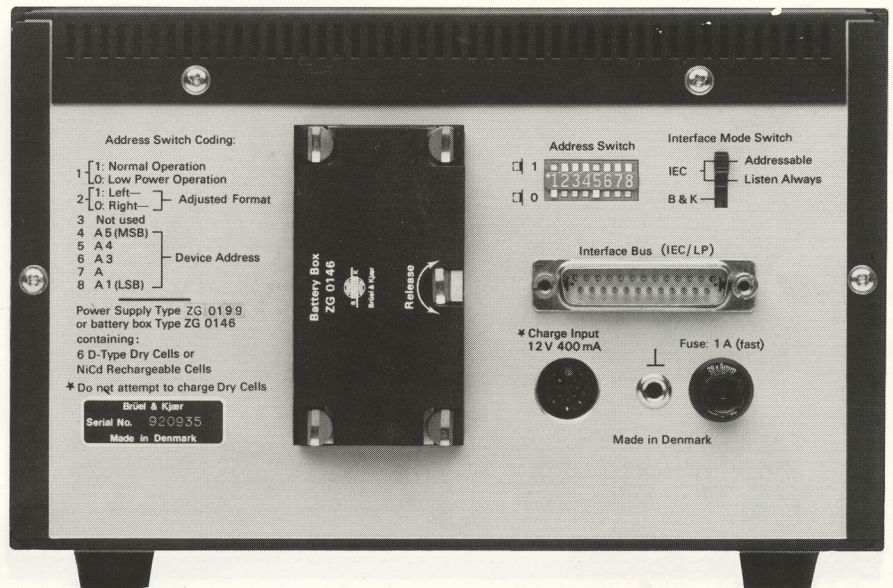


Fig. 4. The rear panel of the Type 2312

Specifications 2312

INPUT:

Digital data in 7-bit ASCII-coded form

INTERFACE:

Byte serial, bit parallel digital interface in accordance with IEC 625-1 and ANSI/IEEE Std 488-1978

3-way changeover switch for Addressable, Listen Always, or B & K Low Power Interface

IEC FUNCTIONS IMPLEMENTED:

Listener L 1

Source Handshake SH 1

PRINTING SYSTEM:

Thermal dot printing, 5 x 7 matrix, on heat sensitive paper

64 alphanumeric characters from the ASCII upper case set

FORMAT:

16 character data line

Left-hand or right-hand data alignment, switch selectable

PRINTING RATE:

6 to 24 characters per second with

6 to 1,5 lines per second

PAPER ROLL:

60 mm paper width

25 m (82 ft) roll length sufficient for 5000 lines

55 mm (2,15 in) max. roll diameter to fit magazine

CLOCK CIRCUIT:

Crystal regulated, measures in days (0-99), hours and minutes

Provides time print-out at the head of each data file if "EOI" is transmitted with last byte
Controls the automatic data print-out at pre-set intervals of 10s, 20s, 1 min., 5 min.,

15 min., 30 min. and 60 min.

Accuracy better than ± 2 min./month over full working temperature range

POWER SUPPLY: (any of the following)

1: 6 x 1,5V batteries, IEC R20, "D" cells *only at temperatures above 0°C*

2: 6 x 1,2V NiCd rechargeable cells

3: Line voltages between 100V and 240V, 50 to 400Hz with plug-in Power Supply Type ZG0199

4: External 12V DC supply from Type ZG0199 or ZG0113 via charging socket **only** when rechargeable cells are in the instrument

CURRENT CONSUMPTION:

1,4 A peak

<1,0 A average during print-out

<30 mA during standby with normal operation

<4 mA during standby with "Low Power" operation provided only B & K Low Power interface instruments are connected via an interface cable

BATTERY LIFE: (Rechargeable cells, 4 Ah)

5 weeks of standby with "Low Power" operation at 20°C (68°F)

Continuous print-out 20000 lines (16 characters) = 4 rolls

Battery life at standby is reduced by 2,6 minutes per full line printed

Self discharge in NiCd cells: 1% per day

Using Alkaline batteries will increase the operation time by a factor of 2 to 3

Zinc-carbon batteries are not recommended

OPERATING TEMPERATURE:

-10°C to +50°C (14°F to 122°F)

0°C to +50°C (32°F to 122°F) with alkaline batteries

DIMENSIONS:

Height: 132,6 mm (5,2 in)

Width: 209,5 mm (8,3 in)

Depth: 200 mm (7,9 in)

(6/12 of 19 in rack module)

Weight: (with standard batteries)

3,3 kg (7,25 lb)

ACCESSORIES INCLUDED:

6 Alkaline dry cells..... QB 0004

1 Battery Box..... ZG 0146

10 Rolls of heat sensitive paper

(2 x QP 0006)

25 pin IEC Bus Connector Kit..... UA 0793

7-pin DIN Plug..... JP 0703

ACCESSORIES AVAILABLE:

Rechargeable NiCd

cells..... QB 0008

Battery Charger..... ZG 0113

Power Supply..... ZG 0199

Cable for recharging from

ZG 0199..... AQ 0034

Cable for powering heat resistors

from ZG 0199..... AQ 0213

Charging Adaptor..... AQ 0157

Mahogany Case..... KA 0037

Packages of 5 rolls of paper..... QP 0006

IEC 625-1 interface cable (2 m)..... AO 0184

IEC/IEEE Adaptor..... AO 0195

IEC/IEEE interface cable (2 m)..... AO 0264

IEEE 488 interface cable (2 m)..... AO 0265

Paper Winder Unit..... WB 0333

Paper Winder Unit..... WB 0334

Modification Kit for Paper Winder

Unit WB 0333..... WH 0948

Brüel & Kjær

DK-2850 NÆRUM, DENMARK

Telephone: + 45 2 80 05 00

TELEX: 37316 bruka dk