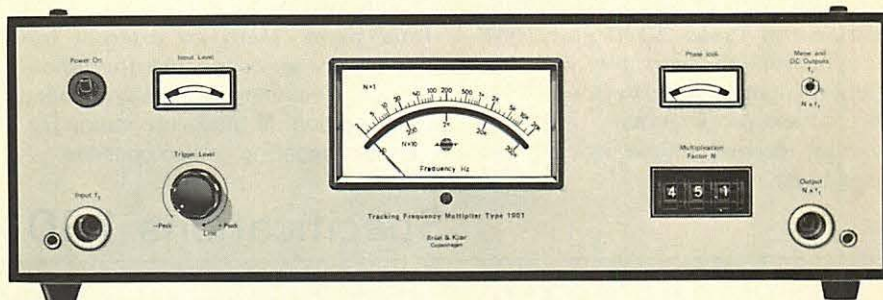


type 1901

FEATURES:

- Frequency coverage from 5 Hz up to 200 kHz
- Automatic tracking electronic tuning
- Simple to operate
- Accepts practically any periodic waveform, e.g. pulse, sine, square, triangular
- Accepts 80 dB variation of input signal level
- Frequency multiplication from $N = 0,1$ to $N = 999$
- N times line triggering
- Provision for external divider
- Lin and Log frequency to DC outputs

Tracking Frequency Multiplier



Tuned from the 1901, the Type 2020 Filter and the Type 2010 Analyzers are capable of performing a variety of automatic selective measurements, e.g. synchronous acoustic and vibration analysis of rotating machinery. Also complex harmonic analysis of loudspeakers. The various instrument combinations with the 1901 are indicated in the figure below.

High Resolution Signal Analyzer Type 2033, and the Dual Channel Signal Analyzers Types 2032 and 2034. The 1901 is then used to synchronise the frequency range of the 2031/2/3/4 with the rate of rotation of a machine to enable order analysis.

Description

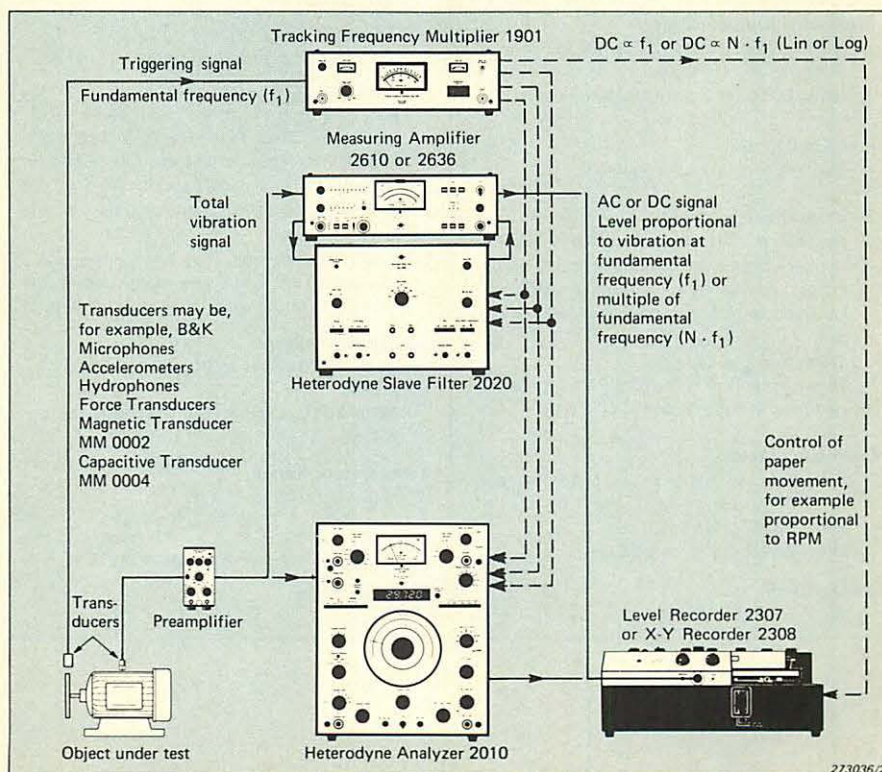
The AGC regulated input circuitry features an adjustable level trigger with hysteresis. It accepts practically any periodic waveform, and

USES:

- Synchronous vibration analysis of rotating machinery, e.g. gas turbines, fans, pumps, machine tools, piston engines, jet engines, gear boxes, etc.
- Acoustic analysis
- Analysis on vibration test set-ups
- Complex harmonic analysis
- Underwater sound analysis
- Dynamic balancing

The Tracking Frequency Multiplier Type 1901 provides the tuning signals to the Heterodyne Slave Filter Type 2020 and to the Heterodyne Analyzer Type 2010 so that they automatically lock onto and track the fundamental or a harmonic of practically any type of periodic waveform in the frequency range 5 Hz to 200 kHz.

With slight modification, the 1901 can be used with the Narrow Band Spectrum Analyzer Type 2031, the



the signal level may vary over an 80dB range from 30 mV to 300 V RMS. The input level meter shows whether the signal level is within limits.

The input circuitry converts the trigger signal into a reference frequency, which is fed to a phase locked loop operating on the heterodyne principle—beating between a fixed and a variable high frequency. These HF signals are used to tune instruments Types 2020 and 2010 in synchronism with the low frequency input signal to the 1901. The phase lock meter indicates whether correct phase locking has taken place.

The loop can be phase locked on multiples of the input frequency. This means that the connected measuring instrument can analyze sub-harmonics and harmonics of the fundamental frequency. Used with Type 2020, the multiplication factor is selectable between 0,1 and 99,9 in steps of 0,1. With Type 2010 the range is from 1 to 999 in steps of 1. The multiplication factor N is selected with a simple to operate thumb wheel switch on the 1901 front panel. With an external frequency divider connected, the fundamental frequency can be multiplied by a fraction. N times the mains frequency triggering is also possible.

Frequency to DC and Lin to Log converters are included in Type 1901. They provide signals to the logarithmic frequency meter and to the DC output, which is switchable to be either linear or logarithmic. Both the meter and the DC output can follow either the input frequency (f_1) or N times f_1 . The DC output signal is well suited to drive the Level Recorder Type 2307 or X-Y Recorder Type 2308 to give paper feed proportional to the fundamental or any harmonic frequency. Thus the complete variation of the harmonic content of the vibration signal from a machine with changing speed, for example, can be automatically plotted.

Specifications 1901

<p>Input: Accepts signals with practically any periodic waveform (e.g. square wave) with up to 10% white noise content 30 mV to 300 V RMS, 5 Hz to 100 kHz 100 mV to 300 V RMS, 100 to 200 kHz</p> <p>Input Impedance: >1 MΩ 230 pF</p> <p>Input Circuitry: Adjustable level trigger with hysteresis. The circuitry is AGC regulated</p> <p>Input Signal Locking: Dual meter indication of acceptable input level and correct phase locking</p> <p>Output Impedance: 1 kΩ, short circuit protected</p> <p>Frequency Multiplication: With 2020: N = 0,1 to 99,9 (steps of 0,1) With 2010: N = 1 to 999 (steps of 1)</p> <p>Line Triggering: N times line (mains frequency)</p> <p>External Divider Socket: For connection of an external frequency divider. Enables multiplication of fundamental frequency by a fraction. May also be used as input for a clean trigger signal Output is TTL compatible Input accepts 0,5 to 35 V RMS. Input impedance 10 kΩ 100 pF</p> <p>Frequency Meter: Shows f_1 or $N \times f_1$ (front panel switch), logarithmic scale With 2020: 2 Hz to 20 kHz With 2010: 20 Hz to 200 kHz</p> <p>Sweep Time: Min. 20 s for 1 decade</p>	<p>Input and Output Frequencies:</p> <table border="1"> <thead> <tr> <th>Analyzer Tuned</th> <th>Type 2020</th> <th>Type 2010*</th> <th>Signal type</th> </tr> </thead> <tbody> <tr> <td>Input (f_1)</td> <td>10 Hz to 200 kHz</td> <td>20 Hz to 200 kHz</td> <td>Periodic</td> </tr> <tr> <td>Output ($N \times f_1$)</td> <td>4 Hz to 20 kHz</td> <td>20 Hz to 200 kHz</td> <td>TTL level</td> </tr> </tbody> </table> <p>*Instruments with serial No. 401819 and less need factory modification</p> <p>Tuning Signal Outputs: Rear panel, screwdriver operated switch selection of tuning signals</p> <table border="1"> <thead> <tr> <th>Analyzer Tuned</th> <th>Type 2020</th> <th>Type 2010</th> </tr> </thead> <tbody> <tr> <td>Fixed Osc.</td> <td>120 kHz</td> <td>1,2 MHz from 2010, 120 mV Pk-Pk</td> </tr> <tr> <td>Variable Osc.</td> <td>200 to 240 kHz</td> <td>1 to 1,2 MHz, 2 V Pk-Pk</td> </tr> <tr> <td>Signal type</td> <td>TTL level</td> <td>Sine wave</td> </tr> </tbody> </table> <p>Dynamic Range of Tuned Analyzer: Static: 2020: 70 dB 2010: 85 dB for $f_1 \geq 400$ Hz, decreasing approx. 6 dB/oct. to 50 dB at $f_1 = 20$ Hz Dynamic: Depending upon sweep speed, f_1 and N</p> <p>DC Outputs: DC f_1 or $N \times f_1$ (front panel switch), for control of Level Recorder Type 2307, X-Y Recorder Type 2308, etc. Lin or Log is selected by rear panel switch: Lin: 1 mV to 10 V ± 2 mV or $\pm 1\%$ whichever is greater Log: 2,5 V/decade; 0 to 10 V corresponding to 80 dB range and scale deflection from zero to full scale. Linearity $\pm 0,2$ dB</p> <p>Bandwidth Control: With 2020: Shift at 30, 100, 300 Hz, 1, 3 kHz With 2010: Shift at 60, 200, 600 Hz, 2, 6 kHz</p> <p>Temperature Range: 5 to 40°C (41 to 104°F)</p> <p>Max. Humidity: 90% RH (non condensing) at 30°C</p> <p>Warm-up Time: 60 s</p>	Analyzer Tuned	Type 2020	Type 2010*	Signal type	Input (f_1)	10 Hz to 200 kHz	20 Hz to 200 kHz	Periodic	Output ($N \times f_1$)	4 Hz to 20 kHz	20 Hz to 200 kHz	TTL level	Analyzer Tuned	Type 2020	Type 2010	Fixed Osc.	120 kHz	1,2 MHz from 2010, 120 mV Pk-Pk	Variable Osc.	200 to 240 kHz	1 to 1,2 MHz, 2 V Pk-Pk	Signal type	TTL level	Sine wave	<p>Electromagnetic Compatibility: Complies with Class B device of American FCC (Federal Communication Commission) Rules</p> <p>Power Supply: 100, 115, 127, 220, 240 V (50 to 60 Hz) AC $\pm 10\%$. 32 VA. Complies with safety class I of IEC 348</p> <p>Cabinet: Supplied as model A (light-weight metal cabinet), B (model A in a mahogany cabinet) or C (as A but with flanges for standard 19" racks)</p> <p>Dimensions (A-Cabinet): Excluding knobs, feet, etc. Height: 133 mm (5,2 in) Width: 430 mm (16,9 in) Depth: 200 mm (7,9 in)</p> <p>Weight: 6,4 kg (14,1 lb)</p> <p>Accessories Included: 2 Screened B & K Plugs JP 0101 1 Double Coaxial BNC Plug JP 0102 4 BNC Plugs JP 0035 2 8-pin DIN Plugs JP 0802 3 Banana Plugs JB 0002 1 Power cable AN 0010 1 315 mA fuse VF 0042 1 200 mA fuse VF 0012</p>
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