1.2. CHARACTERISTICS

This instrument has been designed and tested according to IEC Publication 348 for Class II instruments and has been supplied in a safe condition. The present Instruction Manual contains information and warnings which shall be followed by the purchaser to ensure safe operation and to retain the instrument in a safe condition. Properties expressed in numerical values with stated tolerances are guaranteed for ambient temperatures of +5 °C ... +40 °C unless stated otherwise. Numerical values without tolerances are typical and represent the characteristics of an average instrument.

Designation	*Specification*	*Additional Information*
1.2.1. C.R.T.		
Type	D14-260GH	
Measuring area	8 x 10 divisions	1 div. equals 1 cm
Screen type	P31 (GH) standard	P7 (GM) optional
Total acceleration voltage	4 kV	
Graticule	External	
1.2.2. Vertical amplifier		
Display modes	Channel A only Channel B only A and B chopped A and B alternated A and B added	
Input coupling	AC, DC, 0	
Channel B polarity	Normal or inverted	
Response:		
Frequency range	DC: 0 ... 15 MHz (–3 dB) AC: 10 Hz ... 15 MHz (–3 dB)	Measured at 6 div. amplitude
Pulse aberrations	$\leqslant \pm 3$ %	Measured at 6 div. amplitude, applied rise time $\geqslant 3$ ns
Deflection coefficients	2 mV/DIV ... 10 V/DIV	Calibrated steps, 1-2-5 sequence
Deflection accuracy	± 3 %	
Input impedance	1 MΩ/25 pF	
Input RC time	22 ms	Coupling switch to AC
Maximum permissible input voltage	400 V, DC + AC peak	
Chopping frequency	250 kHz approx.	
Vertical positioning range	± 8 DIV	
Maximal deflection	24 DIV	For sinewave signals with frequencies up to 5 MHz
C.M.R.R. in A-B mode	100:1 at 1 MHz	A-B mode with 8 DIV of common-mode signal
Cross-talk between channels	–50 dB or better at 15 MHz	
Instability of the spot position:		
Trace jump	$<$ 0,3 DIV	When switching between any of the attenuator positions or operating other switches.
DC stability	$<$ 1 DIV/hour	Over total temp. range

1.2.3. Time-base

Designation	*Specification*	*Additional Information*
Time coefficients	0,2 s/DIV ... 0,5 µs/DIV	1-2-5 sequence
Continuous control range	1:≥ 2,5	Uncalibrated continuous control between the 1-2-5 steps
Coefficient error	± 3 %	
Magnification	5x	
Additional error for magnifier	± 2 %	

1.2.4. Triggering

Source	Ch. A, Ch. B, External input and line/mains	
Coupling	AC	
Trigger mode	Automatic or Normal	Automatic mode combined with top level mode
Trigger sensitivity	Internal: 0,75 DIV 1,5 DIV External: 0,8 V	Signals ≤ 5 MHz Signals ≤ 15 MHz Signals ≤ 15 MHz
Triggering frequency range	20 Hz ... 15 MHz 10 Hz ... 15 MHz	Automatic free run Normal
Level range	Internal: ± 12 DIV External: ± 6 V	From centre of screen From centre of screen
Triggering slope	+ or –	
Input impedance	1 MΩ//25 pF	Equivalent to input impedance of vertical inputs
Maximum permissible input voltage	400 V, DC + AC peak	
TV triggering	Triggering on Frame pulses (TVF) or Line pulses (TVL)	TIME/DIV 0.28 ... 0.5 ms/DIV: TVF TIME/DIV 0.2 ms ... 0.5 µs/DIV: TVL When the TV filter is switched on, the time base functions in the AUTO mode.
TV trigger sensitivity	internal 0.75 DIV external 0.8 V	sync pulse amplitude sync pulse amplitude

1.2.5. X Deflection

Source	Time-base X via Y_B operation	If TIME/DIV switch is in position X via B
Deflection coefficients	Ch. B: as selected by AMPL/DIV	
Deflection accuracy	± 15 %	Via Ch. B.
Frequency range	DC: 0 ... 1 MHz (–3 dB)	
Phase shift	3^o at 50 kHz	
Dynamic range	24 divisions	For frequencies ≤ 100 kHz

1.2.6. Probe adjust

Output voltage sufficient for adjusting pulse response of attenuator probes

1.2.7. Power supply

AC supply:	Double insulated	Insulation fulfils the safety requirements of IEC 348 for metal encased Class II instruments.
Nominal voltage range (on line-mains voltage adaptor)	110, 127, 220 or 240 Va.c. ± 10 %	
Nominal frequency range	46 ... 440 Hz	
Power consumption	20 W max.	At nominal mains voltage

The instrument can be equipped with an optional unit for external 24 Volt DC supply (see also 3.4.):

DC supply voltage	23 V ± 10 %
DC supply current	The external power source must be able to deliver a current of at least 1,2 A.

1.2.8. Environmental conditions

The environmental data are valid only if the instrument is checked in accordance with the official checking procedure. Details on these procedures and failure criteria are supplied on request by the PHILIPS organisation in your country, or by N.V. PHILIPS' GLOEILAMPENFABRIEKEN, TEST AND MEASURING DEPARTMENT, EINDHOVEN, THE NETHERLANDS.

Designation	*Specification*	*Additional Information*
Ambient temperature:		
Rated range of use	+5 °C ... +40 °C	
Limit range of operation	−10 °C ... +55 °C	
Storage and transport conditions	−40 °C ... +70 °C	
Altitude	Operating : to 5000 m (15000 ft) non-operating : to 15000 m (45000 ft)	
Humidity	21 days cyclic damp heat 25 °C ... 40 °C	R.H. = 95 %
Shock	30 g: half sine-wave shock of 11 ms duration: 3 shocks per direction for a total of 12 shocks.	
Vibration	3 g: vibrations in three directions with a maximum of 15 min. per direction; 10 minutes with a frequency of 15-25 Hz and amplitude of 1 mm peak-peak: 5 min. with a frequency of 25-55 Hz and an amplitude of 0,5 mm p-p. Unit mounted on vibration table without shock absorbing material.	
Recovery time	Operates within 30 minutes of being transferred from −10 °C soak, to 60 % relative humidity at +20 °C room conditions.	
Electromagnetic interference	Meets VDE, Störgrad K.	

1.2.9. Mechanical data

Dimensions:

Length	550 mm	Including handle
Width	320 mm	Including handle
Height	150 mm	Including feet
Weight	7,5 kg	

1.3. ACCESSORIES

1.3.1. Supplied with the PM 3211

Front cover
BNC - 4 mm Banana adaptor
Manual

1.3.2. Supplied with the PM 3211Q

Front cover
2 Attenuator probes PM 9326/40 (for description see section 1.3.3.).
Manual.

1.3.3. Characteristics of the PM 9326/40 attenuator probe

INTRODUCTION

Two probes of this type are supplied with the PM 3211Q.
The passive attenuator probe PM 9326/40 consists of a measuring cable with BNC connector and a plug-on probe to be used with oscilloscopes having a bandwidth up to 15 MHz and an input resistance of 1 MΩ.

TECHNICAL DATA

Attenuation	10x, ± 3 %
Input resistance	10 MΩ, ± 3 %
Input capacitance	8 pF, ± 2 pF
Rise-time	7 ns
Compensation range input	10 ... 55 pF
Max. allowable input voltage (probe only)	1000 Volt, DC + AC peak

The tolerances apply when the probe is connected to an oscilloscope with nominal input resistance. The max. allowable input voltage of the oscilloscope in both AC and DC position of the input coupling switch must be taken into account.

ACCESSORIES

1 probe cable	5322 321 20087
1 earth cable	5322 321 20134
1 probe 10:1	5322 210 70044
1 test clip	5322 264 20016
Also available:	
1 resistor for attenuator probe	5322 111 20155

MATCHING THE PROBE TO THE OSCILLOSCOPE INPUT

- Display a time-base line by selecting the LINE trigger mode: depress the trigger source selector pushbuttons A and B simultaneously.
- Set the LEVEL control to the AUTO position.
- Release the CH. A AC/DC pushbutton.
- Set the CH. A AMPL/DIV switch to the 5 mV/DIV position.
- Connect the probe to the CH.A input socket X2 and place the tip of the probe on the socket PROBE ADJ.
- Set the TIME/DIV switch to the 0.5 ms or 0.2 ms/DIV position.
- Unscrew the probe locking nut by turning it anti-clockwise (see Fig. 1.2.).
- Rotate the probe body to change capacitance, in the same time watching the display for the desired waveform (see Fig. 1.2.).
- After completion of the compensation procedure carefully turn the locking nut clockwise to lock it, without disturbing the adjustment.

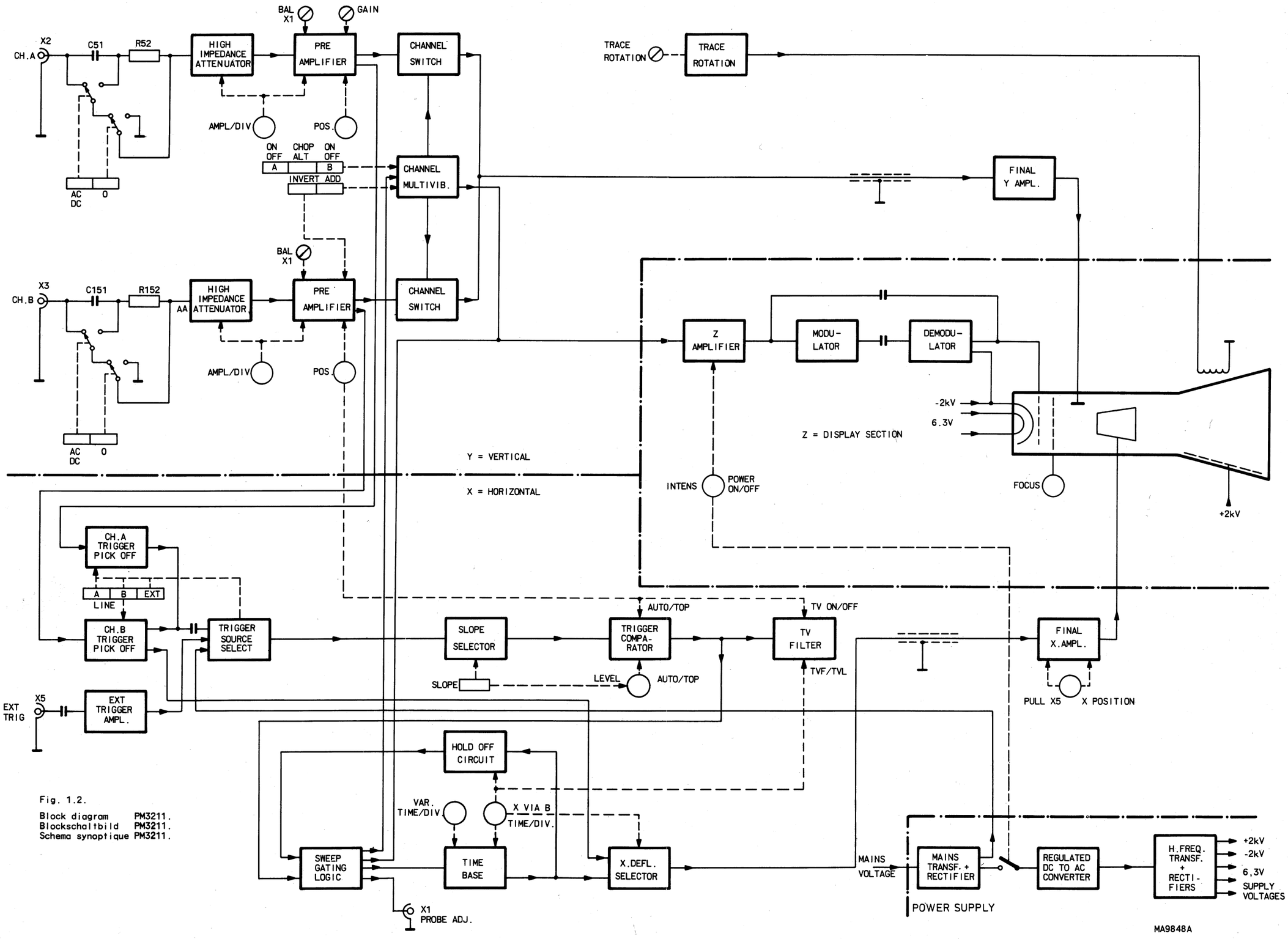

Fig. 1.2.

Block diagram PM3211.
Blockschaltbild PM3211.
Schema synoptique PM3211.

Fig. 1.3. Block diagram of the oscilloscope
Abb. 1.3. Blockschaltbild des Oszillografen
Fig. 1.3. Schéma synoptique de l'oscilloscope

1.3.4. Optional

PM 9326	:	Passive probe 1:1/10:1 (1.1 m)
PM 9327	:	Passive probe 1:1/10:1 (2.1 m)
PM 8921	:	Passive probe 1:1 (1.5 m)
PM 8921L	:	Passive probe 1:1 (2.5 m)
PM 8925	:	Passive probe 10:1; 11 pF (1.5 m)
PM 8925L	:	Passive probe 10:1; 14 pF (2.5 m)
PM 8932	:	Passive probe 100:1; max voltage 5600 V; 2 pF (1.5 m)
PM 9353	:	Active FET-probe 1:1; 10:1; 3.5 pF
PM 9355	:	Current probe; 12 Hz ... 70 MHz
PM 9346	:	Power supply for active probes
PM 8910	:	Polaroid anti-glare filter
PM 9380	:	Oscilloscope camera
PM 8971	:	Camera adaptor
PM 8962	:	19" rackmount adaptor
PM 9366	:	Collapsible viewing hood
PM 8980	:	Closed, long type viewing hood
PM 8991	:	Trolley
PM 8992/01	:	Accessory pouch

Accepts Steinheil Oscillophot ® cameras M3, M4 and M5 using Steinheil adaptor 1820/50.

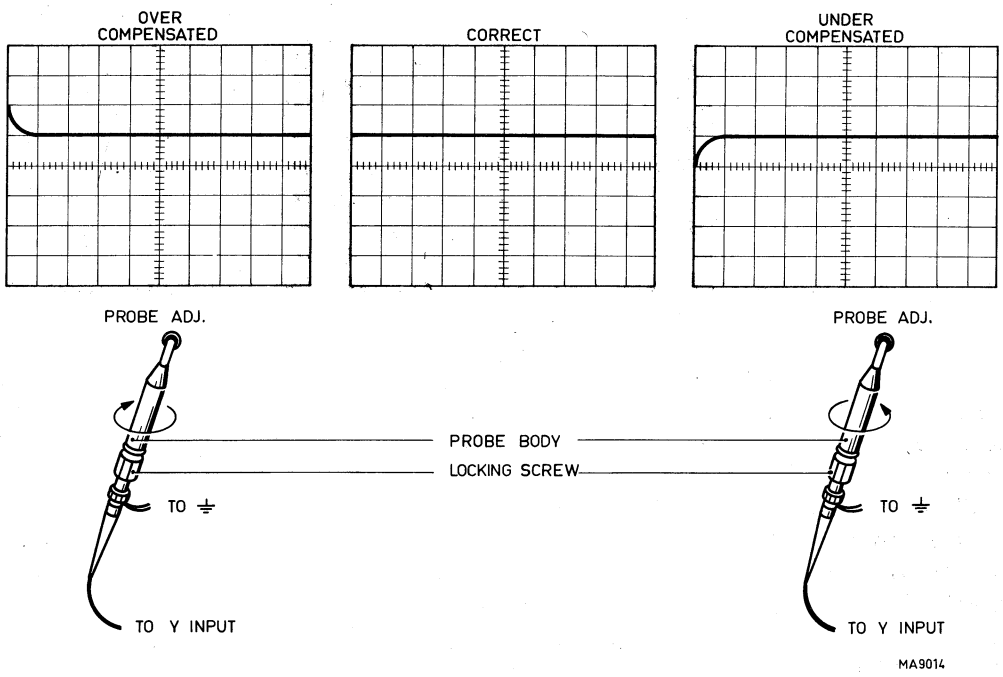

Fig. 1.2. Matching the attenuator probe PM 9326/40 to the oscilloscope input.