	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
2.1	DISPLAY		
	* CRT		
	Type No	PHILIPS D 14-372	
	Measuring area (h x w)	80 x 100 mm	8 x 10 div. 1 div. = 10 mm 1 subdiv. (sd) = 2 mm
	* Screen type		
	Standard	GH (P 31)	Standard persistence (7 ms)
	Option	GM (P 7)	Long persistence (30 ms)
	* Total acceleration voltage	16 kV	
	* Graticule:		
	Engravings	Internal fixed	
	Division lines	1 cm	Horizontal as well as vertical
	Subdivisions	2 mm	Horizontal as well as vertical
	Dotted lines	1,5 and 6,5 cm from top	Only horizontal.
	Percentages	0%, 10%, 90%, 100%	Left side of screen
	* Orthogonality	90^{o} +/- 1^{o}	Measured in zero point.
	* Illumination	Continuously variable	By means of potentiometer.
2.2	VERTICAL DEFLECTION OR Y AXIS		
	* Auto set	Automatic setting according to input signal	
	* Deflection modes and sources	Channel A and/or B or ADDED (A+B, A_B)	Channel B can be inverted. All combinations are possible in ALTERNATE as well as in CHOP mode
	* Deflection coefficients	2 mV/div...10 V/div	In 1, 2, 5 sequence. If probe with range indicator is used, deflection coeff. is automatically calculated in display.
	* Variable gain control range	1 : >2,5	
	* Error limit	+/- 3%	Only in calibrated position.
	* Input impedance	1 M ohm +/-2%	Measured below 1 MHz
	Paralleled by	20 pF +/-2pF	Measured below 1 MHz

CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
* Max. input voltage	400 V (d.c. + a.c. peak)	
Max. test voltage (rms)	500 V	Max. duration 60 s.
* Bandwidth for 20 mV...10 V	> 50 MHz (-3dB, amb. 15..35°C)	Input 6 div. sine-wave. Deviation max. 5MHz for ambient 0 ... 50°C
* Bandwidth for 2 mV, 5 mV and 10 mV	> 35 MHz	Input 6 div. sine-wave.
* Rise-time	7 ns or less	Calculated from 0,35/f-3 dB
* Noise 20 mV...10 V	< 0,5 sd	Measured visually. Pick up on open BNC excluded.
* Lower - 3 dB point	< 10 Hz	In AC position, 6 div. sine-wave
* Dynamic range		
@ 1 MHz	+/- 12 div.	Vernier in CAL position.
@ 50 MHz	> 8 div.	Vernier in CAL position.
* Position range	> +/- 8 div.	Vernier in CAL position.
* Cross talk between channels		Both channels same attenuator setting. Input max. 8 div. sine-wave.
@ 10 MHz	1 : > 100	2, 5 and 10 V are excluded.
@ 50 MHz	1 : > 50	2, 5 and 10 V are excluded.
* Common Mode Rejection Ratio @ 1 MHz	1 : > 100	Both channels same attenuator setting, vernier adjusted for best CMRR; measured with max. 8 div. (+/- 4 div.) each channel.
* Visible signal delay	> 15 ns	Max. intensity, measured from line start to trigger point.

CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
* Base-line jump: between attenuator steps 20 mV...10 V	< 1 sd	
Additional jump between 10 mV <---> 20 mV	< 1,5 sd	
Normal Invert jump	< 1 sd	Only channel B.
ADD jump	< 0,6 div.	When A and B are positioned in screen centre (20 mV...10 V).
Variable jump	< 1 sd	Max.jump in any two positions of the VARiable control.

2.3 HORIZONTAL DEFLECTION OR X AXIS

2.3.1 Time Base

* Time coeff.	0,5 s...50 ns	1, 2, 5 sequence (magn.off)
Error limit	+/-3 %	Measured at -4...+4 div. from screen centre.
* Horizontal position range	Start of sweep and 10th div. must be shifted over screen centre	
* Variable control ratio	1 : > 2,5	
* Time Base magnifier	Expansion x10	Not valid in X-deflection.
Error limit	+/-4 %	Measured at +4...- 4 div. from screen centre. Excluding first 50 ns and last 50 ns.
* Horizontal magnifier balance x10 ---> x1	< 2,5 sd	Shift start of sweep in x10 in mid-screen position, then switch to x1.
* Hold-Off Minimum to maximum hold-off time ratio	1 : > 10	Minimum hold off time is related to time base setting.

	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
2.3.2	X-deflection		
	* Deflection coeff. Via channel A or B	2 mV/div...10 V/div	1, 2, 5 sequence.
	Via EXT input	100 mV/div.	
	* Error limit Via channel A or B	+/- 5%	
	Via EXT input	+/- 5%	
	* Bandwidth	DC .... > 2 MHz	DC coupled
	* Phase shift between X and Y-deflection	< 3^{o} @ 100 kHz	DC coupled
	* Dynamic range	> 24 div. DC... 100 kHz	DC coupled
2.3.3	EXT input		
	* Input impedance Paralleled by	1 M ohm +/- 2% 20 pF +/- 2 pF	f_o < 1 MHz f_o < 1 MHz
⚠	* Max. input voltage	400 V (d.c. + a.c. peak)	
	Max. test voltage (rms)	500 V	Max. duration 60 s.
	* Lower - 3 dB point	< 10 Hz	AC coupled
2.4	TRIGGERING		
	* Trig. mode AUTO (auto free run)	Bright line in absence of trigger signal	Auto free run starts 100 ms (typ.) after no trig.pulse.
	TRIGgered		Switches automatically to auto free run if one of the display channels is grounded.
	SINGLE		In multi-channel mode (alternated) each channel is armed after reset; if sweep has already started, sweep is not finished. Not applicable in peak-to-peak coupling.
	* Trigger source A, B, Composite (A/B), EXT, Line		Line trigger source always triggers on mains frequency. Line trigger amplitude depends on line input voltage. Approx. 6 div. @ 220 VAC input voltage.

CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
* Trigger coupling Peak-to-peak (p-p), DC, TVL, TVF		
* Level range		
Peak-to-peak:	Related to peak-to-peak value	p-p coupling is DC rejected.
DC internal	> (+ or - 8 div.)	
DC EXTernal	> (+ or - 800 mV)	
TVL/TVF	Fixed level	
* Trigger slope	+/-	Slope sign in LCD. For TVL/TVF use + or - to chose positive or negative video
* Trigger sensivity		
INTERNAL		
0 - 10 MHz	< 0,5 div.	Trig. coupling DC.
@ 50 MHz	< 1,0 div.	Trig. coupling DC.
@ 100 MHz	< 3,0 div.	Trig. coupling DC.
EXTERNAL		
0 - 10 MHz	< 50 mV	Trig. coupling DC.
@ 50 MHz	< 150 mV	Trig. coupling DC.
@ 100 MHz	< 500 mV	Trig. coupling DC.
TVL/F INTERNAL	< 0,7 div.	Sync. pulse.
TVL/F EXTERNAL	< 70 mV	Sync. pulse.

2.5 SIGNAL ACQUISITION

* Sampling type @10us/div ... 50s/div	Real time	
* Maximum sample rate:		Sample rate depends on time/div setting
single channel	20 Megasamples/s	
dual channel	20 Megasamples/s	
* Vertical (voltage) Resolution	8 bits	(=0,4% of full range of 10 div)

CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
* Horizontal (time) Resolution: in single channel acquisition:		
in 20us/div... 50s/div	8192 samp./ acquisition	1 Sample = 0,0125% of full record.
10 us/div	4096 samp./ acquisition	1 Sample = 0,024% of full record.
in dual channel acquisition 10us ...50s/div	4096 samp./ acquisition	1 Sample = 0,024% of full record.
* Record length	20,4 x time/div	Display in unmagnified position.
* Acquisition time: real time 10us/div ... 50s/div	20,4 x time/div + 0 ... 20ms	excluding delay time
* Sources	Channel A Channel B	Channel B can be inverted before acquisition.
* Acquisition modes	1 Channel only	Full memory available for 1 channel.
	2 Channels	Simultaneously sampled; 2 channels share memory.

2.6 CHANNELS A AND B

* Frequency response: Lower transition point of BW		
Input coupling in DC position	d.c.	
Input coupling in AC position	$\leq$ 10Hz	
Upper transition point of BW:		
In memory on mode (Ambient: 15 ... 35 °C)	$\geq$ 10MHz(-3dB)	Deviation max. 3MHz for ambient: 0 ... 50 °C.
In memory off mode (Ambient: 15 ... 35 °C)	$\geq$ 50MHz(-3dB)	Deviation max. 5MHz for ambient: 0 ... 50°C.

	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
	* Max. base line instability:		
	Jump (Ambient: 15 ... 35 °C):		Add 25% for ambient: 0 ... 50 °C.
	when switching to memory mode:	0,3 div	
	when actuating INVertor switch between any time /div positions	0,3 div 0,5 div	
	Drift	0,1 div/h	}Measured in 20 mV/div
	Temperature coefficient	± 0,05 div/K	}position. }
2.7	TIME BASE		
	* Modes	Recurrent Single shot Multiple shot	Up to 2 shots.
	* Time coefficients:		
	in recurrent	10 us/div ... 50 s/div	
	in single shot & multiple shot	10 us/div ... 50 s/div	
	error limit (Ambient 15 .. 35°C)		
	in real time mode	±1%	Add 0,5% for ambient: 0 ... 50 °C.
	up to memory	±0,1%	
2.8	TRIGGER		
	* Trigger delay:		
	range	-20 ... 0 div	Selectable in divisions.
	accuracy	± 0,3 div	
	* Trigger level view		Indication in LCD.
	inaccuracy	≤ 0,5 div	

	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
2.9	MEMORY		
	* Memory size:		
	registers	2	
	register depth:		
	acquisition	8K words	
	register	8K words	
	wordlength	8 bits	
	* Functions	Clear	
		Load	Contents of acquisition are saved in register
		Lock	Memory system is locked. If lock is not active the signal is written into the acquisition memory.
2.10	DISPLAY		
	* Sources	Channel A	}
		Channel B	}In any combination
		Register A	}
		Register B	}
	* Display expansion horizontal	0,5x, 1x, 2x, 4x, 8x, 16x and 32x.	
	* Number of displayed samples:		
	single trace	4K/channel	
	two traces	2K/channel	
	three traces	1K/channel	
	four traces	1K/channel	
2.11	CALCULATION FACILITIES		
	* Functions	Ratio, Phase dV, dt, 1/dt	
2.12	AUTO SETTING		
	* Settling time	3s (typ.)	Auto set is done in analog mode.

	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
2.13	CURSORS		
	* Horizontal resolution: in single channel mode	1:1000	Over 10 div
	in dual channel mode	1:1000	
	* Vertical resolution	1:200	8 div
	* Read out resolution	3 Digits	
	* Voltage cursors: error limit amb. 15 ... 35 °C	±3%	Referred to input at BNC, error of probes etc. excluded. Add 3% for ambient 0 .. 40 °C.
	cursor range	Full range	Cursors can not pass not each other. X-position is neglected.
	* Time cursors error limit	±0,1%	
2.14	POWER SUPPLY		
	* Line voltage a.c.		One range.
	Nominal	100...240 V	
	Limits of operation	90...250 V	
	* Line frequency Nominal	50...400 Hz	
	Limits of operation	43...445 Hz	
	* Safety requirements within specification of: IEC 348 CLASS I UL 1244 VDE 0411 CSA 556 B		
	* Power consumption (a.c. source)	55W nominal	At nominal source voltage

	CHARACTERISTICS	SPECIFICATION	ADDITIONAL INFORMATION
2.15	SUNDRIES		
	* Z-MODulation		TTL-compatible.
	ViH	> 2,0 V	Blanks display.
	ViL	< 0,8 V	Max. intensity Analog control between ViH and ViL is possible.
	* CAL output		To calibrate drop or tilt of probes.
	Output voltage	1,2 V +/- 1%	Rectangular output pulse.
	Frequency	2 kHz	
	The output may be short-circuited to ground.		
	* Data and settings retention:		When instrument is switched off or during mains faillure. The oscillooscope settings and traces are saved before instrument goes down.
	memory back-up voltage	2V ... 3,5V	
	memory back-up current drain	Typical 100uA	@25 °C.
	recommended batteries:		According to IEC285 (=Alkaline Manganese Penlight Battery)
	type	LR 6	e.g. PHILIPS LR 6.
	quantity	2 pcs	Delivered with the instrument.
	temperature rise of batteries	20K	After warming up period of instrument.
	retention time	typical 3 years	@ 25°C, with recommended (fresh) batteries.
	* Temperature range	0 ... +70°C.	@ -40 ... 0 °C settings retention is uncertain. It is advised to remove batteries from instrument when it is stored during longer (24h) period below -30°C or above 60°C. WARNING: UNDER NO CIRCUMSTANCES BATTERIES SHOULD BE LEFT IN INSTRUMENT @ TEMPERATURES BEYOND THE RATED RANGE OF THE BATTERY SPECIFICATIONS!