
1.5 TECHNICAL SPECIFICATIONS

These specifications apply for operation in horizontal position

Tape speeds:

Type HS:

30 - 15 - 7.5 - 3.75 ips
(76.2 - 38.1 - 19.05 - 9.525 cm/s)

Type LS (standard programming):

15 - 7.5 - 3.75 ips
(38.1 - 19.05 - 9.525 cm/s)

Variable speed (with varispeed option):

±7 semitones from nominal speed

Tape speed deviation:

max. ± 0.2% from nominal speed

Tape slip:

max. 0.1%

Tape reels:

NAB, EIA (CINE), DIN
max. diameter 11.1 " (282 mm)
max. reel capacity 3280 ft. (1000 m) with professional-quality tape
(tape thickness: 50 µm)

Tape width:

1/4 " (6.3 mm)

Wow and flutter:

Peak weighted according to DIN 45507 or IEC Publ. 386, ambient temperature 68° F (20° C)

30 ips (76.2 cm/s)	15 ips (38.1 cm/s)	7.5 ips (19.05 cm/s)	3.75 ips (9.525 cm/s)
max. 0.04%	max. 0.05%	max. 0.07%	max. 0.12%

Start time:

max. 0.5 s for 15 ips and 1000 m tape on DIN hub or
730 m tape on NAB reel
(to attain double value of flutter specification)

Tape timer:

5-digit LCD displays hours, minutes and seconds for all tape speeds
counts past zero with leading negative sign.
Range: 1 h 59 min 59 s to -1 h 59 min 59 s

or

5-digit LED display, same as LCD except:
Range: 9 h 59 min 59 s to -59 min 59 s
Time code level indicated with LED behind last seconds position.

Winding time:

approx. 150 s for 1000 m tape; approx. 120 s for 730 m tape.

Stopping time from spooling:

max. 3 s

Tape tension:

Reproduce and record:
0.75 N (75 p) nominal, adjustable ± 0.15 N (± 15 p)

Spooling:
0.75 N (75 p) nominal, adjustable 0.4 - 1.0 N (40 - 100 p)

Peak tape tension for start, stop, and reversal of spooling
direction:
6 N (600 p) nominal, adjustable 3 - 6 N (300 - 600 p)

Inputs:

Balanced and floating
Impedance ≥ 10 k Ω , 30 Hz ... 20 kHz

Input level:

- Nominal input level relative to reference magnetic flux:
+6, +10, +14, +16 dBm; internally programmable
- Nominal input level relative to operating level (according to NAB):
0, +4, +8, +10 dBm; internally programmable
(internal adjustment range of the magnetic flux with above input levels: 100 - 1000 nWb/m)

Recorders with VU-meter panel and input/output level controls:
max. 10 dB increase in input sensitivity with input level control
in uncalibrated mode.

Maximum input level:
- with input transformer: +24 dBm
- without input transformer: +28 dBm (+26 dBm, if the nominal input level relative to operating level is set to 0/6 dBm)

Outputs:

balanced and floating, with output transformer
Impedance ≤ 50 Ω , 30 Hz ... 20 kHz
Load ≥ 200 Ω
or
electronically balanced, without output transformer
Impedance ≤ 30 Ω , 30 Hz ... 20 kHz
Load ≥ 200 Ω .

Output level:

- nominal output level relative to reference magnetic flux:
+6, +10, +14, +16 dBm; internally programmable
- nominal output level relative to operating level (according to NAB):
0, +4, +8, +10 dBm; internally programmable
(internal adjustment range of reproduce gain for operating magnetic flux of 100 - 1000 nWb/m)

Recorders with VU-meter panel and input/output level controls:
max. 10 dB increase in reproduce gain with output level control
in uncalibrated mode.

Maximum output level:
- with output transformer: +24 dBm (load ≥ 200 Ω)
- without output transformer:
- balanced load ≥ 200 Ω : +26 dBm
- unbalanced load ≥ 200 Ω : +24 dBm
- balanced load ≥ 600 Ω : +30 dBm (+26 dBm, if the nominal output level relative to operating level is set to 0/6 dBm)
- unbalanced load ≥ 600 Ω : +24 dBm

Equalizations:

NAB and CCIR, switch-selectable

Equalization time constants:

30 ips (76.2 cm/s)	15 ips (38.1 cm/s)	7.5 ips (19.05 cm/s)	3.75 ips (9.525 cm/s)
AES: 17.5/∅ us	CCIR: 35/∅ us	70/∅ us	90/3180 us
AES: 17.5/∅ us	NAB: 50/3180 us	50/3180 us	90/3180 us

Frequency response:

Record-reproduce:			
30 ips (76.2 cm/s)	15 ips (38.1 cm/s)	7.5 ips (19.05 cm/s)	3.75 ips (9.525 cm/s)
±2 dB: 40 Hz ... 22 kHz	30 Hz ... 20 kHz	30 Hz ... 16 kHz	30 Hz ... 10 kHz
±1 dB: 40 Hz ... 20 kHz	30 Hz ... 18 kHz	30 Hz ... 12 kHz	30 Hz ... 8 kHz

Reproduction from record head (SYNC reproduction)

- Amplifier programmed for "narrow band":

30 ips (76.2 cm/s)	15 ips (38.1 cm/s)	7.5 ips (19.05 cm/s)	3.75 ips (9.525 cm/s)
±2 dB: 60 Hz ... 12 kHz	30 Hz ... 12 kHz	30 Hz ... 8 kHz	----- -----

- Amplifier programmed for "wide band":

30 ips (76.2 cm/s)	15 ips (38.1 cm/s)	7.5 ips (19.05 cm/s)	3.75 ips (9.525 cm/s)
±2 dB: 60 Hz ... 20 kHz	30 Hz ... 18 kHz	30 Hz ... 12 kHz	----- -----

Signal-to-noise ratios:

CCIR {Equalization according to CCIR (AES at 30 ips), measured with tape AGFA PER 528, BASF LGR 50, or equivalent type}

30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s)
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Full track (320 nWb/m)
track width 6.3 mm (1/4")

- Linear, RMS, 30 Hz - 20 kHz	63 dB	61 dB	61 dB	57 dB
- Quasi-peak, weighted according to CCIR 468-1 (DIN 45405)	54 dB	52.5 dB	51 dB	50 dB
- RMS value, A weighted according to DIN 45633 as per IEC Publ. 179	68 dB	67 dB	65 dB	62 dB

Stereo (510 nWb/m)
track width 2.75 mm

- Linear, RMS, 30 Hz - 20 kHz	65 dB	63 dB	62 dB	57 dB
- Quasi-peak, weighted according to CCIR 468-1 (DIN 45405)	55.5 dB	54 dB	52.5 dB	51 dB
- RMS value, A weighted according to DIN 45633 as per IEC Publ. 179	69 dB	67 dB	65 dB	62 dB

Two-track (510 nWb/m) track width 2.0 mm	30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s)
- Linear, RMS, 30 Hz - 20 kHz	63 dB	61 dB	61 dB	56 dB
- Quasi-peak, weighted according to CCIR 468-1 (DIN 45405)	54 dB	52.5 dB	51 dB	50 dB
- RMS value, A weighted according to DIN 45633 as per IEC Publ. 179	68 dB	66 dB	64 dB	61 dB

NAB {Equalization according to NAB (AES at 30 ips), measured with tape
SCOTCH 3M 226 or aequivalent type}

	30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s) (referred to 510 nWb/m)
Full track (1040 nWb/m) track width 6.3 mm (1/4")				
- Linear	74 dB	72 dB	74 dB	61 dB
- RMS, weighted according to ASA-A	78 dB	74 dB	76 dB	66 dB
Stereo (1040 nWb/m) track width 2.75 mm				
- Linear	71 dB	68 dB	70 dB	57 dB
- RMS, weighted according to ASA-A	75 dB	71 dB	73 dB	62 dB
Two-track (1040 nWb/m) track width 2.0 mm				
- Linear	70 dB	67 dB	69 dB	56 dB
- RMS, weighted according to ASA-A	74 dB	70 dB	72 dB	61 dB

Signal-to-noise ratios: (record-SYNC reproduction)
(Amplifier programmed to "narrow band")

NAB {Equalization according to NAB (AES at 30 ips), measured with tape
SCOTCH 3M 226 or aequivalent type}

	30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s)
Full track (1040 nWb/m) track width 6.3 mm (1/4")				
- Linear	69 dB	69 dB	69 dB	-----
- RMS, weighted according to ASA-A	75 dB	72 dB	72 dB	-----
Stereo (1040 nWb/m) track width 2.75 mm				
- Linear	66 dB	66 dB	66 dB	-----
- RMS, weighted according to ASA-A	72 dB	69 dB	69 dB	-----
Two-track (1040 nWb/m) track width 2.0 mm				
- Linear	65 dB	65 dB	65 dB	-----
- RMS, weighted according to ASA-A	71 dB	68 dB	68 dB	-----

Distortion: (Record-reproduce, 1 kHz, measured with tape AGFA PER 528)

CCIR:	30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s)
Full track (320 nWb/m):	≤ 2.0%	≤ 1.5%	≤ 1.0%	≤ 1.0%
Stereo/2-track (510 nWb/m):	≤ 2.0%	≤ 1.5%	≤ 1.0%	≤ 1.0%

	(Record-reproduce, 1 kHz, measured with tape SCOTCH 3M 226)			
NAB:	30 ips (76.2cm/s)	15 ips (38.1cm/s)	7.5 ips (19.05cm/s)	3.75 ips (9.525cm/s)
	400 nWb/m	510 nWb/m	510 nWb/m	510 nWb/m
Full track:	≤ 0.5%	≤ 0.5%	≤ 0.5%	≤ 0.5%
Stereo/2-track:	≤ 0.5%	≤ 0.5%	≤ 0.5%	≤ 0.5%

Cross-talk attenuation: (at 1 kHz, according to DIN 45521)

Stereo recorders:	≥ 55 dB
Two track recorders:	≥ 65 dB

Erase efficiency: (at 1 kHz and 510 nWb/m, 15 ips)

Stereo recorders with full-track erase head:	≥ 80 dB
Two-track recorders with overlapping erase head:	≥ 75 dB

Erase and bias frequency:

153.6 kHz for all tape speeds

VU-meter:

Switchable between VU indication (according to IEC recommendation 268, Part 10, Section 4) and PPM (peak programme meter) (according to IEC recommendation 268, Part 10, Section 3, except for 24,1, scale division).

Power supply (line voltage selector):

100 V, 120 V, 140 V, 200 V, 220 V, 240 V; ±10% ; 50 or 60 Hz

Power consumption:

Stop:	80 W
Recording on 2 channels:	160 W
Spooling:	190 W
Peak tape tension during spooling:	240 W

Disturbed operation: (transient line voltage failure)

Operating status unaffected by line voltage failures up to 100 ms.

Ambient temperatures:

50° F ... 104° F (+10° C ... +40° C)

Relative humidity:

20% ... 90%, non-condensing

Safety standard:

according to IEC recommendation, publication 65, degree of protection I (line filter, power switch, power fuse, power transformer and line voltage selector conform to type I and II).

Weight: (portable version)

Net:	30 kg ... 31 kg, depending on configuration
Gross:	34 kg ... 35 kg, depending on configuration (air freight)
	52 kg ... 53 kg, depending on configuration (sea freight)
