

3023 & 3024 X-Y Recorders



3023 (Front-input model)
482 × 441 × 136 mm 18 kg
(19 × 17-3/8 × 5-3/8" 39.7 lbs)

3024 (Rear-input model)
482 × 399 × 136 mm 18 kg
(19 × 15-3/4 × 5-3/8" 39.7 lbs)

The 3023 and 3024 are top-level, high performance A3 X-Y recorders, available in front- or rear-input models, and one- or two-pen models. All models offer the fastest slewing speed and acceleration. The slewing speed and acceleration of the one-pen model in the Y axis is 2,200 mm/s 7.6 G, and 2,000 mm/s 5.1 G in the X axis.

FEATURES

- **The Highest Speed – Slewing Speed of 2,200 mm/s in the Y axis, 2,000 mm/s in the X axis**
The use of new, high-torque DC servomotors and pen mechanism results in the highest speed and excellent phase characteristics.
- **Acceleration in the Y axis of 7.6 G and 5.1 G in the X axis (One-Pen Model)**
Two-pen model is 7.0 G in the Y axis, and 4.5 G in the X axis. By combining high slewing speed and acceleration, the 3023 & 3024 can capture fast-changing signals.
- **High-Quality Traces by Using Disposable, Quick-Change Felt-Tip Pen Cartridges, and by a Light-Weight, Fast-Response Pen Mechanism**
- **Top-Level Accuracy of ±0.2%**
- **Quick, Convenient Operation**
Major design features include the addition of convenient servo ON/OFF and polarity reversal switches, and pre-amplifiers separated from the input terminals for safety input wiring.
- **Electrostatic Paper Holddown with Back-lighted Led for Accurate Paper Alignment**
- **A Choice of Front- or Rear-Input Model, and One- or Two-Pen Model**
- **10 Scales of Calibrated Offset and 16 Speeds of Time Base (Standard)**
- **Versatile Remote Controls**
- **Excellent Frequency Characteristics**

SPECIFICATIONS

- Drive System:** Automatic null-balancing DC servo mechanism
Writing Area (Effective Recording Span): X-axis 381 mm (15"), Y-axis 254 mm (10")
Number of Pens: 1 or 2
Writing System: Ink writing using disposable felt-tip pen cartridges
Ink Colors: Red for Y₁ 1st pen, green for Y₂ 2nd pen
Basic Accuracy: ±0.2% of effective recording span (including non-linearity and dead band) at 23 ±5°C on 25 mV/cm range
Error between Ranges: Less than ±0.1% of pen deflection
Deadband: Less than 0.1% of effective recording span
Slewing Speed (Nominal): X-axis 2,000 mm/s, Y-axis 2,200 mm/s
Acceleration (Nominal): One-pen model ... X-axis 5.1 G, Y-axis 7.6 G, two-pen model ... X-axis 4.5 G, Y-axis 7.0 G
Pen Lift: All pens simultaneously lifted or lowered by PEN UP-DOWN switch on the front panel, or by an external contact or TTL-level signal
Chart Paper: A3 size graph paper
Paper Holddown: Electrostatic paper holddown with LED spot paper alignment
Type of Input: Front (3023) or rear (3024) input. Floating, guarded and shielded (polarity reversal switch on the front panel)
Input Ranges: 50 μV/cm, 0.1, 0.25, 0.5, 1, 2.5, 5, 10, 25, 50 mV/cm, 0.1, 0.25, 0.5, 1, 2.5, 5 V/cm (16 calibrated ranges plus continuous vernier between ranges)
Zero Set: Adjustable to any point on the writing area
Input Impedance: Approx. 1 MΩ constant on all input ranges
Maximum Source Resistance: 10 kΩ
Zero Stability (Nominal): ±(1.5 μV + 0.02% of effective recording span)/°C
Maximum Allowable Input Voltage (Continuous): 50 V DC on 50 μV/cm to 50 mV/cm ranges, 250 V DC on 0.1 V/cm to 5 V/cm ranges
Maximum Common Mode Voltage: 250 Vrms AC, or 350 V DC (3023), 130 Vrms AC, or 180 V DC (3024)
Common Mode Rejection: More than 140 dB at power line frequency or at DC
Normal Mode Rejection: More than 50 dB
Offset Input: Selectable to ±20, ±40, ±60, ±80, ±100 cm (10 ranges) or 0 (OFF) by front panel dial
Time Base (Standard): Sweep rates ... 0.25, 0.5, 1, 2.5, 5, 10, 25, 50 s/cm & min/cm (accuracy: ±0.5%), Pens automatically lifted after sweep or reset. Trial sweep available with pens lifted
Operating Position: Horizontal, vertical or inclined
Dielectric Strength: 1,500 V AC (3023), or 1,000 V AC (3024) for one minute between power line and case, and between input-guard terminals and case
Insulation Resistance: More than 100 MΩ at 500 V DC between power line and case, and between input-guard terminals and case
Power Requirements: 100, 115, 200 or 230 V AC (must be specified), for both 50 and 60 Hz
Weight: One-pen model ... approx. 17 kg (37.5 lbs), two-pen model ... approx. 18 kg (39.7 lbs)

● Remote Controls by External Contact or TTL-Level Signals (Standard)

| Function | Description |
|--------------------------|--|
| Remote pen lift control | All pens are simultaneously lifted or lowered. |
| Remote time base control | Remote control of sweep start (SWEEP TRIAL or SWEEP RECORD) and reset (RESET). |

5. OVERALL INSPECTION.

5-1. Specifications.

| | | One-pen Model | Two-pen Model |
|---|-------------|---|---------------------------|
| Basic Code | Front Input | 302313 | 302323 |
| | Rear Input | 302413 | 302423 |
| Drive System | | Automatic null-balancing DC servo mechanism | |
| Type of Input | | Floating with guard | |
| Writing System | | Ink writing using disposable felt-tip pen cartridge | |
| Number of pens | | 1 | 2 |
| Ink Colors | | Red for 1st pen Y ₁ , green for 2nd pen Y ₂ . | |
| Writing Area (Effective Recording Span) | | X-axis: 381 mm (15 inch) Y-axis: 254 mm (10 inch) | |
| Chart paper | | A3 size sheet paper (B9526AW for JIS, B9545AZ for ANSI), or roll chart (B9523BH)* *Optional chart drive unit required | |
| Paper Holddown | | Electrostatic paper hold down with LED spot paper alignment | |
| Basic Accuracy | | ±0.2% of effective recording span (including non-linearity and dead band) at normal operating conditions on reference range (50 mV). | |
| Error between Ranges | | ±0.1% or less of pen deflection | |
| Dead Band | | ±0.1% or less of effective recording span | |
| Input Ranges (Reference range: 50mV) | | For both X and Y (Y ₁ and Y ₂) axes, 50 μV/cm, 0.1, 0.25, 0.5, 1, 2.5, 5, 10, 25, 50 m V/cm, 0.1, 0.25, 0.5 1, 2.5, 5 V/cm or 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50 mV/inch, 0.1, 0.2, 0.5, 1, 2, 5, 10 V/inch (16 calibrated ranges plus continuous vernier between ranges). | |
| Zero Set | | Adjustable to any point in the writing area. | |
| Input Impedance | | Approx. 1 MΩ constant on all input ranges. | |
| Maximum Source Resistance | | 10 kΩ | |
| Zero Stability (Nominal) | | ±(1.5 μV + 0.02% of effective recording span)/°C | |
| Maximum Allowable Input | | 50 V DC on 50 μV/cm (0.1 mV/inch) to 50 mV/cm (0.1 V/inch) ranges, 250 V DC on 0.1 V/cm (0.2 V/inch) to 5 V/cm (10 V/inch) ranges. | |
| Maximum common mode Voltage | | 250 V rms AC or 350 V DC (front input) 130 V rms AC or 180 V DC (rear input) | |
| Common Mode Rejection | | More than 140 dB at power line frequency or DC | |
| Normal Mode Rejection | | 50 dB | |
| Slew Speed (Nominal) | | X-axis: 2,000 mm/s Y-axis: 2,200 mm/s | |
| Acceleration (Nominal) | | X-axis: 5.1G Y-axis: 7.6G | X-axis: 5.1G Y-axis: 7.1G |
| Input Offset | | Selectable at ±20, 40, 60, 80, 100 cm (or ±10, 20, 30, 40, 50 inch) or 0(OFF) for a total of 11 points. | |
| Accuracy of Input offset | | ±0.2% of offset setting range | |
| Temperature Drift of Input | | ±100 ppm/°C of offset setting range | |
| Pen Lift | | All pens simultaneously lifted or lowered by PEN UP-DOWN switch on the front panel, external contact or TTL-level signal. | |
| Operating position | | Horizontal, vertical or inclined (with stand) | |
| Time Base | | Sweep rates...0.25, 0.5, 1, 2.5, 5, 10, 25, 50 s/cm & min/cm or 0.5, 1, 2, 5, 10, 20, 50, 100 s/inch & min/inch (accuracy ± 0.5%, linearity ±0.1%) Pens automatically lifted after sweep or reset. Trial sweep available with pen lifted. | |
| Standard conditions | | Ambient temperature 23±5°C | |
| Operating Temperature & humidity ranges | | 5 to 40°C, (41 to 104°F) 40 to 80% relative humidity | |
| Dielectric Strength | | 1,500 V AC (front input) or 1,000 V AC (rear input) for one minute between power line and case, and between input-guard terminals and case. | |
| Insulation Resistance | | More than 100 MΩ at 500 V DC between power line and case, and between input-guard terminals and case | |
| Power Requirements | | 100, 115, 200 or 230 V AC (must be specified), for both 50 and 60 Hz. | |
| Power Consumption | | Model Maximum Balanced One-pen model 210 VA 70 VA Two-pen model 250 VA 80 VA | |
| External Dimensions | | (Front input): Approx. 441×482×130 mm (Rear input) : Approx. 399×482×130 mm | |
| Weight | | Approx. 17 kg | Approx. 18 kg |
| Accessories | | Rack mounting Screw...4 pcs. Power cord...1 set. A3-size sheets...50 sheets. Dust cover...1 pc. Power Fuse 2A...2 pcs. 24-contact connector for remote connector (A9025KC)...1 pc. Disposable felt-tip pen cartridge. One-pen model...red pen cartridge...3 pcs. Two-pen model...red pen cartridge...3 pcs green pen cartridge...3 pcs. "Additional Specifications" | |