ZT231 Industrial Printer

Technical Specifications

Specifications are provided for reference and are based on testing the ZT231 Industrial printers using genuine Zebra supplies. Results may vary in actual application settings or when using other-than-recommended Zebra supplies. Zebra recommends always qualifying any application with thorough testing.

Standard Features

Physical Features

- Print methods: direct-thermal or thermal-transfer
- Construction: metal frame and plastic enclosures
- Bi-fold media door with large clear window
- Side-loading supplies path for simplified media and ribbon loading
- Thin film printhead with E3™ Element Energy™ Equalizer for superior print quality
- Three-color LEDs for quick printer status
- 4.3 in. color resistive touch screen with intuitive menu for quick operation and settings
- Communications: USB 2.0 Data Interface, RS-232 Serial port, 10/100 Ethernet
- USB Host
- Adjustable transmissive and reflective media sensors
- ENERGY STAR® certified
- Bluetooth® Low Energy (BTLE)
- ZebraDesigner Essentials–easy label design tool free at www.zebra.com/zebradesigner
- Real-Time Clock (RTC)

Firmware

- ZBI 2.0™—Optional powerful programming language that lets printers run stand-alone applications, connect to peripherals, and much more.
- ZPL and ZPL II™—Zebra Programming Language provides sophisticated label formatting and printer control and is compatible with all Zebra printers.
- EPL and EPL2™— Eltron Programming Language with Line Mode simplifies label formatting and enables format compatibility with legacy applications. (EPL with Line Mode available on direct thermal models only.) (EPL available on 203 dpi models only.)

Optional Features

Physical Features

- Printhead 300 dpi (12 dots/mm)

Connectivity Options (one per printer)

- 802.11ac Wi-Fi® option card
- 10/100 Ethernet option card, which allows for portability of print server settings from one printer to another
- Applicator Interface

Media Handling

- Front mount, passive peel option, with no take-up spindle
- Front mount guillotine cutter
- Liner take-up rewinds entire 8 in. roll of liner (includes peel option; factory installed only)

Optional Features

Printer Operation

- User Interface
  - 4.3 in. color resistive touch screen with intuitive menu
- 256 MB SDRAM memory (32 MB user-available SDRAM)
- 256 MB on-board linear Flash memory (64 MB user available Flash memory storage for downloadable objects)
- Advanced label counters
- Auto calibration—Printer calibrates when printer is turned on or when printhead is closed using approximately two to three labels

RFID

- Supports tags compatible with UHF EPC Gen 2 V2.1, ISO/IEC 18000-63 and RAIN RFID protocols
- Prints and encodes tags with a minimum pitch of 0.6 in./16 mm
- Adaptive Encoding Technology simplifies RFID setup and eliminates complex RFID placement guidelines
- RFID job monitoring tools track RFID performance
- Globally certified in more than 70 countries for RFID to support multinational deployments
- RFID log records all RFID data with timestamps, ensuring complete traceability
- RFID ZPL commands provide compatibility with existing Zebra RFID printers
- Support for industry standard multi-vendor chip-based serialization (MCS)
- Integrated Zebra RE40 RFID Reader/Encoder

Printheads/Resolution

- Printhead 203 dpi (8 dots/mm)
- Printhead 300 dpi (12 dots/mm)

ZKDU Keyboard Display Unit

Enter variable data and retrieve stored forms for standalone applications (requires null modem adapter with DB9 serial cable)

Printing Specifications

Parameter	203 dpi resolution (8 dots/mm)	300 dpi resolution (12 dots/mm)
Dot Size: (W × L)	0.0049 in. × 0.0049 in. (0.125 mm × 0.125 mm)	0.0033 in. × 0.0039 in. (0.084 mm × 0.099 mm)
Maximum Continuous Media Print Length	157 in. (3988 mm)	73 in. (1854 mm)
Maximum Print Width	4.09 in. (104 mm)	4.09 in. (104 mm)
Programmable Print Speeds (per second)	2.0 in. through 12 in. (51 mm–305 mm) in 1 in. increments	2.0 in. through 8 in. (51 mm–203 mm) in 1 in. increments

- First dot location measured from inside media backing edge:
  - 0.10 in. ±.04 in. (2.5mm, not to exceed -0.5mm +1.0mm in 1 in. increments
- Media registration tolerance: **
  - Vertical = less than ±0.039 in. (±1.0mm) on non-continuous media
  - Horizontal = less than ±0.039 in. (±1.0mm) within a roll of media

Gap/Notch Sensing Standards

Parameter	Standard Dimensions	Metric Dimensions
Inter-label Gap	0.079 in. to 0.157 in. preferably 0.118 in.	2 to 4 mm preferably 3 mm
Sensing Notch* (W × L)	0.25 in. × 0.12 in.	6 mm × 3 mm
Sensing Hole*	0.125 in. diameter	3.18 mm diameter

Ribbon Specifications (Thermal Transfer Option Only)

- Ribbon width: 1.57 in. (40mm) to 4.33 in. (110mm)
- Maximum ribbon lengths:
  - 1476' (450 m)
- Maximum ribbon roll size:
  - 450 m: 3.2 in. (81.3 mm) O.D. on a 1.0 in. (25.4 mm) I.D. core
- Ribbon wound ink-side out

*Note: Notch and hole position centered from 0.15 in. to 2.25 in. from media inner edge

** Media registration and minimum label length are affected by media type and width, ribbon type, and print speed. Performance improves as these factors are optimized. Zebra recommends always qualifying any application with thorough testing.

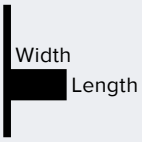
Media Specifications

- Media Types
  - Continuous, die-cut, notch, black-mark
- Maximum non-continuous label length: *
  - 39 in. (991 mm)
- Media web width (label and liner):
  - 0.75 in. (19.4 mm) to 4.50 in. (114 mm)
- Minimum label length: **
  - Tear-off mode: 0.7 in. (17.8 mm)
  - Peel mode: 0.5 in. (12.7 mm)
  - Cutter: 1.0 in. (25.4 mm)
- Media thickness (label and liner):
  - .003 in. (0.076 mm) to 0.010 in. (0.25 mm)
- Maximum media roll dimensions:
  - 8.0 in. (203 mm) O.D. on a 3 in. (76 mm) I.D. core
  - 6.0 in. (152 mm) O.D. on a 1 in. (25 mm) I.D. core

Print DNA Software Tools

This printer is supported by our Print DNA suite of software capabilities to get your printer up and running quickly and securely, and enable your printer to evolve with your business needs. Print DNA features may vary by model, and some features may require a license. For more information, please visit www.zebra.com/printdna

Black Mark Sensing Standards

Parameter	Dimensions
Black Mark Length	0.098 in.–0.453 in. (2.5 mm–11.5 mm)
Black Mark Width 	≥ 0.37 in. (9.5 mm)
Black Mark Location (within inside media edge)	0.040 in. (1 mm)

- Black Mark Density: more than 1.0 Optical Density Units (ODU)
- Maximum Media Density: 0.3 ODU

Physical Specifications

Parameter	ZT231 (with Linear Takeup Unit)	ZT231 (Closed)
Height	12.75 in. (324 mm)	11.0 in. (279 mm)
Width	9.5 in. (241 mm)	9.5 in. (241 mm)
Length	17 in. (432 mm)	17 in. (432 mm)
Weight	24 lbs. (10.9 kg)	20 lbs. (9.1 kg)

*Dimensions are for the base model printer. Consult your sales representative for specifics regarding other configurations.

Communication Specifications

- USB 2.0 Data Interface, high-speed
- High-speed Serial interfaces
  - RS-232C, with DB9F connector
  - Configurable baud rate (4800–115,200), parity and data bits. Stop bits at 1 or 2.
  - Software (XON/XOFF), hardware (DTR/DSR, or RTS/CTS) communication handshake protocols
- 10/100 Ethernet
- 802.11ac WiFi

*Maximum label lengths are affected by option selections and firmware overhead.

** Media registration and minimum label length are affected by media type and width, ribbon type, and print speed. Performance improves as these factors are optimized. Zebra recommends always qualifying any application with thorough testing.

Eltron Programming Language (EPL™) (Available On 203 DPI Only)

- Compatible with mainframe, mini, and PC hosts
- Four-position field rotation (0°, 90°, 180°, 270°)
- Variable field support (00 to 99)
- Counter support (up to 10)
- Variable field addition and subtraction
- Status reporting
- Form storage
- Metered print odometer

ZPL Barcode Symbologies and Specifications

- Barcode modulus "X" dimension:
  - Picket fence (non-rotated) orientation:
    - 203 dpi = 4.9 mil to 49 mil
    - 300 dpi = 3.3 mil to 33 mil
  - Ladder (rotated) orientation:
    - 203 dpi = 4.9 mil to 49 mil
    - 300 dpi = 3.9 mil to 39 mil
- Barcode Ratios: 2:1, 7:3, 5:2, and 3:1
- Linear Barcodes: Code 11, Code 39, Code 93, Code 128 with subsets A/B/C and UCC Case Codes, ISBT-128, UPC-A, UPC-E, EAN-8, EAN-13, UPC and EAN 2-digit or 5-digit extensions, Plessey, Postnet, Standard 2-of-5, Industrial 2-of-5, Interleaved 2-of-5, Logmars, MSI, Codabar and Planet Code
- 2D Barcodes: Codablock, PDF417, Code 49, DataMatrix, MaxiCode, QR Code, TLC 39, MicroPDF, RSS-14 (and composite), Aztec

Font Matrices: 203 DPI (8 dot/mm) Printheads

Font	Matrix		Type†	Character Size			
				Inches		Millimeters	
	H × W	Inter-Character Gap		H × W	Characters Per	H × W	Characters Per
A	9 × 5	1	U-L-D	0.044 × 0.029	33.90	1.13 × 0.75	1.33
B	11 × 7	2	U	0.054 × 0.044	22.60	1.38 × 1.13	0.89
C, D	18 × 10	2	U-L-D	0.088 × 0.059	16.95	2.25 × 1.50	0.67
E	28 × 15	5	OCR-B	0.138 × 0.098	10.17	3.50 × 2.50	0.40
F	26 × 13	3	U-L-D	0.128 × 0.079	12.71	3.25 × 2.00	0.50
G	60 × 40	8	U-L-D	0.295 × 0.236	4.24	7.50 × 6.00	0.17
H	21 × 13	6	OCR-A	0.103 × 0.093	10.71	2.63 × 2.38	0.42
GS	24 × 24	0	SYMBOL	0.118 × 0.118	8.48	3.00 × 3.00	0.33
P	20 × 18	N/A	U-L-D	0.098 × 0.089	N/A	2.49 × 2.26	N/A
Q	28 × 24	N/A	U-L-D	0.138 × 0.118	N/A	3.51 × 2.99	N/A
R	35 × 31	N/A	U-L-D	0.172 × 0.153	N/A	4.37 × 3.89	N/A
S	40 × 35	N/A	U-L-D	0.197 × 0.172	N/A	5.00 × 4.37	N/A
T	48 × 42	N/A	U-L-D	0.236 × 0.207	N/A	5.99 × 5.26	N/A
U	59 × 53	N/A	U-L-D	0.290 × 0.261	N/A	7.37 × 6.63	N/A
V	80 × 71	N/A	U-L-D	0.394 × 0.349	N/A	10.0 × 8.86	N/A
Ø	Default: 15 × 12		U-L-D	Scalable			

† U = Uppercase L = Lowercase D = Descenders

ZPL Printer Fonts

- Fonts A, B, C, D, E, F, G, H and GS are expandable up to 10 times, height and width independently. However, fonts E and H (OCR-A and OCR-B) are not considered “in-spec” when expanded.
- The scalable smooth font Ø (CG Triumvirate™ Bold Condensed**) is expandable on a dot-by-dot basis, height and width independent, while maintaining smooth edges. Maximum character size depends on available memory.
- IBM Code Page 850 international character sets are available in the fonts A, B, C, D, E, F, G and Ø through software control
- Supports user-defined fonts and graphics—Including custom logos
- User Downloadable Fonts, Graphics or Format

**Contains UFST® from Agfa Monotype Corporation

Zebra Programming Language (ZPL/ZPL II)

- Communicates in printable ASCII characters
- Unicode™ compliant
- Compatible with mainframe, mini and PC hosts
- Downloadable objects include graphics, scalable and bitmap fonts, label templates and formats
- Adjustable print cache
- Data compression
- Automatic memory allocation for format while printing
- Automatic serialization of fields
- Format inversion (white on black)
- Mirror-image printing
- Four position field rotation (0°, 90°, 180°, 270°)
- Slew command
- Programmable label quantities with print, pause, cut control
- Status messages to host upon request

Font Matrices: 300 DPI (12 dot/mm) Printheads

Font	Matrix		Type†	Character Size			
				Inches		Millimeters	
	H × W	Inter-Character Gap		H × W	Character Per	H × W	Character Per
A	9 × 5	1	U-L-D	0.030 × 0.020	50.00	0.76 × 0.51	1.97
B	11 × 7	2	U	0.037 × 0.030	33.33	0.93 × 0.76	1.31
C, D	18 × 10	2	U-L-D	0.060 × 0.040	25.00	1.53 × 1.02	0.98
E	41 × 20	6	OCR-B	0.137 × 0.087	11.54	3.47 × 2.20	0.45
F	26 × 13	3	U-L-D	0.087 × 0.053	18.75	2.20 × 1.36	0.74
G	60 × 40	8	U-L-D	0.200 × 0.160	6.25	5.08 × 4.07	0.25
H	30 × 19	9	OCR-A	0.100 × 0.093	10.71	2.54 × 2.37	0.42
GS	24 × 24	0	SYMBOL	0.080 × 0.080	12.50	2.03 × 2.03	0.49
P	20 × 18	N/A	U-L-D	0.098 × 0.089	N/A	2.49 × 2.26	N/A
Q	28 × 24	N/A	U-L-D	0.138 × 0.118	N/A	3.51 × 2.99	N/A
R	35 × 31	N/A	U-L-D	0.172 × 0.153	N/A	4.37 × 3.89	N/A
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V	80 × 71	N/A	U-L-D	0.394 × 0.349	N/A	10.0 × 8.86	N/A
Ø	Default: 15 × 12		U-L-D	Scalable			

† U = Uppercase L = Lowercase D = Descenders

Environmental Specifications

- Operating environment:
  - Thermal transfer = 40° to 104°F (5° to 40°C)
  - Direct thermal = 32° to 104°F (0° to 40°C)
  - 20% to 85% non-condensing R.H.
- Storage/transportation environment:
  - -40° to 140°F (-40° to 60°C)
  - 5% to 85% non-condensing R.H.

Agency Approvals

- IEC 62368-1, EN55022 Class B, EN55024, EN55035, EN61000-3-2, EN61000-3-3, FCC Class B, ICES-003, FCC 15.209; 15.247(d), IC RSS 247, EN 300 328, EN 301 893, EN 62311, cTUVus, CE Marking, UKCA, VCCI, RCM, S-Mark, CCC, CU EAC, BSMI, KCC, and BIS

Electrical

- Universal auto-ranging (PFC-compliant) power supply 100-240 VAC; 50-60 Hz

Preventative Maintenance

Zebra recommends cleaning the printer on a regular basis using standard Zebra printer parts and cleaning supplies. Consult your User's Guide for further details.

- **Cleaning**—The exterior is cleaned with a lint-free cloth, and if necessary, a mild detergent solution or desktop cleaner. Interior components (printhead, platen roller, media sensor, peel bar, ribbon and media paths) are cleaned with alcohol or blown air to remove any particles.
- **Lubrication**—All mechanical parts are self-lubricating and do not require additional lubrication.
- **Printhead Replacement**—For optimal printing quality and proper printer performance across our product line, Zebra strongly recommends the use of genuine Zebra supplies as part of the total solution. Specifically, the ZT231 printer is designed to work only with genuine Zebra printheads, thus maximizing safety and print quality.

For more information, visit **www.zebra.com/zt231**

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