INDUSTRIAL BAR CODE GUIDE

1D BAR CODES

While there are many bar code symbologies used to identify items in retail, healthcare, transportation, and postal systems, there are just a few that are commonly used in industrial manufacturing.

Symbology	Code 39	Code 128	Interleaved 2 of 5
	 *PANNIER 123*	 Pannier 123	 0123456789
Description	Code 39 (or Code 3 of 9) was the first alphanumeric bar code developed, and it remains widely used today.	Code 128 is a more compact symbology, allowing more characters to be encoded in a small space.	Interleaved 2 of 5 (ITF) bar codes are numeric only and are commonly used on labels and packaging.
Available Characters	0–9, A–Z, and special characters – . $ / + % [space]	All 128 standard ASCII characters	0–9 only
Lower Case Characters Allowed	No	Yes	n/a
Spaces Allowed	Yes	Yes	No
Check Digit	Optional	Required	Optional
Encoding Rules	Encoded data must be bounded by an asterisk start and stop character. Example: *Pannier 123*	Codes are constructed using start characters to indicate one of three ASCII code sets: 128A, 128B, and 128C	Codes must contain an even number of digits. If encoding a number with an odd number of digits, a leading zero must be added.
Further Reading	Code 39 symbology	Code 128 symbology	ITF Code symbology

PANNIER COPORATION
207 Sandusky Street, Pittsburgh, PA 15212 USA • sales@pannier.com • +1 412.323.4900
www.pannier.com

1023

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2D CODES

Two-dimensional (2D) codes, sometimes called "2D barcodes", encode data in cells laid out in a horizontal and vertical matrix. These sophisticated symbologies can store 100 times more information than bar codes.

Error Correction: 2D codes incorporate duplicate data to ensure readability in case a code is damaged, distorted, or difficult to read. The error checking and correction algorithms ensure a Data Matrix code is still correct with up to 60% damage, and QR code with up to 30% damage.

Symbology	Data Matrix 	QR 	PDF417 
Description	A Data Matrix is a square or rectangular matrix of cells. Cells can be square or circular in shape, allowing the codes to be made by several types of marking systems.	The QR (Quick Response) was developed in Japan for use in the automotive industry. There are many types of QR codes, but for industrial applications they are typically encoded to contain text only.	PDF417 (Portable Data File) is constitutes a series of bar codes stacked on top of each other. This is the standard code used by the US government and military.
Available Characters	All 256 ASCII characters and extended characters	Four input modes/character sets: **Numeric:** 0–9 only **Alphanumeric:** 0–9, upper case A–Z, special characters – . $ / + % : [space] **Byte:** Latin-1 (ISO 8859-1) **Kanji:** JIS X 0208	All 256 ASCII characters and extended characters
Error Correction	Fixed error correction based on the code size.	Four selectable levels of error correction.	Nine selectable levels of error correction.
Further Reading	Data Matrix code symbology	QR code symbology	PDF417 code symbology