

# SD50 with IO-Link Status Display Product Manual



Original Instructions

p/n: 242037 Rev. A

14-Jan-25

© Banner Engineering Corp. All rights reserved.



# Contents

**Chapter 1 Features ..... 3**  
Models ..... 3

**Chapter 2 Wiring..... 4**

**Chapter 3 IO-Link Process Data Out (Master to Device) ..... 5**

**Chapter 4 Specifications .....11**  
FCC Part 15 Class A for Unintentional Radiators .....11  
Industry Canada ICES-003(A).....11  
Dimensions ..... 12

**Chapter 5 Accessories..... 13**  
Cordsets ..... 13  
Mounting Brackets..... 13

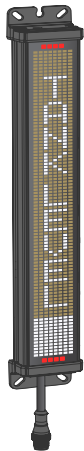
**Chapter 6 Product Support and Maintenance ..... 15**  
UTF-8 Encoding Table and Unicode Characters ..... 15  
Clean with Mild Detergent and Water ..... 19  
Repairs ..... 19  
Contact Us..... 20  
Banner Engineering Corp Limited Warranty ..... 20

Chapter Contents

Models ..... 3

# Chapter 1      Features

*Provide More Status Information in the Most Helpful Locations*



- Easily configurable, versatile display can be installed nearly anywhere, making it a simple yet powerful alternative to complex HMIs and other displays
- Great for displaying takt time, equipment status, assembly sequences, counts, and measurements where they are most useful
- Discrete and IO-Link models integrate into many different systems and applications, especially Banner sensing, safety, and monitoring solutions
- Quick and easy configuration—simply define the desired text and call it via discrete control or process data
- Bright white LED display and multicolored status LEDs legible from 10 meters away inform operators about exactly what is going on so they can respond quickly and accurately
- IP65-rated polycarbonate housing resists impact and condensation to provide clear communication in challenging and changing environmental conditions

## Models

*Model Key*

Series	Height	Style	Display Length	Display Text Color	Control	Connector <sup>(1)</sup>
SD	50	P	300	W	K	QP
Status Display	50 mm height	P = Pro	300 = 300 mm	W = White	K = IO-Link	QP = 150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector

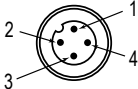
<sup>(1)</sup> Models with a quick-disconnect connector require a mating cordset.

Chapter 2

Wiring

---

*SD50 with IO-Link Wiring*

4-Pin Male M12 Pinout	Pinout Key and Wiring
	<div>1. Brown - 12 V DC to 30 V DC</div> <div>2. White - Not used</div> <div>3. Blue - DC Common</div> <div>4. Black - IO-Link Communication</div>

Chapter Contents

Chapter 3

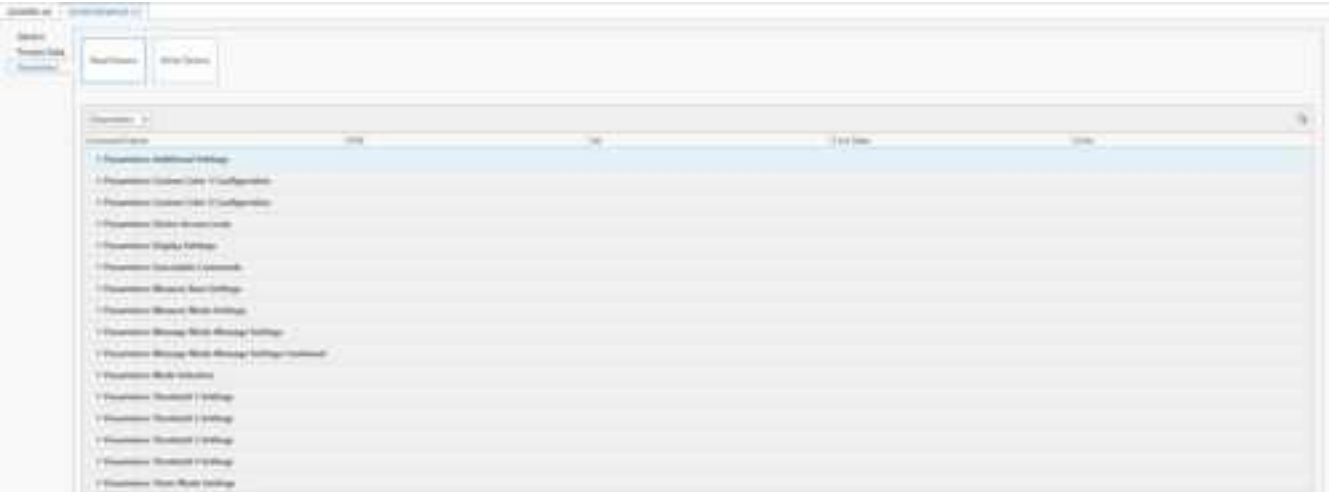
IO-Link Process Data Out (Master to Device)

IO-Link® is a point-to-point communication link between a master device and a sensor and/or light. It can be used to automatically parameterize sensors or lights and to transmit process data. For the latest IO-LINK protocol and specifications, please visit [www.io-link.com](http://www.io-link.com).

For the latest IODD files, please refer to the Banner Engineering Corp website at: [www.bannerengineering.com](http://www.bannerengineering.com).

Parameter Data

Use Banner's IO-Link Master to configure the Parameter Data, which can configure the device's mode, display settings, and custom configurations.



Mode

Select the mode for the device: Run Mode (default setting), Message Mode, Measure Mode, Timer Mode, Counter Mode, or Demo Mode.

Parameters: Mode Selection		
Operating Mode Selection	rw	Timer Mode

Additional Settings

Use Additional Settings to set the Indicator Intensity, Flash Rate, Display Intensity, and Scroll Speed to custom values that are unique from the standard options.

Command Name	R/W	Val
Parameters: Additional Settings		
Additional Settings:Custom Intensity (0 - 100%)	rw	100
Additional Settings:Custom Flash Rate (0.5 - 20)	rw	1.5
Additional Settings:Custom Display Intensity (0 - 100%)	rw	100
Additional Settings:Custom Display Scroll Speed (0 - 255)	rw	15

Custom Color Configuration

Use Custom Color Configuration to control the colors of the indicator LEDs using RGB codes ranging from 0-255.

Custom 1.Red	rw	255		
Custom 1.Green	rw	255		
Custom 1.Blue	rw	255		

Device Access Locks

Use Device Access Locks to lock or unlock Parameter Write Access and Data Storage Access.

Parameters: Device Access Locks		
Device Access Locks.Parameter Write Access	rw	Unlocked
Device Access Locks.Data Storage	rw	Unlocked

## Display Settings

Use Display Settings to configure the color, intensity, direction, speed, scroll mode, orientation, and justification of the display text.

General Settings	Description
Display Text Color	Select either white or black display text.
Display Intensity	Define the intensity of the display text with a set of preset values or a custom value.
Display Control Direction	Select the direction the display text scrolls, using the connector as a reference.
Display Scroll Speed	Define the speed at which the display text scrolls using a set of preset values or a custom value.
Display Scroll Mode	Determine if the device scrolls the text. Auto scrolls the text for inputs longer than 16 characters.
Display Orientation	Select the orientation of the device, using the connector as a reference. The text and display rotate to match the device's orientation.
Display Justification	Select the justification of the display text between Left, Right, or Center.

## Restore Factory Settings

Use Restore Factory Settings to clear the current configurations and reset the device to its initial settings.

## Measure Base Settings

Use Measure Base Settings to configure the overall settings of the display device in Measure Mode.

Parameters: Measure Base Settings		
Measure Base Configuration.Display Override	rw	Disabled
Measure Base Configuration.Override string	rw	Base
Measure Base Configuration.Animation	rw	Off
Measure Base Configuration.Color 1	rw	Green
Measure Base Configuration.Color 1 Intensity	rw	High
Measure Base Configuration.Speed	rw	Standard
Measure Base Configuration.Pulse Pattern	rw	Normal
Measure Base Configuration.Color 2	rw	Green
Measure Base Configuration.Color 2 Intensity	rw	High

General Settings	Description
Display Override	Determine if the device displays a string of text rather than the output values.
Override String	Determine the text that displays if Display Override is enabled.
Animation	Select the animation of the indicator LEDs from the animation table.
Color 1	Select the color of the first row of indicator LEDs.
Color 1 Intensity	Define the intensity of the first row of indicator LEDs.
Configuration Speed	Define the speed of the animation.
Pulse Pattern	Select the pulse pattern of the indicator LEDs: Normal, Strobe, Three Pulse, SOS, or Random.
Color 2	Select the color of the first row of indicator LEDs.
Color 2 Intensity	Define the intensity of the first row of indicator LEDs.

## Measure Mode Settings

Use the Process Data to display the measurement values. Options include either the raw input values or the scaled values.

Parameters: Measure Mode Settings		
Measure General Configuration.Filtering	rw	Off
Measure General Configuration.Hysteresis	rw	Off
Measure General Configuration.Measure/Timer/Counter Mode Data Label	rw	
Measure General Configuration.Measure/Timer/Counter Mode Value	rw	Enabled
Measure General Configuration.Measure/Timer/Counter Mode Bar Graph	rw	Enabled
Measure General Configuration.Output Scale Value Low	rw	0
Measure General Configuration.Output Scale Value High	rw	10
Measure General Configuration.Input Scale Value Low	rw	0
Measure General Configuration.Input Scale Value High	rw	65535
Measure General Configuration.Measure/Timer/Counter Mode Value Label	rw	
Measure General Configuration.Measure/Timer/Counter Mode Display Orientation	rw	0
Measure General Configuration.Measure/Timer/Counter Mode Display Minimal Bar Graph	rw	Disabled
Measure General Configuration.Measure/Timer/Counter Mode Decimal Places	rw	1
Measure General Configuration.Measure/Timer/Counter Mode Display as Time	rw	Disabled

General Settings	Description
Filtering	The level of filtering used to minimize the effects of noise on the output.
Hysteresis	The level of lag between the measurement thresholds to minimize the flickering at switch points.
Measure/Timer/Counter Mode Data Label	Text that displays before the Count Value.
Measure/Timer/Counter Mode Bar Graph	Display the bar graph across the full display.
Output Scale Value Low	The low-end value of the output translated from the input frequency.
Output Scale Value High	The high-end value of the output translated from the input frequency.
Input Scale Value Low	The lowest frequency of the input range.
Input Scale Value High	The highest frequency of the input range.
Measure/Timer/Counter Mode Value Label	Text that displays after the Count Value to indicate the units displayed. This can be up to three characters.
Measure General Configuration.Measure/Timer/Counter Mode Display Orientation	Determine the orientation of the bar graph, using the connector as a reference.
Measure General Configuration.Measure/Timer/Counter Mode Display Minimal Bar Graph	Display the bar graph as a single line of LEDs.
Measure General Configuration.Measure/Timer/Counter Mode Decimal Places	Determine the number of decimal places displayed on the Count Value.
Measure General Configuration.Measure/Timer/Counter Mode Display as Time	Display the time in HH:MM:SS format without data labels.

## Message Mode

Use Message Mode to create and save thirteen display messages.

Parameters: Message Mode Message Settings		
Message Mode Settings.Message 1	rw	Reset
Message Mode Settings.Message 2	rw	Fault
Message Mode Settings.Message 3	rw	Stop
Message Mode Settings.Message 4	rw	Start
Message Mode Settings.Message 5	rw	Changeover
Message Mode Settings.Message 6	rw	Open
Parameters: Message Mode Message Settings Continued		
Message Mode Settings Continued.Message 7	rw	Welcome
Message Mode Settings Continued.Message 8	rw	Quality
Message Mode Settings Continued.Message 9	rw	Warning
Message Mode Settings Continued.Message 10	rw	Alarm
Message Mode Settings Continued.Message 11	rw	Break
Message Mode Settings Continued.Message 12	rw	Run
Message Mode Settings Continued.Message 13	rw	Maintenance

## Threshold Settings

Use Threshold Settings to configure the thresholds using in Measure Mode, Timer Mode, and Counter Mode. Four of these thresholds can be set individually.

4 Parameters: Threshold 1 Settings		
Measure Threshold 1 Configuration.Threshold Enable	rw	Enabled
Measure Threshold 1 Configuration.Threshold Value	rw	25
Measure Threshold 1 Configuration.Threshold Comparison	rw	Less Than
Measure Threshold 1 Configuration.Threshold Override	rw	Disabled
Measure Threshold 1 Configuration.Display Override	rw	Disabled
Measure Threshold 1 Configuration.Override string	rw	Thresh 1
Measure Threshold 1 Configuration.Animation	rw	Steady
Measure Threshold 1 Configuration.Color 1	rw	Green
Measure Threshold 1 Configuration.Color 1 Intensity	rw	High
Measure Threshold 1 Configuration.Speed	rw	Standard
Measure Threshold 1 Configuration.Pulse Pattern	rw	Normal
Measure Threshold 1 Configuration.Color 2	rw	Green
Measure Threshold 1 Configuration.Color 2 Intensity	rw	High

General Settings	Description
Threshold Enable	Determine if thresholds will be used to change the output at various levels.
Threshold Value	Define the percentage of the overall value that sets the threshold based on the threshold number used.
Threshold Comparison	Determine if this threshold is in use for values greater than or less than the Threshold Value.
Threshold Override	Determine the precedence of the thresholds that have overlapping criteria.

General Settings	Description
Display Override	Determine if the device displays a string of text rather than the output values.
Override String	Determine the text that displays if Display Override is enabled.
Animation	Select the animation of the indicator LEDs from the animation table.
Color	Select the color of the indicator LEDs.
Color Intensity	Define the intensity of the indicator LEDs.
Configuration Speed	Define the speed of the animation.
Pulse Pattern	Select the pulse pattern of the indicator LEDs: Normal, Strobe, Three Pulse, SOS, or Random.

## Timer Mode

Use Timer Mode to count up to or down from a determined value. For additional timer settings, refer to the table in Measure Mode Settings.

4 Parameters: Timer Mode Settings		
Timer Mode Settings.Timer Value	rw	15
Timer Mode Settings.Timer Unit Type	rw	Seconds
Timer Mode Settings.Timer Count Type	rw	Up
Timer Mode Settings.Enable Auto Reload	rw	Enabled

General Settings	Description
Timer Value	The total time of the timer.
Timer Unit Type	Select the units of the timer.
Timer Count Type	Up: Counts up from zero to Count Seconds. Down: Counts down from Count Seconds to zero.
Enable Auto Reload	The timer loops back to the original value automatically when it reaches its final value.

## Counter Mode

Counter Mode uses parameter settings found in Measure Mode Settings to configure the output of the device. For more detail, refer to the table in Measure Mode Settings.

## Demo Mode

Demo sequence cycles through twelve different configurations to highlight example applications.

## Process Data

Process Data is used to implement the data to run the device. With Process Data, the selection menu changes based on the Mode Selection written to the device.



Generic  
Process Data  
Parameters

Process Data IN		Process Data OUT	
Name	Val	Name	Val
		Increment Count	0
		Reset Count	0

Write

### Run Mode

Process Data OUT	
Name	Val
Animation	Off
Color 1	Green
Color 1 Intensity	High
Speed	Slow
Pulse Pattern	Normal
Color 2	Green
Color 2 Intensity	High
Display Text	@

### Message Mode

Process Data OUT	
Name	Val
Animation	Off
Color 1	Green
Color 1 Intensity	High
Speed	Slow
Pulse Pattern	Normal
Color 2	Green
Color 2 Intensity	High
Message Selection 1	0
Message Selection 2	4

### Measure Mode

Process Data OUT	
Name	Val
Measure Mode Value	16384

Timer Mode

Process Data OUT	
Name	Val
Run Timer	1
Reset Timer	0

Counter Mode

Process Data OUT	
Name	Val
Increment Count	1
Reset Count	0

Indicator LED Animations

Animation	Description
Off	Indication LEDs are off.
Steady	Color 1 is solid on at a defined intensity.
Flash	Color 1 flashes alternately at defined speed, color intensities, and pattern (Normal, Strobe, Three Pulse, SOS, or Random).
Two Color Flash	Color 1 and Color 2 flash alternately at defined speed, color intensities, and pattern (Normal, Strobe, Three Pulse, SOS, or Random).
50/50	Color 1 and Color 2 are solid at a defined intensity.
50/50 Flash	Color 1 and Color 2 flash at a defined speed, color intensity, and pattern (Normal, Strobe, Three Pulse, SOS, or Random).
Intensity Sweep	Color 1 repeatedly increases and decreases intensity between 0% to 100% at defined speed and color intensity.
Two Color Sweep	Color 1 and Color 2 define the end values of a line across the color gamut. The light continuously displays a color by moving along the line at the defined speed and color intensities.

## Chapter Contents

FCC Part 15 Class A for Unintentional Radiators.....	11
Industry Canada ICES-003(A).....	11
Dimensions.....	12

## Chapter 4 Specifications

### Supply Voltage

12 V DC to 30 V DC

Use only with a suitable Class 2 power supply (UL) or SELV power supply (CE)

### Supply Current

550 mA max. at 12 V DC

260 mA max. at 24 V DC

210 mA max. at 30 V DC

### Connections

150 mm (6 in) PVC-jacketed cable with a 4-pin M12 male quick-disconnect connector

Models with a quick-disconnect connector require a mating cordset

Do not spray cable with high-pressure sprayer or cable damage will result

### Operating Temperature

–20 °C to +50 °C (–4 °F to +122 °F)

### Storage Temperature

–40 °C to +70 °C (–40 °F to +158 °F)

### Environmental Rating

Rated IP65

Suitable for damp locations per UL 2108

### Vibration and Mechanical Shock

Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 1.0 mm amplitude, 5 minutes sweep, 30 minutes dwell)

Meets IEC 60068-2-27 requirements (Shock: 15G 11 ms duration, half sine wave)

### Construction

Black polycarbonate housing and end caps

Internal silicone-encapsulated LEDs

Smoky polycarbonate window

### Required Overcurrent Protection



**WARNING:** Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to [www.bannerengineering.com](http://www.bannerengineering.com).

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	1.0	30	0.5

### Mounting

M5 and 1/4-20 compatible end caps (not included)

Clip brackets for mounting are available

## FCC Part 15 Class A for Unintentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

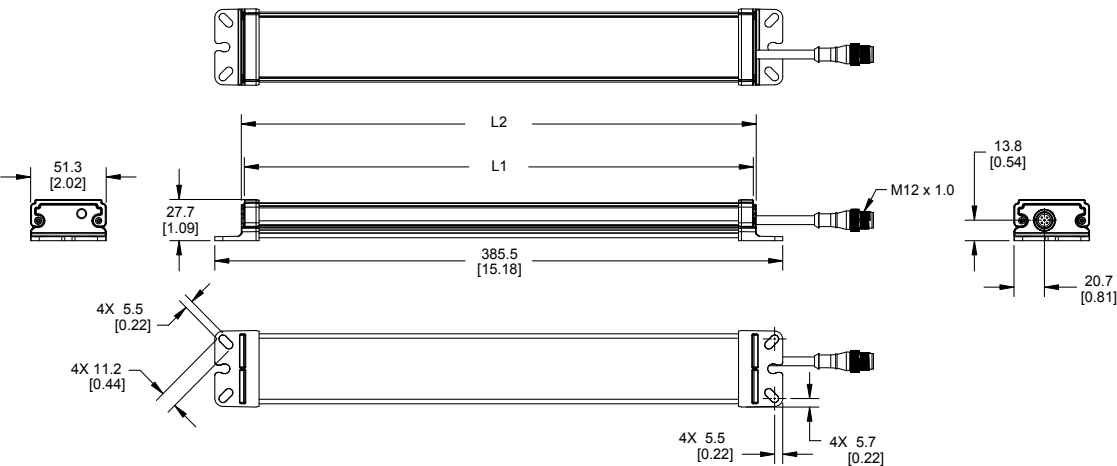
## Industry Canada ICES-003(A)

This device complies with CAN ICES-3 (A)/NMB-3(A). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(A). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

# Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



Models	L1	L2
SD50..300..	300 mm (11.81 in)	325 mm (12.8 in)

Chapter Contents	
Cordsets .....	13
Mounting Brackets.....	13

Chapter 5

Accessories

Cordsets

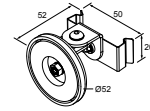
4-Pin Threaded M12 Cordsets—Double Ended				
Model	Length	Style	Dimensions	Pinout
MQDEC-401SS	0.31 m (1 ft)	Male Straight/ Female Straight		Female
MQDEC-402SS	0.6 m (1.97 ft)			
MQDEC-403SS	0.91 m (2.99 ft)			Male
MQDEC-406SS	1.83 m (6 ft)			
MQDEC-410SS	3 m (9.4 ft)			

Mounting Brackets

<b>LMBSD50</b> <ul style="list-style-type: none"><li>• Metal mounting bracket kit</li><li>• Hardware included</li></ul>	
<b>LMBSD50MAG</b> <ul style="list-style-type: none"><li>• Magnetic mounting bracket kit</li><li>• Up to 7.26 kg (16 lb) pull</li><li>• Hardware included</li></ul>	
<b>LMBSD50-180S</b> <ul style="list-style-type: none"><li>• Metal mounting bracket kit with 180-degree rotation</li><li>• Stainless steel</li><li>• Hardware included</li></ul>	

**LMBSD50-180SMAG**

- Magnetic mounting bracket kit with 180-degree rotation
- Stainless steel
- Up to 7.26 kg (16 lb) pull
- Hardware included



## Chapter Contents

UTF-8 Encoding Table and Unicode Characters.....	15
Clean with Mild Detergent and Water.....	19
Repairs.....	19
Contact Us.....	20
Banner Engineering Corp Limited Warranty.....	20

## Chapter 6 Product Support and Maintenance

### UTF-8 Encoding Table and Unicode Characters

Unicode Code Point	Character	UTF-8 (hex.)	Name
U+0020		20	SPACE
U+0021	!	21	EXCLAMATION MARK
U+0022	"	22	QUOTATION MARK
U+0023	#	23	NUMBER SIGN
U+0024	\$	24	DOLLAR SIGN
U+0025	%	25	PERCENT SIGN
U+0026	&	26	AMPERSAND
U+0027	'	27	APOSTROPHE
U+0028	(	28	LEFT PARENTHESIS
U+0029	)	29	RIGHT PARENTHESIS
U+002A	*	2a	ASTERISK
U+002B	+	2b	PLUS SIGN
U+002C	,	2c	COMMA
U+002D	-	2d	HYPHEN-MINUS
U+002E	.	2e	FULL STOP
U+002F	/	2f	SOLIDUS
U+0030	0	30	DIGIT ZERO
U+0031	1	31	DIGIT ONE
U+0032	2	32	DIGIT TWO
U+0033	3	33	DIGIT THREE
U+0034	4	34	DIGIT FOUR
U+0035	5	35	DIGIT FIVE
U+0036	6	36	DIGIT SIX
U+0037	7	37	DIGIT SEVEN
U+0038	8	38	DIGIT EIGHT
U+0039	9	39	DIGIT NINE
U+003A	:	3a	COLON
U+003B	;	3b	SEMICOLON
U+003C	<	3c	LESS-THAN SIGN
U+003D	=	3d	EQUALS SIGN
U+003E	>	3e	GREATER-THAN SIGN

Continued on page 16

Continued from page 15

Unicode Code Point	Character	UTF-8 (hex.)	Name
U+003F	?	3f	QUESTION MARK
U+0040	@	40	COMMERCIAL AT
U+0041	A	41	LATIN CAPITAL LETTER A
U+0042	B	42	LATIN CAPITAL LETTER B
U+0043	C	43	LATIN CAPITAL LETTER C
U+0044	D	44	LATIN CAPITAL LETTER D
U+0045	E	45	LATIN CAPITAL LETTER E
U+0046	F	46	LATIN CAPITAL LETTER F
U+0047	G	47	LATIN CAPITAL LETTER G
U+0048	H	48	LATIN CAPITAL LETTER H
U+0049	I	49	LATIN CAPITAL LETTER I
U+004A	J	4a	LATIN CAPITAL LETTER J
U+004B	K	4b	LATIN CAPITAL LETTER K
U+004C	L	4c	LATIN CAPITAL LETTER L
U+004D	M	4d	LATIN CAPITAL LETTER M
U+004E	N	4e	LATIN CAPITAL LETTER N
U+004F	O	4f	LATIN CAPITAL LETTER O
U+0050	P	50	LATIN CAPITAL LETTER P
U+0051	Q	51	LATIN CAPITAL LETTER Q
U+0052	R	52	LATIN CAPITAL LETTER R
U+0053	S	53	LATIN CAPITAL LETTER S
U+0054	T	54	LATIN CAPITAL LETTER T
U+0055	U	55	LATIN CAPITAL LETTER U
U+0056	V	56	LATIN CAPITAL LETTER V
U+0057	W	57	LATIN CAPITAL LETTER W
U+0058	X	58	LATIN CAPITAL LETTER X
U+0059	Y	59	LATIN CAPITAL LETTER Y
U+005A	Z	5a	LATIN CAPITAL LETTER Z
U+005B	[	5b	LEFT SQUARE BRACKET
U+005C	\	5c	REVERSE SOLIDUS
U+005D	]	5d	RIGHT SQUARE BRACKET
U+005E	^	5e	CIRCUMFLEX ACCENT
U+005F	_	5f	LOW LINE
U+0060	`	60	GRAVE ACCENT
U+0061	a	61	LATIN SMALL LETTER A
U+0062	b	62	LATIN SMALL LETTER B
U+0063	c	63	LATIN SMALL LETTER C
U+0064	d	64	LATIN SMALL LETTER D
U+0065	e	65	LATIN SMALL LETTER E
U+0066	f	66	LATIN SMALL LETTER F
U+0067	g	67	LATIN SMALL LETTER G
U+0068	h	68	LATIN SMALL LETTER H

Continued on page 17



Continued from page 16

Unicode Code Point	Character	UTF-8 (hex.)	Name
U+0069	i	69	LATIN SMALL LETTER I
U+006A	j	6a	LATIN SMALL LETTER J
U+006B	k	6b	LATIN SMALL LETTER K
U+006C	l	6c	LATIN SMALL LETTER L
U+006D	m	6d	LATIN SMALL LETTER M
U+006E	n	6e	LATIN SMALL LETTER N
U+006F	o	6f	LATIN SMALL LETTER O
U+0070	p	70	LATIN SMALL LETTER P
U+0071	q	71	LATIN SMALL LETTER Q
U+0072	r	72	LATIN SMALL LETTER R
U+0073	s	73	LATIN SMALL LETTER S
U+0074	t	74	LATIN SMALL LETTER T
U+0075	u	75	LATIN SMALL LETTER U
U+0076	v	76	LATIN SMALL LETTER V
U+0077	w	77	LATIN SMALL LETTER W
U+0078	x	78	LATIN SMALL LETTER X
U+0079	y	79	LATIN SMALL LETTER Y
U+007A	z	7a	LATIN SMALL LETTER Z
U+007B	{	7b	LEFT CURLY BRACKET
U+007C		7c	VERTICAL LINE
U+007D	}	7d	RIGHT CURLY BRACKET
U+007E	~	7e	TILDE
U+00A0		c2 a0	NO-BREAK SPACE
U+00A1	¡	c2 a1	INVERTED EXCLAMATION MARK
U+00A2	¢	c2 a2	CENT SIGN
U+00A3	£	c2 a3	POUND SIGN
U+00A4	¤	c2 a4	CURRENCY SIGN
U+00A5	¥	c2 a5	YEN SIGN
U+00A6	¦	c2 a6	BROKEN BAR
U+00A7	§	c2 a7	SECTION SIGN
U+00A8	¨	c2 a8	DIAERESIS
U+00A9	©	c2 a9	COPYRIGHT SIGN
U+00AA	ª	c2 aa	FEMININE ORDINAL INDICATOR
U+00AB	«	c2 ab	LEFT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00AC	¬	c2 ac	NOT SIGN
U+00AD		c2 ad	SOFT HYPHEN
U+00AE	®	c2 ae	REGISTERED SIGN
U+00AF	—	c2 af	MACRON
U+00B0	°	c2 b0	DEGREE SIGN
U+00B1	±	c2 b1	PLUS-MINUS SIGN
U+00B2	²	c2 b2	SUPERSCRPT TWO
U+00B3	³	c2 b3	SUPERSCRPT THREE

Continued on page 18

Continued from page 17

Unicode Code Point	Character	UTF-8 (hex.)	Name
U+00B4	´	c2 b4	ACUTE ACCENT
U+00B5	µ	c2 b5	MICRO SIGN
U+00B6	¶	c2 b6	PILCROW SIGN
U+00B7	·	c2 b7	MIDDLE DOT
U+00B8	¸	c2 b8	CEDILLA
U+00B9	¹	c2 b9	SUPERSCRIPT ONE
U+00BA	º	c2 ba	MASCULINE ORDINAL INDICATOR
U+00BB	»	c2 bb	RIGHT-POINTING DOUBLE ANGLE QUOTATION MARK
U+00BC	¼	c2 bc	VULGAR FRACTION ONE QUARTER
U+00BD	½	c2 bd	VULGAR FRACTION ONE HALF
U+00BE	¾	c2 be	VULGAR FRACTION THREE QUARTERS
U+00BF	¿	c2 bf	INVERTED QUESTION MARK
U+00C0	À	c3 80	LATIN CAPITAL LETTER A WITH GRAVE
U+00C1	Á	c3 81	LATIN CAPITAL LETTER A WITH ACUTE
U+00C2	Â	c3 82	LATIN CAPITAL LETTER A WITH CIRCUMFLEX
U+00C3	Ã	c3 83	LATIN CAPITAL LETTER A WITH TILDE
U+00C4	Ä	c3 84	LATIN CAPITAL LETTER A WITH DIAERESIS
U+00C5	Å	c3 85	LATIN CAPITAL LETTER A WITH RING ABOVE
U+00C6	Æ	c3 86	LATIN CAPITAL LETTER AE
U+00C7	Ç	c3 87	LATIN CAPITAL LETTER C WITH CEDILLA
U+00C8	È	c3 88	LATIN CAPITAL LETTER E WITH GRAVE
U+00C9	É	c3 89	LATIN CAPITAL LETTER E WITH ACUTE
U+00CA	Ê	c3 8a	LATIN CAPITAL LETTER E WITH CIRCUMFLEX
U+00CB	Ë	c3 8b	LATIN CAPITAL LETTER E WITH DIAERESIS
U+00CC	Ì	c3 8c	LATIN CAPITAL LETTER I WITH GRAVE
U+00CD	Í	c3 8d	LATIN CAPITAL LETTER I WITH ACUTE
U+00CE	Î	c3 8e	LATIN CAPITAL LETTER I WITH CIRCUMFLEX
U+00CF	Ï	c3 8f	LATIN CAPITAL LETTER I WITH DIAERESIS
U+00D0	Ð	c3 90	LATIN CAPITAL LETTER ETH
U+00D1	Ñ	c3 91	LATIN CAPITAL LETTER N WITH TILDE
U+00D2	Ò	c3 92	LATIN CAPITAL LETTER O WITH GRAVE
U+00D3	Ó	c3 93	LATIN CAPITAL LETTER O WITH ACUTE
U+00D4	Ô	c3 94	LATIN CAPITAL LETTER O WITH CIRCUMFLEX
U+00D5	Õ	c3 95	LATIN CAPITAL LETTER O WITH TILDE
U+00D6	Ö	c3 96	LATIN CAPITAL LETTER O WITH DIAERESIS
U+00D7	×	c3 97	MULTIPLICATION SIGN
U+00D8	Ø	c3 98	LATIN CAPITAL LETTER O WITH STROKE
U+00D9	Ù	c3 99	LATIN CAPITAL LETTER U WITH GRAVE
U+00DA	Ú	c3 9a	LATIN CAPITAL LETTER U WITH ACUTE
U+00DB	Û	c3 9b	LATIN CAPITAL LETTER U WITH CIRCUMFLEX
U+00DC	Ü	c3 9c	LATIN CAPITAL LETTER U WITH DIAERESIS
U+00DD	Ý	c3 9d	LATIN CAPITAL LETTER Y WITH ACUTE

Continued on page 19

Continued from page 18

Unicode Code Point	Character	UTF-8 (hex.)	Name
U+00DE	þ	c3 9e	LATIN CAPITAL LETTER THORN
U+00DF	ß	c3 9f	LATIN SMALL LETTER SHARP S
U+00E0	à	c3 a0	LATIN SMALL LETTER A WITH GRAVE
U+00E1	á	c3 a1	LATIN SMALL LETTER A WITH ACUTE
U+00E2	â	c3 a2	LATIN SMALL LETTER A WITH CIRCUMFLEX
U+00E3	ã	c3 a3	LATIN SMALL LETTER A WITH TILDE
U+00E4	ä	c3 a4	LATIN SMALL LETTER A WITH DIAERESIS
U+00E5	å	c3 a5	LATIN SMALL LETTER A WITH RING ABOVE
U+00E6	æ	c3 a6	LATIN SMALL LETTER AE
U+00E7	ç	c3 a7	LATIN SMALL LETTER C WITH CEDILLA
U+00E8	è	c3 a8	LATIN SMALL LETTER E WITH GRAVE
U+00E9	é	c3 a9	LATIN SMALL LETTER E WITH ACUTE
U+00EA	ê	c3 aa	LATIN SMALL LETTER E WITH CIRCUMFLEX
U+00EB	ë	c3 ab	LATIN SMALL LETTER E WITH DIAERESIS
U+00EC	ì	c3 ac	LATIN SMALL LETTER I WITH GRAVE
U+00ED	í	c3 ad	LATIN SMALL LETTER I WITH ACUTE
U+00EE	î	c3 ae	LATIN SMALL LETTER I WITH CIRCUMFLEX
U+00EF	ï	c3 af	LATIN SMALL LETTER I WITH DIAERESIS
U+00F0	ð	c3 b0	LATIN SMALL LETTER ETH
U+00F1	ñ	c3 b1	LATIN SMALL LETTER N WITH TILDE
U+00F2	ò	c3 b2	LATIN SMALL LETTER O WITH GRAVE
U+00F3	ó	c3 b3	LATIN SMALL LETTER O WITH ACUTE
U+00F4	ô	c3 b4	LATIN SMALL LETTER O WITH CIRCUMFLEX
U+00F5	õ	c3 b5	LATIN SMALL LETTER O WITH TILDE
U+00F6	ö	c3 b6	LATIN SMALL LETTER O WITH DIAERESIS
U+00F7	÷	c3 b7	DIVISION SIGN
U+00F8	ø	c3 b8	LATIN SMALL LETTER O WITH STROKE
U+00F9	ù	c3 b9	LATIN SMALL LETTER U WITH GRAVE
U+00FA	ú	c3 ba	LATIN SMALL LETTER U WITH ACUTE
U+00FB	û	c3 bb	LATIN SMALL LETTER U WITH CIRCUMFLEX
U+00FC	ü	c3 bc	LATIN SMALL LETTER U WITH DIAERESIS
U+00FD	ý	c3 bd	LATIN SMALL LETTER Y WITH ACUTE
U+00FE	þ	c3 be	LATIN SMALL LETTER THORN
U+00FF	ÿ	c3 bf	LATIN SMALL LETTER Y WITH DIAERESIS

## Clean with Mild Detergent and Water

Wipe down the enclosure and the display with a soft cloth that has been dampened with a mild detergent and warm water solution.

## Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

**IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

## Contact Us

Banner Engineering Corp. headquarters is located at: 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: + 1 888 373 6767

For worldwide locations and local representatives, visit [www.bannerengineering.com](http://www.bannerengineering.com).

## Banner Engineering Corp Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

**THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.**

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: [www.bannerengineering.com](http://www.bannerengineering.com).

For patent information, see [www.bannerengineering.com/patents](http://www.bannerengineering.com/patents).

