iVu Bar Code Reader (BCR) Image Sensor

BANNER ®
more sensors, more solutions

Datasheet

iVu BCR Image Sensor with Integrated Display

The iVu Series Barcode Reader (BCR) sensor package consists of lighting, sensor, lens, and display. Appropriate cables and mounting brackets can be ordered for each application. Additionally, other lenses, brackets, filters and external lights are available. Installation, setup, and configuration can be done quickly without requiring a PC to configure the sensor.

Features
- No PC required to configure the sensor
- Image processing expertise is not required
- USB port for uploading and downloading of inspections and log files for easy updating and diagnostics
- Integrated color touch screen display
- A RS-232 serial communications port that is used to output barcode data to other applications
- High speed processing

The iVu BCR reads the following barcode types:
- DataMatrix (ECC 200) barcodes
- QR Code (QR and Micro QR)
- Linear barcodes: Code128, Code39, CODABAR, Interleaved 2 of 5, EAN13, EAN8, UPCE, Postnet, IMB, and Pharmacode

⚠️ **WARNING: Not To Be Used for Personnel Protection**

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Models

Ring Light Options	NPN Models					
	Micro Video Lens Options					C-Mount Lens Options
	4.3 mm	8 mm	12 mm	16 mm	25 mm	
None	IVUTBNX04	IVUTBNX08	IVUTBNX12	IVUTBNX16	IVUTBNX25	IVUTBNXC
Red	IVUTBNR04	IVUTBNR08	IVUTBNR12	IVUTBNR16	IVUTBNR25	N/A
Blue	IVUTBNB04	IVUTBNB08	IVUTBNB12	IVUTBNB16	IVUTBNB25	N/A
Green	IVUTBNG04	IVUTBNG08	IVUTBNG12	IVUTBNG16	IVUTBNG25	N/A
IR	IVUTBNI04	IVUTBNI08	IVUTBNI12	IVUTBNI16	IVUTBNI25	N/A
White	IVUTBNW04	IVUTBNW08	IVUTBNW12	IVUTBNW16	IVUTBNW25	N/A
UV 365 [1]	IVUTBN604	IVUTBN608	IVUTBN612	IVUTBN616	IVUTBN625	N/A
UV 395 [1]	IVUTBN904	IVUTBN908	IVUTBN912	IVUTBN916	IVUTBN925	N/A

[1] Blue Filter Kit (FLTB) included with UV models.

PNP Models						
Ring Light Options	Micro Video Lens Options					C-Mount Lens Options
	4.3 mm	8 mm	12 mm	16 mm	25 mm	
None	IVUTBPX04	IVUTBPX08	IVUTBPX12	IVUTBPX16	IVUTBPX25	IVUTBPXC
Red	IVUTBPR04	IVUTBPR08	IVUTBPR12	IVUTBPR16	IVUTBPR25	N/A
Blue	IVUTBPB04	IVUTBPB08	IVUTBPB12	IVUTBPB16	IVUTBPB25	N/A
Green	IVUTBPG04	IVUTBPG08	IVUTBPG12	IVUTBPG16	IVUTBPG25	N/A
IR	IVUTBPI04	IVUTBPI08	IVUTBPI12	IVUTBPI16	IVUTBPI25	N/A
White	IVUTBPW04	IVUTBPW08	IVUTBPW12	IVUTBPW16	IVUTBPW25	N/A
UV 365 [1]	IVUTBP604	IVUTBP608	IVUTBP612	IVUTBP616	IVUTBP625	N/A
UV 395 [1]	IVUTBP904	IVUTBP908	IVUTBP912	IVUTBP916	IVUTBP925	N/A

> NOTE: This product emits UV light. Exempt Risk Group (RG 0) product. No optical hazard is considered reasonably foreseeable, even for continuous, unrestricted use (IEC 62471).

Sensor Specifications

Power Connection
12-pin Euro-style (M12) male connector; accessory cable required for operation (see *Power Cable — Required* on page 7)

USB 2.0 Host
8-pin Euro-style (M12) female connector; optional USB cable required for operation of USB flash drive (see *USB Cable — Optional* on page 7)

Power Requirements
Voltage: 10 to 30 V dc
Current: 800 mA maximum (exclusive of I/O load)

Output Configuration
NPN or PNP determined by model

Demo Mode
Full tool functionality on canned images

Sensor Lock
Optional password protection

External Strobe Output
+ 5 V dc

Integrated Ring Light
Red, IR, Green, Blue, White

Output Rating
150 mA

Display
68.5 mm (2.7 in) LCD Color Integrated Display 320 × 240 pixels

Acquisition
60 fps (frames per second)[2]

Exposure Time
0.1 ms to 1.049 s

Imager
1/3 inch CMOS 752 × 480 pixels; adjustable Field of View (FOV)

Lens Mount
Micro Video Lens models: M12 × 1 mm thread; micro video lens 4.3, 6, 8, 12, 16, 25 mm
C-Mount models: Standard C-mount (1 inch-32 UN)

Construction
Black Valox™ sensor housing; acrylic window
Weight: 0.28 kg (0.61 lbs)

Environmental Rating
IP67

Operating Conditions
Stable Ambient Temperature: 0 °C to +50 °C (+32 °F to +122 °F)
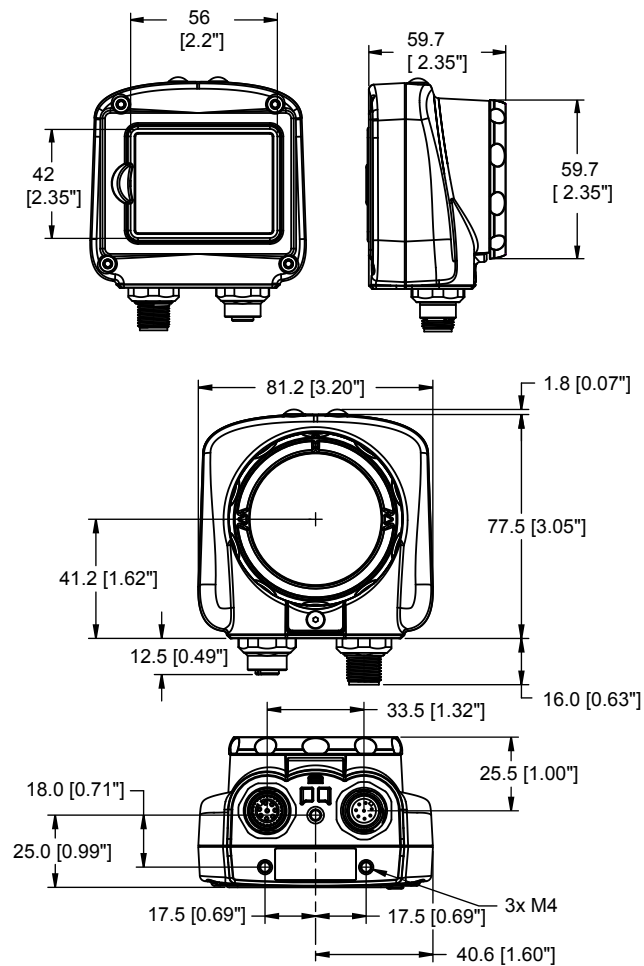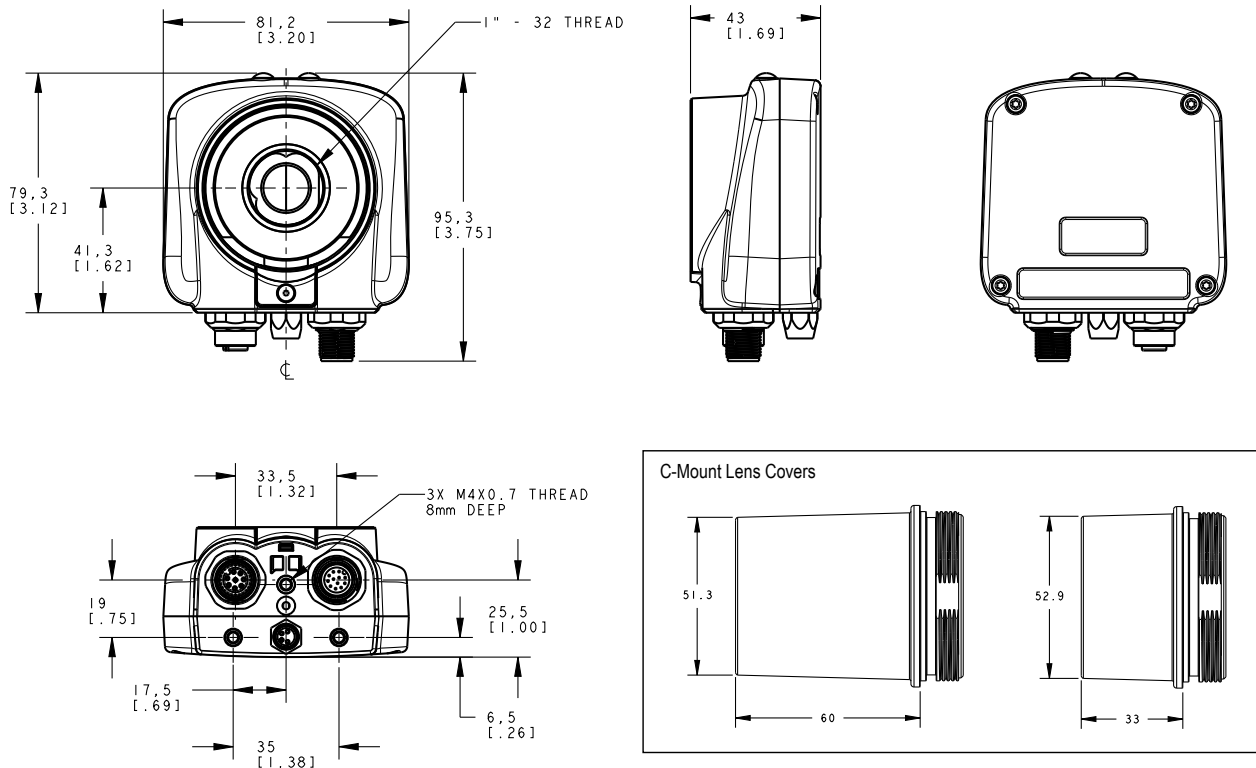Maximum relative humidity: 95% maximum relative humidity (non-condensing)

Certifications
C E

---

[2] This value can vary based on inspection settings.

Dimensions

Micro Video Lens Dimensions

56
[2.2"]

59.7
[2.35"]

42
[2.35"]

59.7
[2.35"]

81.2 [3.20"]

1.8 [0.07"]

77.5 [3.05"]

41.2 [1.62"]

12.5 [0.49"]

16.0 [0.63"]

33.5 [1.32"]

25.5 [1.00"]

18.0 [0.71"]

25.0 [0.99"]

17.5 [0.69"]
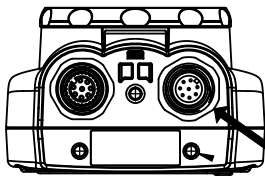
17.5 [0.69"]

3x M4

40.6 [1.60"]

C-Mount Lens Dimensions

C-Mount Lens Covers

Cable Connections for iVu BCR with Integrated Display

The power and I/O cable for the iVu BCR sensor is available in 2, 5, 9, and 15 m (6, 15, 30, 50 ft) lengths. The connector on the sensor is shown below (B).

B   Power I/O Connector

B

NOTE: Micro video lens model shown. C-Mount model connections are identical.

Power I/O Connections			
Pin #	Wire Color	Description	Direction
1	White	Output 1	Output
2	Brown	10-30V dc	Input
3	Green	Output 2	Output
4	Yellow	Strobe Out (5V dc only)	Output
5	Gray	Remote Teach	Input

Power I/O Connections			
Pin #	Wire Color	Description	Direction
6	Pink	External Trigger	Input
7	Blue	Common (Signal Ground)	Input
8	Red	Ready	Output
9	Orange	Not used	N/A
10	Light Blue	RS-232 TX	Output
11	Black	RS-232 Signal Ground	Output
12	Violet	RS-232 Rx	Input

iVu Trigger, Remote Teach, and I/O Waveforms

The iVu has two input signals—Trigger and Remote Teach. The default setting is to detect the low to high transition. This setting can be changed in the Main Menu > System > Discrete I/O > Input Polarity screen on the sensor.

PNP (Low-to-High) Trigger and Remote Teach Input Waveforms
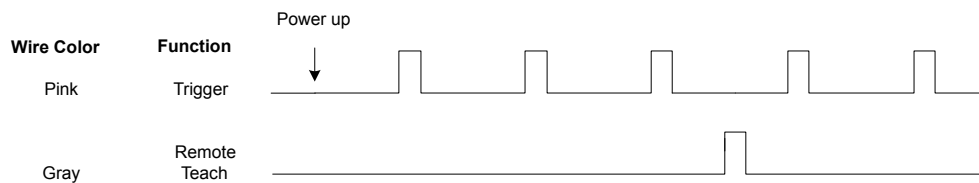
The sensor triggers from low to high, and Remote Teach behaves electrically like trigger.

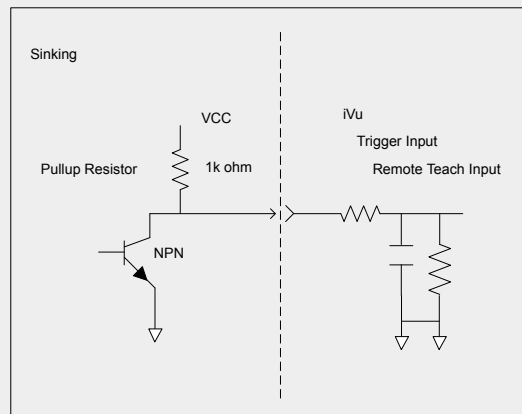### NPN (High-to-Low) Trigger and Remote Teach Input Waveforms
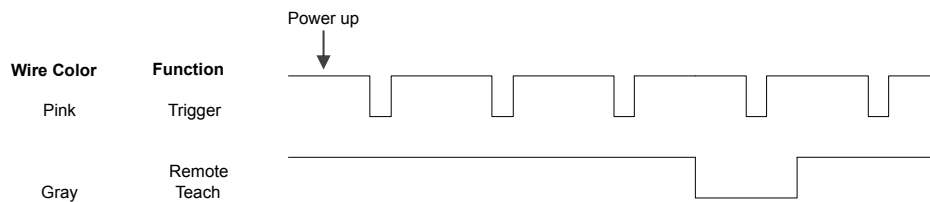
The sensor triggers from high to low, and Remote Teach behaves electrically like trigger.

NOTE: If the device used to trigger or remote teach the iVu BCR is a sinking device, these are the options regarding the use of a pull-up resistor:

Option 1: Put a pull-up resistor, rated approximately 1k ohm, between the sensor's positive (+) voltage and the sensor's input as shown below.
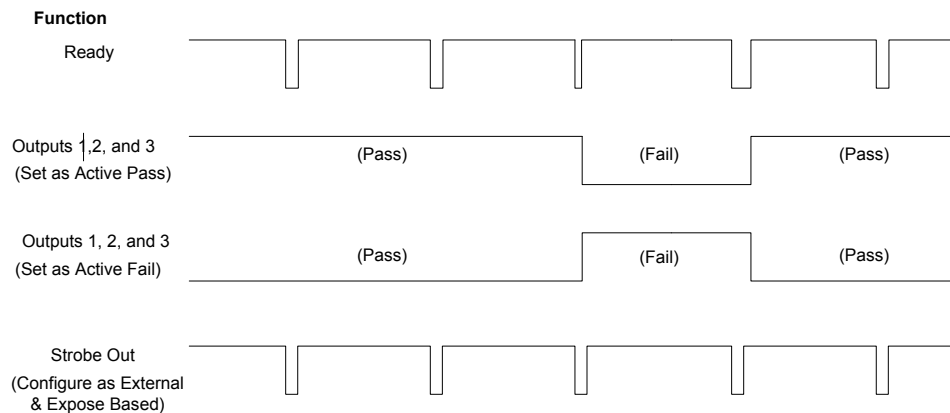
Sinking

VCC

iVu

Pullup Resistor | 1k ohm | Trigger Input

Remote Teach Input

NPN

iVu Output Waveforms

Function

Ready

Outputs 1,2, and 3
(Set as Active Pass)
(Pass) (Fail) (Pass)

Outputs 1, 2, and 3
(Set as Active Fail)
(Pass) (Fail) (Pass)

Strobe Out
(Configure as External
& Expose Based)

Figure 1. PNP Outputs

Function

Ready

Outputs 1, 2, and 3
(Set as Active Pass)
(Pass) (Fail) (Pass)

Outputs 1, 2, and 3
(Set as Active Fail)
(Pass) (Fail) (Pass)
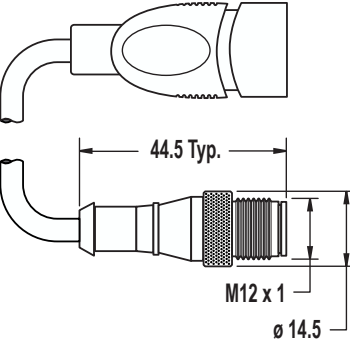
Strobe Out
(Configure as External
& Expose Based)
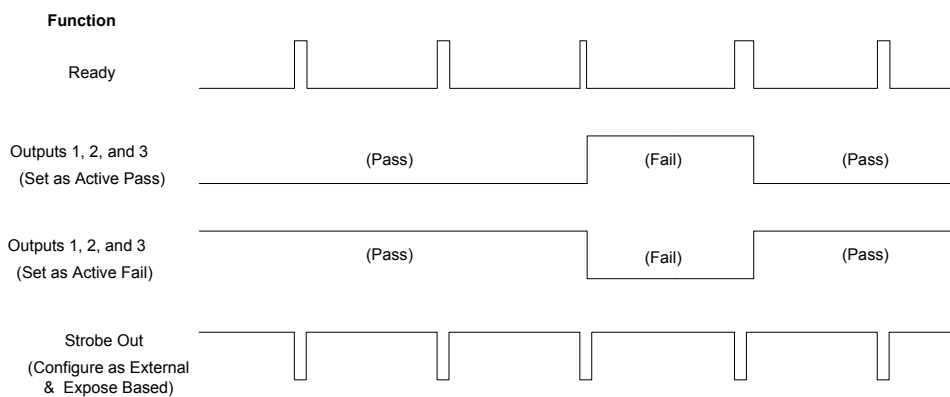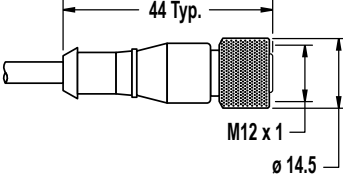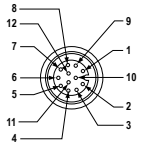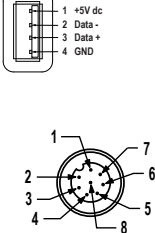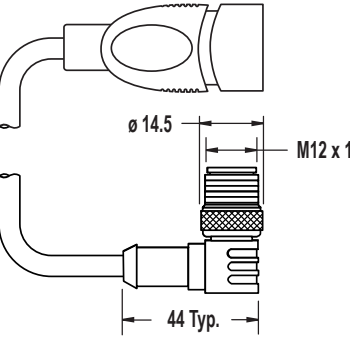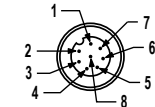
Figure 2. NPN Outputs

Accessories

Power Cable — Required

12-Pin M12/Euro-Style Cordsets with Open Shield				
Model	Length	Style	Dimensions	Pinout
MQDC2S-1206	1.83 m (6 ft)	Straight		
MQDC2S-1215	4.57 m (15 ft)			
MQDC2S-1230	9.14 m (30 ft)			
MQDC2S-1250	15.2 m (50 ft)			
MQDC2S-1275	22.9 m (75 ft)			

Dimensions: 44 Typ., M12 x 1, ø 14.5

Pinout:
1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Gray
6 = Pink
7 = Blue
8 = Red
9 = Orange
10 = Lt. Blue
11 = Black
12 = Violet

USB Cable — Optional

8-Pin Threaded M12/Euro-Style to USB Cordsets—Double Ended				
Model	Length	Style	Dimensions	Pinout
MQDEC-8005-USB	0.15 m (6 6)	Straight Euro QD/USB		
MQDEC-801-USB	0.31 m (1 ft)			
MQDEC-803-USB	0.91 m (3 ft)			
MQDEC-810-USB	3.0 m (10 ft)			
MQDEC-8005RA-USB	0.15 m (6 6)	Right-Angle Euro QD/USB		
MQDEC-801RA-USB	0.31 m (1 ft)			
MQDEC-803RA-USB	0.91 m (3 ft)			
MQDEC-810RA-USB	3.0 m (10 ft)			

Dimensions (Straight): 44.5 Typ., M12 x 1, ø 14.5

Dimensions (Right-Angle): ø 14.5, M12 x 1, 44 Typ.
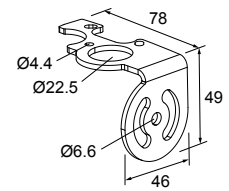
Pinout:
1 +5V dc
2 Data -
3 Data +
4 GND

Brackets

SMBIVUB
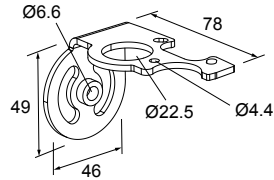- Bottom mounting bracket
- Black anodized aluminum
- Hardware included
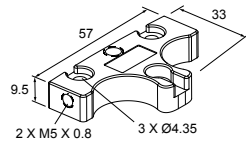
SMBIVURAL
- Right-angle bracket for mounting sensor from the left
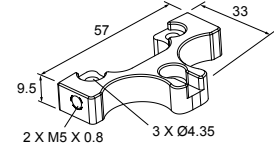- 12-ga. stainless steel
- Hardware included

SMBIVURAR
- Right-angle bracket for mounting sensor from right
- 12-ga. stainless steel
- Hardware included

SMBIVUU
- U-shaped swivel bracket kit
- 14-ga. stainless steel
- Hardware included

NOTE: Use cables with right-angle connectors with this bracket kit.

Micro Video Lens Accessories

Micro Video Lens Models

Model	Lens Description
LMF04 [3]	4.3 mm lens
LMF06	6 mm lens
LMF08	8 mm lens
LMF12	12 mm lens
LMF16	16 mm lens
LMF25	25 mm lens

Micro Video Lens Filters — Optional

Model	Description
FLTMR	Red filter kit
FLTMB	Blue filter kit
FLTMG	Green filter kit
FLTMI	IR filter kit

---

[3] Due to the flexibility of the replaceable lenses, focus mechanism, and imager field-of-view settings, it is possible with the 4.3 mm lens to experience reflections from the internal strobe on the inspection image. To eliminate this effect, the field-of-view can be limited to the system default of 320×240 (or 640×480 for fine), the working distance to the object should be no more than about 8 inches, or an external strobe should be used instead of the internal ring light.

C-Mount Lens Accessories

C-Mount Lens Models

Model	Lens Description
LCF04	4 mm Lens - no threads for filter
LCF08	8 mm Lens - no threads for filter
LCF12	12 mm Lens - no threads for filter
LCF16	16 mm Lens, aperture lock - no threads for filter
LCF25R	25mm lens
LCF25LR	25mm lens with focus locking
LCF50L1R	50mm lens with focus locking, plastic
LCF50L2R	50mm lens with focus locking, metal (will not fit ring)
LCF75LR	75mm lens with focus locking, metal (will not fit ring)

C-Mount Lens Enclosure Choices

Model	Description
IVUSLC50-P	Sealed C-mount lens enclosure
IVUSLC75-P	

C-Mount Lens Filters — Optional

Model	Description
FLTR	Red filter kit
FLTB	Blue filter kit
FLTG	Green filter kit
FLTI	IR Filter kit

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.