

Emitter and Receiver Models

Emitter/Receiver Model	Array Length Y*	Total Beams
MAHE6A Emitter MAHR6A Receiver	163 mm (6.4")	64
MAHE13A Emitter MAHR13A Receiver	325 mm (12.8")	128
MAHE19A Emitter MAHR19A Receiver	488 mm (19.2")	192
MAHE26A Emitter MAHR26A Receiver	650 mm (25.6")	256
MAHE32A Emitter MAHR32A Receiver	813 mm (32.0")	320
MAHE38A Emitter MAHR38A Receiver	975 mm (38.4")	384
MAHE45A Emitter MAHR45A Receiver	1138 mm (44.8")	448
MAHE51A Emitter MAHR51A Receiver	1300 mm (51.2")	512
MAHE58A Emitter MAHR58A Receiver	1463 mm (57.6")	576
MAHE64A Emitter MAHR64A Receiver	1626 mm (64.0")	640
MAHE70A Emitter MAHR70A Receiver	1788 mm (70.4")	704
MAHE77A Emitter MAHR77A Receiver	1951 mm (76.8")	768

High-Resolution Emitter



High-Resolution Receiver

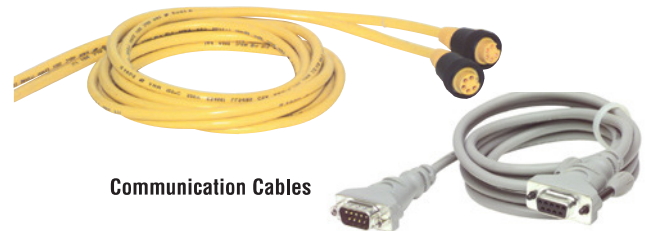


Configure and monitor the System with the supplied software and any PC-compatible computer (running Windows® XP, Vista, or 7), via an RS-232 cable.



DIN-Rail Mountable Control Module

Quick-Disconnect Cables



Communication Cables

Control Module Models

Controller Model	Solid-State Discrete Outputs	Analog Outputs
MAHCVP-1	2 PNP	(2) 0-10V Sourcing
MAHCVN-1	2 NPN	(2) 0-10V Sourcing
MAHCIP-1	2 PNP	(2) 4-20 mA Sinking
MAHCIN-1	2 NPN	(2) 4-20 mA Sinking


Cables

Cable Model	Description
Sensor Cables	
QDC-515C	4.6 m (15') Cable, straight QD connector
QDC-525C	7.6 m (25') Cable, straight QD connector
QDC-550C	15.2 m (50') Cable, straight QD connector
Communication Cables	
MASC	2 m (6.5') DB9, straight RS-232 cable

Figure 1-1. A-GAGE High-Resolution MINI-ARRAY System components

Specifications

2.2 Control Module Specifications

Output Configuration	MAHCVP-1: Two PNP discrete (switched), two 0-10V voltage sourcing MAHCVN-1: Two NPN discrete (switched), two 0-10V voltage sourcing MAHCIP-1: Two PNP discrete (switched), two 4-20 mA current sinking MAHCIN-1: Two NPN discrete (switched), two 4-20 mA current sinking
Power Requirements	16 to 30V dc @ 1.0 A (typical: 0.5 A @ 16V dc)
Inputs	Sensor input: Emitter and receiver wire in parallel to five terminals. Gate input: Optically isolated, requires 10 to 30V dc (7.5k Ω impedance) for gate signal Remote alignment input: Optically isolated, requires 10 to 30V dc (7.5k Ω impedance) for alignment sequence signal
Discrete (Switched) Outputs	NPN outputs: Open collector NPN transistor rated at 30V dc max., 150 mA max. PNP outputs: Open collector PNP transistor rated at 30V dc max., 150 mA max. All discrete outputs: OFF-state leakage current: < 10 μ A @ 30V dc ON-state saturation voltage: < 1V @ 10 mA and < 1.5V @ 150 mA
Analog Outputs	Voltage-sourcing outputs: 0 to 10V dc (25 mA current limit) Current-sinking outputs: 4 to 20 mA (16 to 30V dc input) Resolution: Span/Number of sensing channels Linearity: 0.1% of full scale Temperature variation: 0.01% of full scale per $^{\circ}$ C
Serial Data Outputs	RS-232 or RS-485 interface. (Up to 15 control modules may be given unique addresses on one RS-485 party line.) ASCII or binary data format 9600, 19.2K, or 38.4K baud rate 8 data bits, 1 stop bit, and even, odd, or no parity
System Programming	Via RS-232 interface to PC-compatible computer running Windows [®] XP, Vista, or 7 and using software supplied with each control module.
Status Indicators	Output 1 (red): Lights to indicate Discrete Output #1 is active Alarm (red): Lights to indicate Discrete Output #2 is active Gate (red): Lights to indicate GATE input is active Align (green): Lights to indicate emitter and receiver are aligned Diagnostics indicator: (Key on controller side label) Identifies System errors and status
Construction	Polycarbonate housing; mounts to flat surface or directly onto 35-mm DIN rail
Environmental Rating	Control Module: NEMA 1, IEC IP20 Emitter/Receiver: NEMA 4, 13; IEC IP65
Operating Conditions	Temperature: 0 $^{\circ}$ to +50 $^{\circ}$ C (+32 $^{\circ}$ to 122 $^{\circ}$ F) Maximum relative humidity: 95% @ 50 $^{\circ}$ C (non-condensing)
Certifications	

Installation and Mechanical Alignment

3.3 Hookups

Refer to Figures 3-4, 3-5, 3-6, and 3-7 for the appropriate hookup information.

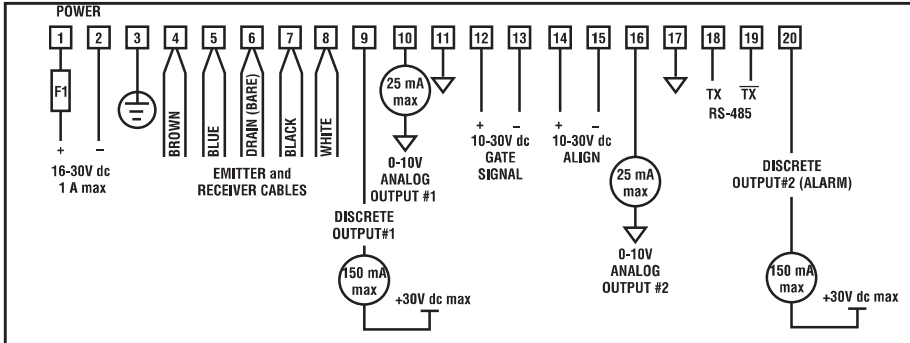


Figure 3-3. MAHCVN-1 hookup

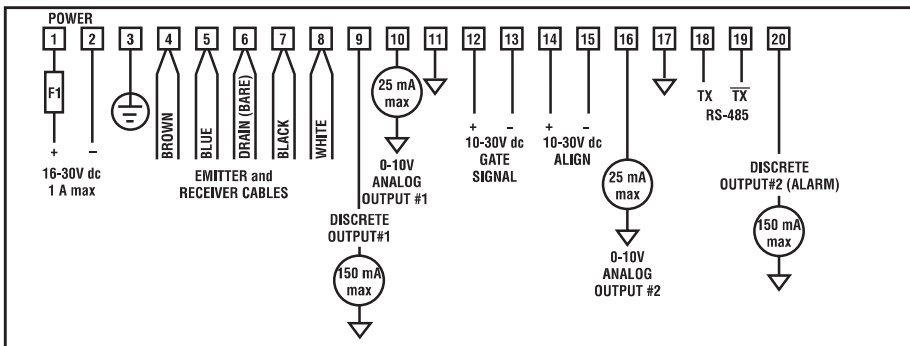


Figure 3-4. MAHCVP-1 hookup

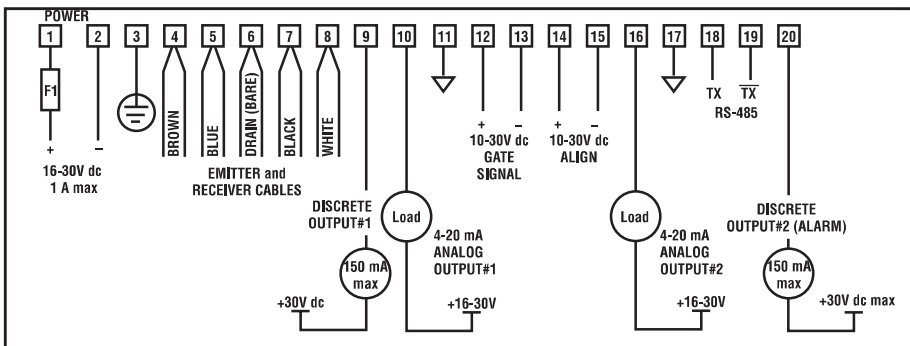


Figure 3-5. MAHCIN-1 hookup

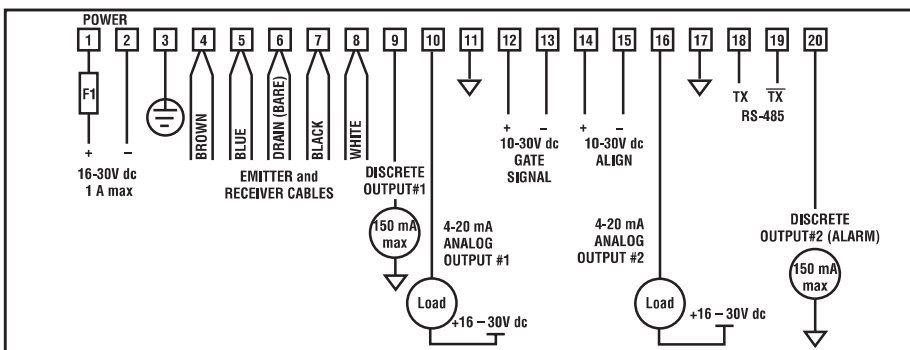


Figure 3-6. MAHCIP-1 hookup

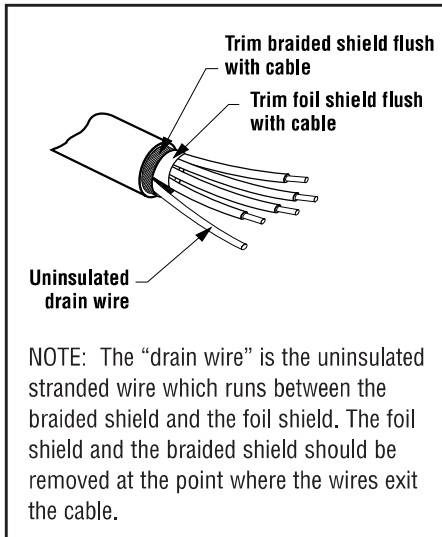


Figure 3-7. Emitter and receiver cable preparation

3.3.1 Emitter and Receiver Hookups

Emitters and receivers connect together in parallel to terminals #4 through #8 of the control module (identical for all control module models). See Figures 3-3, 3-4, 3-5, and 3-6 for wire color information.

3.3.2 Inputs

System Power: Connect a source of 16 to 30V dc, rated at 1 amp or greater, to control module terminals #1 (+) and #2 (-). Connect a good earth ground to terminal #3 to provide electrical and RF noise immunity to the System.

NOTE: Remove power before making other connections to the controller.

Gate Signal: A source of 10 to 30V dc switched to terminals #12(+) and #13(-) provides a gating input (if required). The gating voltage typically is switched by the open-collector output transistor of a dc sensing device. The gate signal controls scanning when one of four Gate options is selected in the Control Mode Selection menu of the PSF configuration routine (see Section 5.3.2).

Align: A source of 10 to 30V dc switched to terminals #14(+) and #15(-) provides a remote means of running the automatic alignment and blanking routines. The switch sequence is identical to the procedure described in Section 5.2.1 for the Alignment switch on the front of the control module.

3.3.3 Outputs

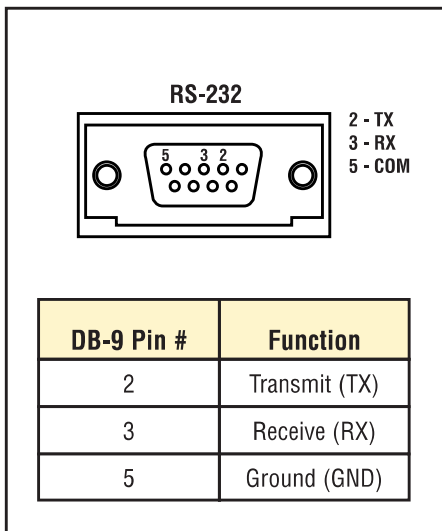


Figure 3-8. DB-9 connections between the control module and the PC

Control Module	Analog Outputs (Terminals #10 and 16)	Discrete Outputs* (Terminals #9 and 20)
MAHCVN-1 Figure 3-3	0 to 10V Sourcing 15 mA max.	NPN open-collector 30V dc max. 150 mA max.
MAHCVP-1 Figure 3-4	0 to 10V Sourcing 15 mA max.	PNP open-collector 30V dc max.
MAHCIN-1 Figure 3-5	4 to 20 mA Sinking 16 to 30V dc	NPN open-collector 30V dc max. 150 mA max.
MAHCIP-1 Figure 3-6	4 to 20 mA Sinking 16 to 30V dc	PNP open-collector 30V dc max. 150 mA max.

*NOTE: Discrete Output #2 is labeled “Alarm” on the control module.

Serial Communication

RS-232: All A-GAGE High-Resolution MINI-ARRAY Systems may communicate with a host computer or controller via RS-232 or RS-485 serial protocol. See Section 5.3.1 for selectable communications parameters. Prepare an RS-232 cable using a male DB-9 connector with connections as shown in Figure 3-8.

NOTE: DO NOT use a “null modem” RS-232 cable

RS-485: RS-485 serial port is located at terminals #18 (TX) and #19 (TX).