Laser Scanners

Safety laser scanners provide a safety solution for mobile vehicles and stationary applications, such as the interior of robotic work cells, that cannot be solved by other safeguarding solutions.
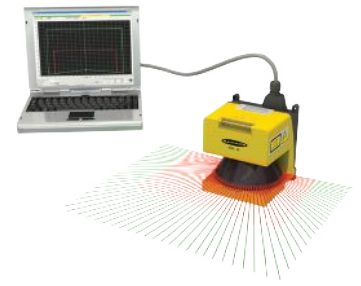
AG4
Safety Laser Scanners

Two-dimensional laser scanners effectively protect personnel, as well as stationary and mobile systems within a user designated area.

- Eight protective warning field pairs are individually defined using a PC
- Scanner has 0.36° lateral resolution and detects objects in 190° working zone
- The highly flexible protective and warning fields can be set to match the shape of the work area
- Exceeds OSHA/ANSI Control Reliability requirements, certified to cTUVus, and CE certified to Type 3, Cat 3 PLd, and SIL 2
- Compact design with a rugged, die-cast aluminum housing for simple installation into work areas
- Cordsets and brackets see page 835

AG4 Safety Laser Scanners, 24 V DC

Range		Safety Output	Aux. Outputs	Scanning Angle	Response Time	Model*
Protective Fields	Warning Fields					
30 mm Resolution = 1.6 m 40 mm Resolution = 2.2 m 50 mm Resolution = 2.8 m 70 mm Resolution = 4.0 m 150 mm Resolution = 4.0 m	150 mm Resolution = 15 m	2 PNP OSSD	2 PNP	190°	80 ms (Default) adjustable to 640 ms	**AG4-4E**
30 mm Resolution = 1.6 m 40 mm Resolution = 2.2 m 50 mm Resolution = 2.8 m 70 mm Resolution = 6.25 m 150 mm Resolution = 6.25 m	150 mm Resolution = 15 m	2 PNP OSSD	2 PNP	190°	80 ms (Default) adjustable to 640 ms	**AG4-6E**

* Model includes scanner, plugs and CD with diagnostic and configuration software. Cordset ordered separately (see page 835).

Configuration and Diagnostic Software
Graphically adjust all device parameters and the protective field contours to both local conditions and required safety distances.

Test Box

With the test box it's possible to test the following Scanner functions without hooking it up to the machine interface:

- Can be used as a "cloning" device to load the same configuration into multiple scanners
- Switch over between the different field pairs
- Indication of the Safety OSSD outputs (when entering protective field)
- Indication of the Alarm outputs (when entering warning field)
- Machine Interface-to-Test Box cordset included
- Power supply not included

Test Box for AG4 Safety Laser Scanners

Description	Model
AG4 Test Box	**AG4-TB1**

AG4 Safety Laser Scanner Kits

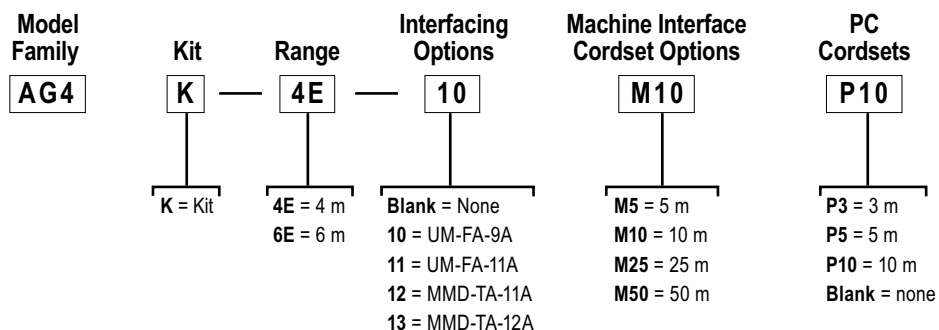You can purchase a kit that contains a laser scanner, optional interfacing solutions and cordsets.

• *Scanner*	*page 833*
• *Interfacing Options*	*837*
• *Cordsets*	*835*

To Order:
1. Choose an optional interfacing solution, such as an **UM-FA-9A** or **-11A** universal input safety module.
2. Choose a DB15 machine interface cordset, such as **AG4-CPD15...**
3. Choose a PC communication cordset, such as **AG4-PCD9...**

See www.bannerengineering.com for complete documentation and a current listing of accessories.

AG4 Safety Laser Scanner Kit Model Key

Model Family	Kit	Range	Interfacing Options	Machine Interface Cordset Options	PC Cordsets
AG4	K	4E	10	M10	P10

	Kit	Range	Interfacing Options	Machine Interface Cordset Options	PC Cordsets
	K = Kit	**4E** = 4 m **6E** = 6 m	**Blank** = None **10** = UM-FA-9A **11** = UM-FA-11A **12** = MMD-TA-11A **13** = MMD-TA-12A	**M5** = 5 m **M10** = 10 m **M25** = 25 m **M50** = 50 m	**P3** = 3 m **P5** = 5 m **P10** = 10 m **Blank** = none

Cordsets

DB15 Machine Interface

See page 902

Length	Model
5.00 m	AG4-CPD15-5
10.0 m	AG4-CPD15-10
25.0 m	AG4-CPD15-25
50.0 m	AG4-CPD15-50

> Additional cordset information available. See page 902

DB9 PC Communication*

See page 924

Length	Model
3.00 m	AG4-PCD9-3
5.00 m	AG4-PCD9-5
10.0 m	AG4-PCD9-10

* RS-232 Serial protocol

DB9 to USB†

See page 924

Length	Model
1.00 m	AG4-PCD9USB-1

† Not recommended for use with AG4-PCD9-10

Brackets

AG4

See page 896

AG4-MBK1

> Additional brackets and information available. See page 852

Misc. Replacement Parts

Description	Model
Replacement window	AG4-WIN1
Replacement configuration plug, straight	AG4-CP
Replacement PC plug, straight	AG4-PCD9

Description	Model
Cleaning set (150 ml fluid)	AG4-CLN1
Cleaning set (1000 ml fluid)	AG4-CLN2

195 mm

135 mm

140 mm

AG4 - 4E

AG4 Laser Scanner Specifications

Supply Voltage (UB)	24 V dc (+20% / -30%) Power supply in acc. with IEC 742 with safe supply isolation and compensation with voltage dips of up to 20 milliseconds in acc. with EN 61496-1. **Over current protection:** Via 1.6 A fuse, melting fuse in the cabinet **Over-voltage protection:** Over-voltage protection with safe limit stop **Protective earth conductor:** Connection not permitted
Supply Current	420 mA approx. (use 2.5 A power supply)
Fuse (power supply)	1.6A normal blow, medium time lag fuse (user supplied)
Response Time	Min. 80 milliseconds (2 scans) Max. 640 milliseconds (16 scans)
Wavelength	905 nm
Protection Field (Sensing Range)	**AG4-4E:** **150 mm resolution:** 200 mm to 4.0 m (radius) **70 mm resolution:** 200 mm to 4.0 m (radius) **50 mm resolution:** 200 mm to 2.8 m (radius) **40 mm resolution:** 200 mm to 2.2 m (radius) **30 mm resolution:** 200 mm to 1.6 m (radius) **Sensing object reflectance:** Minimum 1.8% **AG4-6E:** **150 mm resolution:** 200 mm to 6.25 m (radius) **70 mm resolution:** 200 mm to 6.25 m (radius) **50 mm resolution:** 200 mm to 2.8 m (radius) **40 mm resolution:** 200 mm to 2.2 m (radius) **30 mm resolution:** 200 mm to 1.6 m (radius) **Sensing object reflectance:** Minimum 1.8%
Warning Field	**Resolution:** 150 mm (at 15 m) **Sensing range (radius):** 200 mm to 15 m **Sensing object reflectance:** Minimum 20%
Monitored Area	0-50 m
Scanning Angle	max. 190°

**Output
Signal Switching Devices
(OSSD1, OSSD2)**
	PNP open-collector transistor 2 outputs: short circuit proofed
	Rated operating voltage: supply voltage (UB) -3.2 V
	Max. source current: 250 mA
	Residual voltage: 3.2 V or less
	Operation mode:
	    No object in protection field: ON
	    Object inside protection field: OFF
	Response Time: Min. 80 milliseconds (2 scans) to max. 640 milliseconds (16 scans) switching method

**Alarm
(Auxiliary)
Outputs 1 & 2**
	PNP open-collector transistor
	Rated operating voltage: supply voltage (UB) -4 V
	Max. source current: 100 mA
	Residual voltage: 4 V or less
	Operation mode: Switching method of operation mode (set below)
	    Scanner at normal operation: ON
	    Abnormal operation: OFF
	    No object inside Warning Field: ON
	    Object inside Warning Field: OFF
	Response Time: Min. 80 milliseconds (2 scans) to max. 640 milliseconds (16 scans) switching method

Start-restart	+24 V opto-uncoupled, dynamically monitored
Field Pair Switchover	Selection of 4 or 8 field pairs via 4 control lines, +24 V opto-uncoupled, dynamically monitored, logically 1 = field pair activated
Input Signal Definition	**High/logical 1:** 16-30 V **Low/logical 0:** less than 3 V
Laser Protection Class	Class 1 (IEC 60825-1)
Number of Field Pair Configurations	8 Field Pairs in combination of Protective Field and Warning Field can be switched over by external input. Field Pair number 8 is not user configurable.
Environmental Rating	IP65 (per IEC 60529)
Housing Material	Die-cast aluminum with a thermoplastic resin window
Weight	2.1 kg
Operating Conditions	**Temperature:** 0° to 50°C **Humidity:** Max. 95%
Indicators	Five LEDs on front show Safety Sensor Status
Shock and Vibration	10 to 150 Hz frequency, 5 G max. (50 m/s^2 approx.) in X, Y and Z directions for twenty times each
Max Cordset Length	**15-pin plug:** 50 m **9-pin plug:** 10 m (RS-232C), 50 m (RS-422)
Design Standards	IEC 61496-1/-3 (Type 3), ISO 13849-1 (Category 3, PLd), IEC 61508-1 to -7 (SIL2) and IEC 62061 SIL CL2
Certifications	CE TÜVRheinland c US TUV Rheinland of North America, a Nationally Recognized Test Laboratory (NRTL) in the United States according to OSHA 29 CFR 1910.7, and accredited by the Standards Council of Canada to test and certify products to Canadian National Standards, has certified the AG4 Laser Scanner to all applicable U.S. and Canadian National Standards. The cTUVus mark is recognized throughout the United States and Canada by OSHA and the SCC.

AG4 Interfacing Products

	Description	Models	Product Information
Interface Modules and Controllers	• Universal input safety modules monitors both contact-based and PNP solid-state input devices • Convenient plug-in terminal blocks on a 22.5 mm DIN-rail mountable housing	**UM-FA-9A** (3 NO) **UM-FA-11A** (2 NO/1NC)	Page 736
	• Control system monitors a variety of input devices such as e-stop buttons, rope pulls, enabling devices, protective safety stops, interlocked guards or gates, optical sensors, two-hand controls and safety mats • Intuitive programming environment for easy implementation • Configure inputs, outputs and functionality of the controller for more usability • Base controller allows eight of the 26 inputs to be configured as outputs for efficient terminal utilization • Ethernet models available providing up to 64 virtual status outputs, fault diagnostic codes and messages	**SC26-2** **SC26-2D** **SC26-2E** **SC26-2DE**	Page 714
	• One controller provides configurable monitoring of multiple safety devices • 22 input terminals can monitor both contact-based and PNP solid-state input devices • 3 pairs of independent solid-state safety outputs can be used with selectable one- or two-channel external device monitoring • Ten configurable non-safety status outputs track inputs, outputs, lockout, I/O status and other functions • All SC22-3 modules use 24 V dc • 10/100 Base TX Ethernet communication option using EtherNet/IP and Modbus TCP protocols (SC22-3E models)	**SC22-3-S...** **SC22-3-C...** **SC22-3E-S...** **SC22-3E-C...**	Page 722
Muting Modules	• The Muting Module temporarily inhibits a safety light screen so materials can safely pass through the screen without stopping the machinery • The module uses redundant microcontroller-based logic • MMD Modules can be used as dual controllers when muting function is not used	**MMD-TA-12B** **MMD-TA-11B**	Page 740

NC = Normally closed, NO = Normally open