GKR-2011 IVUS HARDWARE OPERATOR'S GUIDE

GATEKEEPER
Intelligent Security

ISO 9001:2015

BUREAU VERITAS

CE

R8-02092019

REVISION STATUS

This document is controlled through the Gatekeeper Document Control System. Proposed changes and/or updates must be submitted, as redlined documents, to the Gatekeeper Technical Support Department for processing.

Revision	Date	Initiated By	Description	Pages Affected
REV 0	1/1/2018	D. Hovest	Updated to reflect Gatekeeper logo change, product changes, etc.	All
REV 1	2/28/2018	A. Ellickson	Edits made to initial draft.	All
REV 2	3/15/2018	D. Hovest	Final draft approval.	All
REV 3	4/12/2018	D. Hovest	Added BV logo.	All
REV 4	7/19/2018	D. Hovest	Corrected font. Updated General Information section. Removed revision from naming scheme.	All
REV 5	9/6/2018	D. Hovest	Corrected terminology.	All
REV 6	1/1/2019	D. Hovest	Corrected copyright date. Corrected ILPA terminology. Corrected hardware.	All
REV 7	1/4/2019	D. Hovest	Updated hardware.	All
REV 8	2/8/2019	D. Hovest	Updated hardware.	All

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015
BUREAU VERITAS
CE
R8-02092019

Part Number: GKR – 2011 IVUS Hardware Operator's Guide

February 2019

Printed in the USA

GATEKEEPER SECURITY INC.		
GATEKEEPER Intelligent Security		
Phone: (703) 673-3320 **Fax:** (703) 673-3329	**Address:** 45975 Nokes Blvd, Unit 115 Sterling, VA 20166	**Technical Support:** www.gatekeepersecurity.com

GATEKEEPER Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015   BUREAU VERITAS   C E
R8-02092019

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

GENERAL INFORMATION

Who Should Use This Manual

This guide is intended for use by individuals deemed as an Operator of the GKR-2011 IVUS system. Operators must be intimately familiar with the GKR-2011 IVUS System Hardware.

Technical Support

For additional help maintaining or operating the GKR-2011 IVUS System please contact your System Administrator.

GATEKEEPER
Intelligent Security

**45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320**
www.gatekeepersecurity.com

ISO
9001:2015

BUREAU
VERITAS

C E

R8-02092019

OVERVIEW OF THE GKR-2011 SYSTEM

GKR-2011's Galvanized Steel Embedded Frame Layout

The **GKR-2011 - Intelligent Vehicle Undercarriage Scanner (IVUS)-Embedded** (page 19) is an industry leading intelligent optical inspection system. The system rapidly scans a vehicle's undercarriage and compares to a previous scan to detect changes and/or modifications. In under 5 seconds, the discrepancies are highlighted, and the operator is alerted to any threats that are present with 3-D imagery.

Power Requirements

The GKR-2011 utilizes 110 volts alternating current (VAC) or 220 VAC with a maximum of 800 watts.

Environmental Information

The GKR-2011 can operate in temperatures ranging from -20° ~ 60° Celsius (-4° ~ 140° Fahrenheit).

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

GATEKEEPER
Intelligent Security

ISO 9001:2015   BUREAU VERITAS   CE

R8-02092019

STANDARD COMPONENTS

The GKR-2011 IVUS System is composed of several standard components. Each of which are listed below.

- GKR-1043
- GKR-1020
- GKR-1022-R
- GKR-7067
- GKR-7080
- GKR-7043
- GKR-2011-Cable Kit
- GKR-1086
- GKR-1035

GKR-1043

The **GKR-1043 (Embedded Frame Assembly)** (page 19) houses both the GKR-1020 and the GKR-1022-Rs. This component is made of high strength steel capable of supporting up to 10 US tons (10,000 KG). The embedded frame is placed into a steel vault in the lanes where the GKR-2011 will be used.

GKR-1020

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

GATEKEEPER
Intelligent Security

ISO 9001:2015
BUREAU VERITAS
CE
R8-02092019

The **GKR-1020 (Dual-View Scanner)** (page 19) is the component that captures an image of the under carriage of a vehicle. A single camera is enclosed in the Dual-View Scanner. This camera utilizes mirrors to capture a dual view of the under carriage. Both the front and rear of the vehicle is scanned at a 60° angle. Using the IVUS software, the images are stitched together allowing the operator to isolate threats in an expedited manner. The Dual-View Scanner is installed inside the GKR-1043-2.

GKR-1022-R

The **GKR-1022-R (LED Light Rail)** (page 19) works in conjunction with the GKR-1020 to capture the undercarriage imagery. Each GKR-2011 IVUS System contains two (2) LED Light Rails. When triggered, each GKR-1022-R floods the underside of the vehicle with a distinctive red light. This component is installed on both sides of the GKR-1020 inside the GKR-1043-2.

GKR-7067

The **GKR-7067 (Multi-functional Camera)** (page 20) captures both a still image and video of every vehicle crossing the GKR-1011 IVUS System. This camera can assist in viewing vehicles when the operator does not have a direct view of the GKR-1011 IVUS System. Additionally, when the ILPA option is selected, the GKR-7067 captures imagery of the vehicle's license plate. It is placed on the GKR-1086.

GATEKEEPER Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015   BUREAU VERITAS   CE
R8-02092019

GKR-7080

The **GKR-7080 (Traffic Control Signal Light)** (page 20) controls vehicle traffic crossing over the GKR-1020. Once triggered, the GKR-7080 will change from a green arrow to a red X. This controlled entry into the GKR-2011 IVUS System helps to create accurate imagery of the under carriage and over view. The GKR-7080 is placed on the GKR-1086.

GKR-7043

The **GKR-7043 (Control Box)** (page 19) is the central nervous system for the GKR-2011 IVUS System hardware. All field components are terminated at the Control Box making this the central point where the Operator Terminal can

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015   BUREAU VERITAS   C E
R8-02092019

communicate with the entire system. Power is provided from the GKR-7043 in either 110 VAC or 220 VAC. The GKR-7043 is placed on the GKR-1086.

GKR-2011-Cable Kit

The GKR-2011-Cable Kit contains all the cabling needed to connect the various components to the GKR-7043.

GKR-6051-1

The **GKR-6051-1 (Ground Loop Cable)** (page 20) is the trigger for the GKR-2011 system. Each kit contains two (2). One (1) is buried in front of and one (1) is buried behind the GKR-1043. Both connect to the GKR-7043.

GKR-1077-R

The **GKR-1077-R (Light Rail Cable)** (page 19) provides the connection between the GKR-1022-R and the GKR-7043. Each kit contains two (2) Light Rail Cables.

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015
BUREAU VERITAS
CE
R8-02092019

GKR-1072

The **GKR-1072 (CPU Cat 6 Cable)** (page 19) connects the GKR-7043 to the GKR-1035. Each kit contains one (1) GKR-1075 Cable.

GKR-1075-R

The **GKR-1075-R (Dual-View Scanner Cable)** (page 19) connects the GKR-1020 to the GKR-7043. An RJ-45 is included for connection purposes. Each kit contains one (1) Dual-View Scanner Cable.

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015   BUREAU VERITAS   C E
R8-02092019

GKR-1086

The **GKR-1086 (Pole)** (page 19) is the backbone for the various components of the GKR-2011 IVUS System. The GKR-7067, GKR-7080, and the GKR-7043 are attached to the Pole. The GKR-1086 itself is bolted to the ground near the GKR-1043-2 and stands 6 feet tall.

GKR-1035

The **GKR-1035 (Operator Terminal)** (page 19) contains the software needed to successfully operate the GKR-2011 IVUS System. The GKR-1035 is the primary means of input and output for the GKR-2011 IVUS System. It displays the imagery from the cameras as well as other data that may be collected during the operation of the system. The operator can input any necessary data. The terminal itself uses a touch screen monitor which can replace the keyboard and mouse if desired.

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

GATEKEEPER
Intelligent Security

ISO 9001:2015   BUREAU VERITAS   CE
R8-02092019

OPTIONAL COMPONENTS

The GKR-2011 IVUS System supports additional hardware that enhances the overall effectiveness of the system. This includes dual triggering, auto washing, front and back license plate reading, and driver detection. These components include:

- GKR-7067
- GKR-7066-L
- GKR-2021
- GKR-1088

GKR-7067

A second GKR-7067 can be included with the system if the ILPA functionality is desired. This second camera can be used to capture rear license plates.

GKR-7066-L
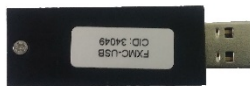
The **GKR-7066-L (ILPA License Dongle)** (page 20) provides the software required for the GKR-7067 to perform the Optical Character Recognition (OCR) allowing for the system to fully read and decode various styles of license plates. This product is installed and enclosed within the GKR-1035.

GKR-2021

The **GKR-2021 (Auto Wash System)** (page 19) automatically sprays water over the Scanner to aide in cleaning the windows. It is set up on automatic intervals by the System Administrator. The Auto Wash System is placed inside the GKR-1043-2 with the GKR-1020.

GKR-1088

The **GKR-1088 (Intelligent Vehicle Occupant Detector (IVOD))** (page 19) captures high resolution images of the vehicle's occupants. It is mounted to the GKR-1086 and connects to the GKR-7043.

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015
BUREAU VERITAS
C E
R8-02092019

PRENTATIVE MAINTENANCE

GKR-1043

The Well and Drainage

The GKR-1043 well will, over time, collect trash and other debris. The operator should clean the debris that can be reached, when it is discovered, daily. Not doing this can result in damage to the Scanner, LED Light Rails, and associated cabling. Additionally, debris can greatly reduce the ability of the GKR-2011 IVUS System to identify threats.

Drainage is also a vital to the ability of the GKR-1020 and the GKR-1022-R to scan and detect foreign objects. Drain holes are designed into the well to aide in submersion prevention. The operator is responsible for ensuring that the drain hole remains free of debris daily.

GKR-1020 and GKR-1022-R

Environmental Factors

Cleaning the Dual-View Scanner and LED Light Rail windows is a necessity to ensuring high quality imagery. The operator is responsible for keeping the windows wiped clean. Cleaning should be done with a dry cloth to prevent scratching.

Debris must be kept clear of the Dual-View Scanner and LED Light Rails as well. Under no circumstances should any debris be allowed to stay on top of the GKR-1020. Also, no obstacles should be pushed along the Scanner or Light Rails with a broom.

During dry operating conditions, dust must be cleaned from the windows every hour. During wet operating conditions, the GKR-1020 and GKR-1022-R windows should be cleaned every 30 minutes.

When snow or ice builds up on the window a rubber scrapper should be used every 30 minutes. Pulling the scrapper sideways across the glass, NOT down the length of the Scanner and Light Rails will aide in scratch prevention.

GATEKEEPER
Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015
BUREAU VERITAS
CE
R8-02092019

Cables and Connections

The operator should take care to remove any debris that could damage the Dual-View Scanner and LED Light Rail Cables and its connection to the GKR-1020 and GKR-1022-R.

GKR-7067 and GKR-1088

Lenses

Regardless of the cameras your system contains, daily preventative maintenance is required to ensure optimal system operating conditions. Camera lenses should be wiped clean at least once an hour. A dry cloth can be used to complete this task.

Cables and Connections

A daily check of each cable by the operator can properly identify any issues that may be present. Ensure that any cables that may be exposed are free from cuts. Confirm that exposed cables are not placed under any object.

GKR-6051-1

Daily inspections of the Ground Loops should be conducted. Verify that the ground around the cable install is free from debris and that there are no cracks or other issues with the pavement.

GATEKEEPER Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015   BUREAU VERITAS   CE
R8-02092019

TROUBLESHOOTING

Failure	Cause	Corrective Action
LED Light Rails locked on.	Vehicle stopped on top of the Dual-View Scanner for greater than 60 seconds which causes a time out in the GKR-1020-A.	Log out/log in to the Operator Terminal.
No scans being collected.	Environmental factors.	Log out/log in to the Operator Terminal. If the issue persists, contact the System Administrator
'Water Fall' on imagery.	Dirty window on the Dual-View Scanner.	Clean the Dual-View Scanner window.

DEFINITIONS

GKR-1020 (Dual-View Scanner) – Captures imagery from the under carriage of a given vehicle. Dual-View technology enables the IVUS software to capture imagery from multiple angles.

GKR-1022-R (LED Light Rail) – Provides the necessary light to scan the underside of the vehicle.

GKR-7043 (Control Box) – Central termination point for all components of the GKR-2011.

GKR – 1035 (Operator Terminal) – The component of the Gatekeeper system which runs the AUVIS™ software, displays the images from the various cameras, and allows the operator to input data into the system.

GKR-1043 (Embedded Frame Assembly) – Installed into the ground at the lane. Holds the GKR-1020 and the GKR-1022-R

GKR-1072 (CPU Cat 6 Cable) – Connects the Operator Terminal to the GKR-7043.

GKR-1075-R (Dual-View Scanner Cable) – Connects the Dual-View Scanner to the GKR-7043.

GKR-1077-R (Light Rail Cable) – Connects the LED Light Rails to the GKR-7043.

GKR-1086 (Pole) – The backbone that supports the GKR-7067, GKR-7080, and the GKR-7043. Additionally, the GKR-1088 can be supported if a part of the system.

GKR-1088 (Intelligent Vehicle Occupant Detector) – Captures imagery of the driver and occupants of a given vehicle.

GKR-2011 (IVUS-Embedded) – The embedded intelligent optical system that scans the underside of a vehicle and provides an overview image.

GKR-2021 (Auto Wash System) – Provides washing capabilities to the Scanner on a scheduled basis.

GKR-6051-1 (Ground Loop Cable) – The triggering mechanism for the GKR-2011. Installed into the ground near the GKR-1043-2 and terminates at the GKR-7043.

Intelligent Security

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

ISO 9001:2015
BUREAU VERITAS
CE
R8-02092019

GKR-7066-L (ILPA License Dongle) – Contains the licensing necessary to decode license plates as part of the ILPA functionality. Installed into the GKR-1035.

GKR-7067 (Multi-functional Camera) – Captures an overview image and video of the entire lane in which the Gatekeeper hardware is placed. Additionally, can be used if the ILPA function is enabled.

GKR-7080 (Traffic Control Signal Light) – The traffic control mechanism used by the GKR-2011.

45975 Nokes Boulevard
Suite 115
Sterling, Virginia 20166
(703) 673-3320
www.gatekeepersecurity.com

GATEKEEPER Intelligent Security

ISO 9001:2015 BUREAU VERITAS CE
R8-02092019