

1067 LF RFID User Guide



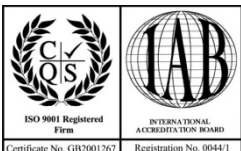
**TECHNOLOGY
SOLUTIONS** UK LTD

part of **HID**

Technology Solutions UK Ltd Suite A,
Loughborough Technology Centre,
Epinal Way,
Loughborough,
Leicestershire,
LE11 3GE,
United Kingdom.

Tel: +44 (0) 1509 238248
Fax: +44 (0) 1509 220020

Email: enquiries@tsl.com



Copyright © 2021 Technology Solutions (UK) Ltd. All rights reserved.

No part of this publication may be reproduced or used in any form, or by any electrical or mechanical means, without permission in writing from Technology Solutions (UK) Ltd. This includes electronic or mechanical means, such as photocopying, recording, or information storage and retrieval systems. The material in this manual is subject to change without notice.

Technology Solutions (UK) Ltd (TSL) reserves the right to make changes to any product to improve reliability, function, or design. TSL does not assume any product liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein. No license is granted, either expressly or by implication, estoppel, or otherwise under any patent right or patent, covering or relating to any combination, system, apparatus, machine, material, method, or process in which TSL products might be used. An implied license exists only for equipment, circuits, and subsystems contained in TSL products. TSL and the TSL logo are registered trademarks of TSL. Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

All software is provided strictly on an “as is” basis. All software, including firmware, furnished to the user is on a licensed basis. TSL grants to the user a non-transferable and non-exclusive license to use each software or firmware program delivered hereunder (licensed program). Except as noted below, such license may not be assigned, sublicensed, or otherwise transferred by the user without prior written consent of TSL. No right to copy a licensed program in whole or in part is granted, except as permitted under copyright law. The user shall not modify, merge, or incorporate any form or portion of a licensed program with other program material, create a derivative work from a licensed program, or use a licensed program in a network without written permission from TSL. The user agrees to maintain TSL’s copyright notice on the licensed programs delivered hereunder, and to include the same on any authorized copies it makes, in whole or in part. The user agrees not to decompile, disassemble, decode, or reverse engineer any licensed program delivered to the user or any portion thereof.

TSL reserves the right to make changes to any software or product to improve reliability, function, or design.

TSL does not assume any product liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein.

Symbol is a registered trademark of Motorola Technologies, Inc.

Contents

1	Introduction	4
2	Parts of the 1067 LF RFID Reader.....	4
3	Attaching to an MC70/75/75A	5
4	Detaching from an MC70/75/75A.....	6
5	Using the 1067 LF RFID reader	7
5.1	Basic operation	7
5.2	Reader demonstration software.....	9
5.3	SmartWedge RFID application.....	10
5.4	1067 LF RFID Configuration	11
5.5	Software support for the 1067 LF RFID reader.....	11
5.5.1	Low level command set	11
5.5.2	API	11
5.6	Power management with the 1067 LF RFID reader	12
5.7	Compatible peripherals	13
5.8	ActiveSync.....	13
6	Troubleshooting and Maintenance.....	14
6.1	Maintenance.....	14
6.2	Troubleshooting	14
7	Technical specifications	16
7.1	Summary of specifications	16
7.2	Pin-outs	18
7.3	Regulatory Information.....	19
8	Health and Safety Recommendations.....	19
9	Waste Electrical and Electronic Equipment (WEEE)	20
10	Warranty	20

History

Version	Date	Modifications
1.0	05/07/11	Document Creation

1 Introduction

Technology Solutions' 1067 LF RFID Reader provides the Motorola MC70/75/75A with Low Frequency (LF) Radio Frequency Identification (RFID) functionality. The unit attaches as a snap on to the MC70/75/75. The mechanical design of the unit allows it to be quickly and easily removed, alternatively two screws may be used to make the installation semi-permanent. The unit is designed to retain compatibility with standard MC70/75/75A accessories such as desktop cradles and chargers.

The 1067 LF RFID Reader is powered from the MC70/75/75A. It can be used with the majority of transponders operating at 125 kHz and 134.2 kHz.

2 Parts of the 1067 LF RFID Reader



Figure 1: The parts of the 1067 LF RFID Reader

3 Attaching to an MC70/75/75A



Figure 2: Attaching to an MC70/75/75A

4 Detaching from an MC70/75/75A



Figure 3: Detaching from an MC70/75/75

5 Using the 1067 LF RFID reader

5.1 Basic operation

RFID transponders can be read when they are in range of the antenna. The antenna is located under the back cover of the 1067 LF RFID reader. The range at which a transponder can be read depends on the transponder type and size. Larger transponders can be read further away from the antenna. In many cases it will be possible to read transponders in front and to the side of the 1067 LF RFID reader. For best performance the transponder must be orientated correctly with the antenna. For disk and card shaped transponders this means that the transponder should be parallel to the back cover. For rod style transponders the transponder should have its long axis at right angles to the back cover. The photographs below show examples of optimum transponder orientation:

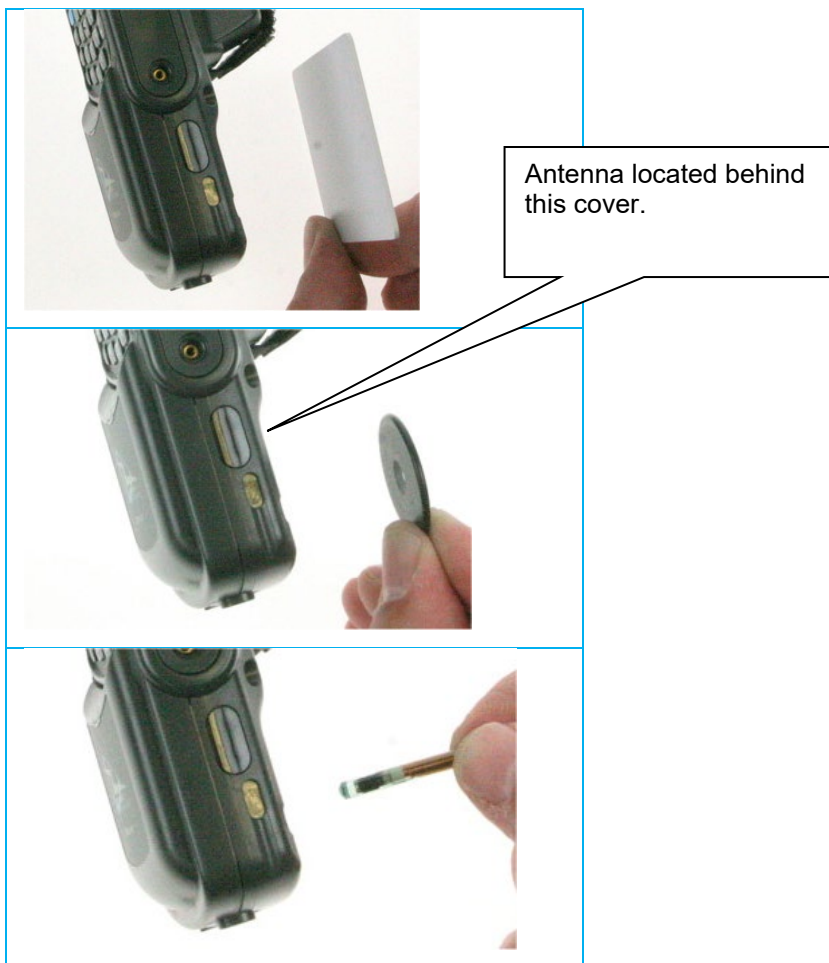


Figure 4: Presenting a transponder to the RFID 1059

There are no drivers required for the 1067 LF RFID reader. The unit is automatically powered up when the serial port on the bottom of the MC70/75/75A (COM1) is opened.

The default operating mode of the 1067 LF RFID reader as supplied from Technology Solutions is continuous polling for transponders with the serial number of any compatible transponder being sent out to the MC70/75/75A in ASCII format (COM1, 19200 baud).

The status LEDs on the front of the 1067 LF RFID reader provide an indication of the operating status of the reader.

LED colour	Status
Green flash	The previous command was successfully received and processed by the reader. OR A transponder was read.
Red flash	The previous command was not successfully processed by the reader.

Note that custom configuration of the 1067 LF RFID reader may prevent it from operating as described above.

5.2 Reader demonstration software

Technology Solutions provide a demonstration application which can be used to explore some of the functionality of the 1067 LF RFID reader and test the read range for a particular transponder. This application and full instructions are available for download from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> . An example screenshot of the Demonstration software is shown in Figure 5.

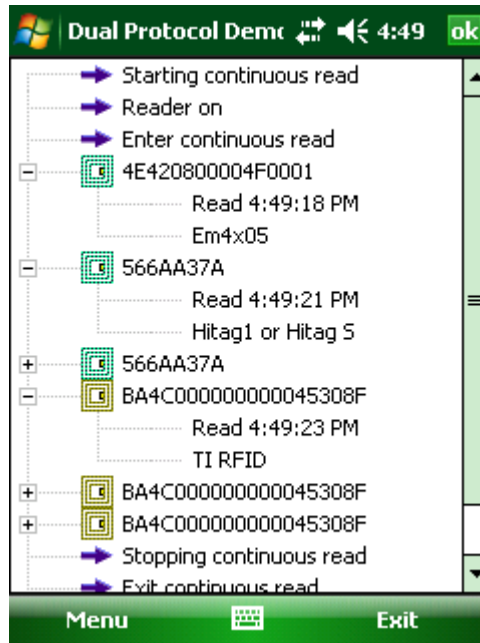


Figure 5 : Demonstration software

5.3 SmartWedge RFID application

A Wedge application has been developed for use with the 1067 and other Technology Solutions RFID readers. This activates the RFID reader whilst any of the yellow scan buttons are held down. Any transponder serial numbers that are read are sent out as though they had been typed on the keypad to whichever application has focus.

Instructions for installing and using the Wedge application are provided separately from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> .

5.4 1067 LF RFID Configuration

A Configuration application has been developed for use with the 1067 and other Technology Solutions RFID readers. This allows common operating parameters to be changed and stored.

Instructions for installing and using the Configuration Application are provided separately from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> .

5.5 Software support for the 1067 LF RFID reader

To make full use of the functionality of the LF RFID reader, a customised software application will be required. Technology Solutions support two approaches to this; direct communication with the reader using the low level command set or the use of an API to simplify application development.

5.5.1 Low level command set

The Low level command set supports two modes; ASCII and binary. ASCII mode is typically used for simple applications, for example collecting transponder unique identifiers (UIDs). The binary protocol is more suited where complex interaction with transponders is required, for example a Mifare ticketing or vending application.

The command set format and content is described in the document 'LF RFID Command Protocol.pdf' which is available for download from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> .

5.5.2 API

An API is provided for use with Technology Solutions LF and HF RFID readers. This can be downloaded from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> .

A document is provided as part of the .zip folder which introduces the API. The RFID API is provided with Microsoft style compiled HTML help (.chm) and an intelli-sense file for general reference to the API. A sample application is also provided which demonstrates the use of the API.

5.6 Power management with the 1067 LF RFID reader

All power for the 1067 LF RFID Reader is drawn from the MC70/75/75A. Maximum operating time is therefore obtained by managing the operation of the LF reader optimally.

The LF RFID reader has two operating modes; continuous read mode and standby mode. The third mode is fully powered off. The reader is switched between the two operating modes by software commands, documented in the Low level command set. The reader is fully powered off when the COM port on the MC70/75/75A is closed.

The recommended power saving method is to close the serial port when the reader is not being used. The current consumption in Standby mode is high enough to reduce the MC70/75/75A battery life and the time taken to exit Standby mode is not much shorter than that from the serial port being opened. Any application using the LF RFID reader should therefore only open the COM port when an RFID transaction is to be performed. This is the approach taken with the Demonstration application and with SmartWedge RFID.

5.7 Compatible peripherals

The 1067 LF RFID reader is compatible with any standard Motorola peripheral that does not use the serial port (COM1) because this is used for RFID data. The serial port is not connected to the Docking Connector on the bottom of the LF RFID reader. A list of compatible peripherals for the LF RFID reader is available for download from the Technology Solutions website at <http://www.tsl.uk.com/downloads.htm> .

It is not possible to use the RFID reader with the vehicle cradle (part number VCD7000-P000R). To charge the MC70/75/75A in a vehicle it is necessary to remove the RFID reader from the MC70/75/75A or to use the Auto charge cable (part number 25-70979-01). Third Party vehicle cradles are available and are listed in the compatible peripheral list.

5.8 ActiveSync

The MC70/75/75A with 1067 LF RFID reader attached can be used with ActiveSync, but the USB rather than the serial connection must be used.

6 Troubleshooting and Maintenance

6.1 Maintenance

For trouble-free service treat the 1067 LF RFID reader in the same way as you would the MC70/75/75A and observe the following tips when using the RFID reader:

- + Do not store or use the RFID reader in any location that is dusty, damp, or wet.
- + Protect the RFID reader from temperature extremes. Do not leave it on the dashboard of a car on a hot day, and keep it away from heat sources.

6.2 Troubleshooting

Symptoms	Possible Cause	Action
The Application on the MC70/75/75A cannot communicate with the RFID reader.	The MC70/75/75A is not firmly seated into the RFID reader.	Remove and re-insert the MC70/75/75A from the RFID reader, ensuring it is firmly seated.
	The port has not been opened.	Check that the Application has been configured to use COM1.
	The port is in use by another application.	Close the other application and try again.
	The baud rate is set incorrectly in the application.	Check that the application is set to 19200 baud, 8 data bits, no parity and one stop bit (settings may be different if the RFID reader has been reconfigured) .
The RFID reader does not read a particular transponder	The RFID reader has been configured to exclude some transponder types.	Refer to the command documentation to include the appropriate transponder type.
	The transponder is out of range of the RFID reader.	Move the transponder closer to the antenna.
MC70/75/75A battery does not charge	The battery is faulty.	Verify that other batteries charge properly. If so, replace the faulty battery.
	Ambient temperature is too warm.	Move the unit to an area where the ambient temperature is between 0°C and 35°C.
	The MC70/75/75A is not firmly seated into the RFID reader.	Remove and re-insert the MC70/75/75A from the RFID reader, ensuring it is firmly seated.
ActiveSync cannot connect to the MC70/75/75A	ActiveSync is not correctly configured on the PC or the MC70/75/75A.	Detach the RFID reader from the MC70/75/75A and try to ActiveSync directly to the

Technology Solutions (UK) Limited reserves the right to change its products, specifications and services at any time without notice. Technology Solutions (UK) Limited provides customer assistance in various technical areas, but does not have full access to data concerning the uses and applications of any customer's products. Therefore, Technology Solutions (UK) Limited assumes no responsibility for customer product design or for infringement of patents and/or the rights of third parties, which may result from assistance provided by Technology Solutions (UK) Limited. No part of this document may be reproduced in any form without the written consent of the author.

Symptoms	Possible Cause	Action
		MC70/75/75A. If this does not work then consult the MC70/75/75A User Guide.
	ActiveSync is using a serial connection.	ActiveSync must use USB with the RFID reader connected.
	The MC70/75/75A is not firmly seated into the RFID reader.	Remove and re-insert the MC70/75/75A from the RFID reader, ensuring it is firmly seated.
An accessory connected to the RFID reader does not work	The accessory uses a serial connection to the MC70/75/75A.	The accessory is not compatible with the RFID reader because only the USB port is available on the docking connector.
	The MC70/75/75A is not firmly seated into the RFID reader.	Remove and re-insert the MC70/75/75A from the RFID reader, ensuring it is firmly seated.

7 Technical specifications

7.1 Summary of specifications

The following table summarises the 1067 LF RFID's intended operating environment and technical hardware specifications:

Performance Characteristics	
RF Transmit Frequency	125kHz, 134.2kHz
Supported RFID Standards	ISO 11784, ISO 11785, ISO 18000-2
Supported Tag-ICs	NXP HITAG1, HITAG2, HITAGS Sokymat Q5 EM Microelectronics EM4x02, EM4x05 (ISO FDX B), EM4x50 Texas Instruments 64 bit Read Only, 64 Read Write, 1088 bit Multipage.
Typical read time (serial number only)	HITAG 2 – 30ms HITAG S – 59ms EM4002 – 65ms EM4005 – 58ms EM4050 – 95ms Q5 – 55ms Texas Instruments – 93ms
Host interface	Serial interface on COM1 of MC70/75/75A, ASCII or Binary Protocols 9600bit/s to 115200bit/s 8,N,1.
Reading distance	Dependent on transponder type and antenna. Typically up to 8cm for Texas Instruments 32mm glass, up to 7cm for EM4102 50mm disc.
Current consumption	
Current Consumption	Typically 50mA whilst active (dependent on transponder types)
	0mA in shutdown mode
User indication	
Red, Green LEDs	Flash indicating activity (function may also be customised).
Connection Interfaces	
Physical interface	USB and power in to charge MC70/75/75A

Technology Solutions (UK) Limited reserves the right to change its products, specifications and services at any time without notice. Technology Solutions (UK) Limited provides customer assistance in various technical areas, but does not have full access to data concerning the uses and applications of any customer's products. Therefore, Technology Solutions (UK) Limited assumes no responsibility for customer product design or for infringement of patents and/or the rights of third parties, which may result from assistance provided by Technology Solutions (UK) Limited. No part of this document may be reproduced in any form without the written consent of the author.

Reader power supply	Powered from host terminal
ActiveSync	via USB
Physical Characteristics	
Dimensions	90×82×32mm (3.54"x3.23"x1.26")
Weight	95g (3.35 oz)
Enclosure material	Polycarbonate
Colour	Grey
Material finish	Sparked surface
Mechanical attachment	Snap-on action with optional locking screws
Docking	Attachment maintains dockability with Motorola docking cradle for charging and ActiveSync
Environmental	
Operating Temperature	-10°C to +50°C (14°F to 122°F)
Storage Temperature	-40°C to +60°C (-40°F to 140°F)
Humidity	Up to 90% Relative humidity Non Condensing
Drop specification	1.3m (4.26ft) to concrete, 6 drops per 6 sides over operating temperature; 1.5m (5ft) to concrete, 2 drops per 6 sides at ambient temperature 23°C (73°F)
Sealing	Internal components conformal coated
Electrostatic discharge	+/-15kV air discharge, +/-8kV direct discharge
Construction	RoHS compliant
Regulatory	
EMI/RFI	TBA
Electrical Safety	TBA
Notes	
All PCBs are conformally coated	

7.2 Pin-outs



PIN	Docking Connector (Socket)
1	Power Ground
2	Cradle Detect
3	RS232 DCD/Trigger
4	USB_D-
5	USB_D+
6	USB_Gnd
7	USB_Vbus
8	USB_ID
9	Not Connected
10	Not Connected
11	Not Connected
12	Not Connected
13	Not Connected
14	Not Connected
15	Not Connected
16	External DC In 5.4V

Technology Solutions (UK) Limited reserves the right to change its products, specifications and services at any time without notice. Technology Solutions (UK) Limited provides customer assistance in various technical areas, but does not have full access to data concerning the uses and applications of any customer's products. Therefore, Technology Solutions (UK) Limited assumes no responsibility for customer product design or for infringement of patents and/or the rights of third parties, which may result from assistance provided by Technology Solutions (UK) Limited. No part of this document may be reproduced in any form without the written consent of the author.

7.3 Regulatory Information

All TSL devices are designed to be compliant with appropriate regulations and standards and are CE marked. Any changes or modifications to TSL equipment, not expressly approved by TSL, could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. 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.

8 Health and Safety Recommendations

Ergonomic Recommendations

Caution: In order to avoid or minimize the potential risk of ergonomic injury, follow the recommendations below. Consult with your local Health & Safety Manager to ensure that you are adhering to your company's safety programs to prevent employee injury.

- + Reduce or eliminate repetitive motion
- + Maintain a natural position
- + Reduce or eliminate excessive force
- + Keep objects that are used frequently within easy reach
- + Perform tasks at correct heights
- + Reduce or eliminate vibration
- + Reduce or eliminate direct pressure
- + Provide adjustable workstations
- + Provide adequate clearance
- + Provide a suitable working environment
- + Improve work procedures.

For vehicle installation and use

An air bag inflates with great force. DO NOT place objects, including either installed or portable wireless equipment, in the area over the air bag or in the air bag deployment area. If in-vehicle wireless equipment is improperly installed and the air bag inflates, serious injury could result.

RF signals may affect improperly installed or inadequately shielded electronic systems in motor vehicles (including safety systems). Check with the manufacturer or its representative regarding your vehicle. You should also consult the manufacturer of any equipment that has been added to your vehicle.

Power Supply

Use only Motorola-approved cradles, chargers and power supplies with the HF RFID 1059. Use of an alternative power supply will invalidate any approval given to this device, void the warranty for the product and may be dangerous.

9 Waste Electrical and Electronic Equipment (WEEE)

For EU Customers: All products at the end of their life must be returned to TSL for recycling. For information on how to return product please contact TSL.

10 Warranty

(A) Warranty TSL's hardware Products are warranted against defects in workmanship and materials for a period of twelve (12) months from the date of shipment, unless otherwise provided by TSL in writing, provided the Product remains unmodified and is operated under normal and proper conditions. Warranty provisions and durations on software, integrated installed systems, Product modified or designed to meet specific customer specifications ("Custom Products"), remanufactured products, and reconditioned or upgraded products, shall be as provided in the applicable Product specification in effect at the time of purchase or in the accompanying software license.

(B) Spare Parts Spare parts (i.e. parts, components, or subassemblies sold by TSL for use in the service and maintenance of Products) are warranted against defects in workmanship and materials for a period of thirty (30) days from the date of shipment. Spare parts may be new or originate from returned units under the conditions set forth in subsection D below.

(C) Repair of TSL branded hardware For repairs on TSL branded hardware Products under this Agreement, including repairs covered by warranty, the repair services provided are warranted against defects in workmanship and materials on the repaired component of the Product for a period of thirty (30) days from the shipment date of the repaired Product, or until the end of the original warranty period, whichever is longer. Any such defects shall be notified to TSL in writing within 7 days of the same becoming apparent.

(D) Product Service Products may be serviced or manufactured with parts, components, or subassemblies that originate from returned products and that have been tested as meeting applicable specifications for equivalent new material and Products. The sole obligation of TSL for defective hardware Products is limited to repair or replacement (at TSL's option) on a "return to base (RTB)" basis with prior TSL authorisation.

Customer is responsible for prompt shipment to TSL and assumes all costs and risks associated with this transportation; return shipment to the Customer will be at TSL's expense. Customer shall be responsible for return shipment charges for product returned where TSL determines there is no defect ("No Defect Found"), or for product returned that TSL determines is not eligible for warranty repair. No charge will be made to Buyer for replacement parts for warranty repairs. TSL is not responsible for any damage to or loss of any software programs, data or removable data storage media, or the restoration or reinstallation of any software programs or data other than the software, if any, installed by TSL during manufacture of the Product.

(E) Original Warranty Period Except for the warranty applying solely to the repaired component arising from a repair service as provided in Section C above, the aforementioned provisions do not extend the original warranty period of any Product that had either been repaired or replaced by TSL.

(F) Warranty Provisions The above warranty provisions shall not apply to any Product

(i) which has been repaired, tampered with, altered or modified, except by TSL's authorized service personnel; (ii) in which the defects or damage to the Product result from normal wear and tear, misuse, negligence, improper storage, water or other liquids, battery leakage, use of parts or accessories not approved or supplied by TSL, or failure to perform operator handling and scheduled maintenance instructions supplied by TSL;

(iii) which has been subjected to unusual physical or electrical stress, abuse, or accident, or forces or exposure beyond normal use within the specified operational and environmental parameters set forth in the applicable Product specification; nor shall the above warranty provisions apply to any expendable or consumable items, such as batteries, supplied with the Product.

EXCEPT FOR THE WARRANTY OF TITLE AND THE EXPRESS WARRANTIES STATED ABOVE, TSL DISCLAIMS ALL WARRANTIES ON PRODUCTS FURNISHED HEREUNDER INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED IN DURATION TO THE LIMITED WARRANTY PERIOD. SOME STATES OR COUNTRIES DO NOT ALLOW A LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR CONSUMER PRODUCTS. IN SUCH STATES OR COUNTRIES, FOR SUCH PRODUCTS, SOME EXCLUSIONS OR LIMITATIONS OF THIS LIMITED WARRANTY MAY NOT APPLY.

The stated express warranties are in lieu of all obligations or liabilities on the part of TSL for damages, including but not limited to, special, indirect or consequential damages arising out of or in connection with the use or performance of the Product or service. TSL's liability for damages to Buyer or others resulting from the use of any Product or service furnished hereunder shall in no way exceed the purchase price of said Product or the fair market value of said service, except in instances of injury to persons or property.

TSL is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact your local distributor or TSL to have another sent to you.

TSL shall not be responsible for any injury, damage or loss of whatever kind caused directly or indirectly by the goods whether as a result of their manufacture, operation, use or otherwise and the customer shall indemnify TSL from any claim arising from any loss suffered by any third party.

About TSL[®]



Technology Solutions UK Ltd (TSL[®]), part of HID Global, is a leading manufacturer of high performance mobile RFID readers used to identify and track products, assets, data or personnel.

For over two decades, TSL[®] has delivered innovative data capture solutions to Fortune 500 companies around the world using a global network of distributors and system integrators. Specialist in-house teams design all aspects of the finished products and software ecosystems, including electronics, firmware, application development tools, RF design and injection mould tooling.

TSL[®] is an ISO 9001:2015 certified company.



ISO 9001: 2015

Contact

Address: Technology Solutions (UK) Ltd, Suite A, Loughborough Technology Centre, Epinal Way, Loughborough, Leicestershire, LE11 3GE, United Kingdom.

Telephone: +44 1509 238248

Fax: +44 1509 214144

Email: enquiries@tsl.com

Website: www.tsl.com

About HID Global



HID Global powers the trusted identities of the world's people, places and things.

We make it possible for people to transact safely, work productively and travel freely. Our trusted identity solutions give **people**

convenient access to physical and digital **places** and connect **things** that can be identified, verified and tracked digitally. Millions of people around the world use HID products and services to navigate their everyday lives, and billions of things are connected through HID technology. We work with governments, educational institutions, hospitals, financial institutions, industrial businesses and some of the most innovative companies on the planet. Headquartered in Austin, Texas, HID Global has over 4,000 employees worldwide and operates international offices that support more than 100 countries. HID Global is an ASSA ABLOY Group brand.

For more information, visit www.hidglobal.com.