IQsafeLink
A product of Armac B.V.

MANUAL
Third generation
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1. The underlying thoughts

1.1 The solution

Globalisation and growing intercontinental trade create opportunities to sell machines and installations worldwide. Besides the initial price of the production of a machine or installation, this also increasingly competitive market often demands a low maintenance rate, 24/7 assistance to the operator, constant monitoring and a high standard in services. Exactly these form nowadays crucial unique selling points that every serious business needs to add to their product in order to make a difference. Bringing effective and sufficient support to the customer is however a costly surplus, due to rising costs of labour, larger distances and travel expenses. IQsafeLink™, however, is the answer to the problem!

Machine manufacturers (OEM), but also other industries, for example active in infrastructure, immediately see the benefits of remote service. Being of assistance to the customer or generally have control of operations, without having to travel half across the world, is the most adequate solution. However without possibilities of intrusion or other risks and disturbances.

IQsafeLink™ is built on a combination of these two elements. It is the most safe and reliable remote connection for machine- and process control systems. It offers possibilities like:

- Remote control and monitoring;
- Machine management;
- Diagnostics; maintenance and prediction on maintenance;
- Trending and logging;
- (remote) Alarm service.

Besides just making a traditional connecting bridge, IQsafeLink™ is unique in its possibility to take control over the local display and it's functions. Therefore, it is not necessary to have similar applications running on the computer that runs the remote control. Also, IQsafeLink™ supports all computer operating systems.

1.1.1 Remote Engineering

IQsafeLink™ is always and everywhere applicable. Simply answer the question: "Is internet available?" with "yes" and there is connection with machine- or process control.

Now machine manufacturers can invest fully in machine- or process controls, without having to care about qualifications of future operating personnel. In case the control system is made remotely available, the possibilities for support are greatly extended. Specialists of the manufacturer can now be of service to the customer anywhere in the world from their chair, by “looking over the shoulder” of the machine operator on side. This creates a high level of machine reliability (production loss due to standing still is minimized). Maintenance and service can be supervised from afar by professional machine technicians or software can be updated without any assistance of customer’s personnel. IQsafeLink™ even offers environmental friendly options such as remote monitoring energy consumption, water or other material use. This offers an economist or specialist to optimize the machine’s or installation’s operation to the most efficient levels.

1.1.2 IQsafeLink™, technically the right solution!

IQsafeLink™ is an internet based technology, which creates a tunnelled VPN connection between the user and the machine or process control system. There is no need to change the existing network (security) settings, which eliminates disadvantages that were experienced in previous internet-
connection-based, remote service solutions. Using RSA encryption, the connection is as safe as, for example, telebanking.

Connection to the internet can be made through all existing internet connections. IQsafeLink™ makes any communication interface remotely available.

IQsafeLink™ also offers custom made solutions, such as connections with an IP camera to monitor a process, logging applications, but also specific web pages that contain important data for monitoring machines to improve their capacity. And ... applications can run local with IQsafeLink™.

1.1.3 IQsafeLink™ from costs to profit
With growing distances in combination with the local current traffic situation, it is a challenge to grant service rapidly and adequate to a customer in busy industrial and dense populated areas. In combination with the increasing costs of travel, stay and working hours of service engineers, services on side become less desirable, especially when later it is determined as a simple solution to a stagnating process.
With a relative small investment in IQsafeLink™, expenditures are saved, a faster service is realized and production loss is minimized.

1.1.4 IQsafeLink™ saves time and money!
IQsafeLink™ offers possibilities that extend further than current representation of remote connections. Where service now is seen as an expense, IQsafeLink™ can turn service into a mutual profit. And since all technical drawback for service on distance are taken away by IQsafeLink™, now is the time for investment in remote service!

1.2 Advantages IQsafeLink™ listed
An overview of the advantages with regards to IQsafeLink™ and your company or product (machine or process control industry):

- 24/7 service will be possible: from your specialised personnel immediate “to” your customer;
- More efficient facilitation of your personnel;
- No travel expenses;
- A better service level than your competitor;
- Simple to implement in any installation;
- Completely brand independent;
- Works with all PC control systems;
- Everywhere where is internet, there will be connection to the machine;
- Remote monitoring statistical process control (SPC) and statistic machine control (SMC);
- All applications can be used, without any local installation;
- Clear and prompt help as lingual barriers and (cultural) miscommunication are minimized;
- Professional, service oriented image of your company.
In addition, for your customer there are also many advantages when using IQsafeLink™:

- Software expert watches remote, hence solutions are quicker found;
- Less and shorter production stagnation, thus increasing your capacity;
- Completely brand independent, thus all systems can be connected and all applications run;
- No extra software necessary;
- Operator watches along and learns, while doing so, more about the machine’s processes;
- Logging, trending, monitoring and diagnosis: optimisation of your production process.

### 1.3 The distinguished characteristics of IQsafeLink™

IQsafeLink™ is the best manner to execute several tasks from distance to your industrial automation.

The requirements to the design of IQsafeLink™ were:

- Easy in usage;
- Safe usage of internet;
- Suitable for an unmanned location;
- Brand independent. Ought to support as many as possible machines;
- Grows along with technological development. It will be supportive to what will be launched ‘tomorrow’;
- Ability to use the latest technological innovations.
The last to requirements resulted in, among others, the following thought: “Whenever I would be on site with a laptop, it would be possible, because all systems are approachable and accessible via this mode.”

Other systems are focused on the extension of the serial port or Ethernet port until the desired location. This originates from the ‘modem thoughts’ of former times. Some people still refer to dialling-in, while one is not using a phone anymore to create an internet connection.

IQsafeLink™ expresses a different approach. The PC is shifted in its totality to the service location. The system will create a situation in which the PC is under total control of the remote user. The PC itself can also be maintained remotely, in order to meet aforementioned requirement three.

IQsafeLink™ has been developed by utilization of existing and proven techniques; by merging them together to form a new product. This enables the technique to develop along with the current state of technology; new developments can be implemented quickly and reliably. The name IQsafeLink™ originates from this:

IQ (smart) safe (secure) Link (connection).
2. The Principle

The IQsafeLink™ consists of 3 main components:

1. The client software on the PC which delivers the service called IQsafeLink™ Client;
2. The IQsafeLink™ cloud on the internet;
3. The IQsafeLink™ box on the location purposed for remote control.

The box will be turned on. It connects to the cloud where the box will be identified. The user connects to the cloud using the tool, which will as well be identified by the cloud. The user has access to the box.

It is not necessary to open ‘the ports’, to know IP addresses or URLs. It is sufficient when the box and the user PC have access to the Internet. The identification happens by pre-shared keys and certificates. These also provide access to the server and the encryption of all data transmitted over the Internet. These are contained in files which are already installed at purchase and require no further intervention from the user.

An IQsafeLink™ box is connected to the Internet via the WAN port. The LAN ports are used to connect your machine network. The IQsafeLink™ ensures a secure connection so that users within the subgroup can externally access the machine network. This means that you are virtually near the machine. In combination with the virtual machine, this experience becomes increasingly stronger. The advantage of the software set up at the virtual machine is found in the fact that during the update, download or upload from your program to, for example, a PLC, you do not have to worry about the losing of certain packages during transmission over the Internet. Even though the Internet ceases for a moment, the IQsafeLink™ will just continue as it is locally connected to the PLC.
3. Getting Started

To quickly get started, follow the steps below:

1. Make sure the box is connected to the Internet via the first Ethernet port, called WAN. In case
   the network provides standard access to the Internet and hence does not require special
   (TCP/IP) settings, the box will connect automatically as we have programmed it already.
2. Turn the box on. The sequence is of major importance. The box checks after start up and
   indicates the status with an audible signal, as described in section 6.1.6.

With regards to the box we are finished. Now, we will make connection to the PC.

Upon consignment of the first IQsafeLink™ box, an USB stick is enclosed on which you will find the
client tool, the key and the certificates. The certificates and keys are never sent over the Internet.
These are ought to be treated as personal and confidential.

IQsafeLink™ Tool is the so-called portable application. This means that it does not need to be installed,
it is executable even straight from the USB stick.
In principle, the tool runs on every Win32 platform. It has been tested on Windows XP SP3 at both the
32 and 64 bit edition.

3. Insert the USB stick into the drive of the PC.
4. Open the folder on the USB stick. Herein you will find the executable file “IQsafeLinkTool.exe”
   (depending on the display settings, the extension “exe” could be omitted in the view).
5. Start the program IQsafeLinkTool.

**Note!**

It is important that the program can be run “as administrator”.

When the program is run for the first time on a PC, the so-called TAP Virtual Ethernet adapters will be
installed.
A window as shown alongside will appear several times.
To run the installation, the warning should be ignored and “continue” should be selected.
Depending on the Windows distribution, the window may vary somewhat.

Without this installation, the IQsafeLinkTool cannot operate. The virtual adapters are purposed to
connect the PC to the cloud.
4. IQsafeLinkTool

After the installation is completed, the following –analogue- window of the tool is shown (content will be different):

![IQsafeLinkTool](image)

**Figure 2: IQsafeLinkTool**

In the example shown in figure 2, the connection is already established and the list is collected. In case you do not see the right language, this can be changed by pressing the F12 key.

The status bar (at the bottom) shows, in the most left field, the status of the IQsafeLink™ connection (the connection to the server). The field besides it, shows the status of the bridge connection; further details on this later in this manual. The rightmost section provides general information and status messages.

Most functions can be accesses both via the toolbar at the top and through the menu at the top as well as via a keyboard shortcut (usually function key). In the window itself is shown, if the server is connected, which devices can be connect to.

The functions, as visualised in figure 2:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Icon of leftmost button if there is no connection. Click to connect. This function is also accessible via F2.</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Icon of leftmost button if there is connection with the server. Click to disconnect. You could also do this via Shift+F2.</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>The list of users and equipment being online, is automatically loaded after connecting. This button (or F5) the list will refresh the list. This is primarily used whenever the equipment is turned on or off.</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Visit the web interface of the IQsafeLink™ server with the default browser. This is also possible through F6. This web interface is explained later.</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Visit the web interface of the selected IQsafeLink™ box by using the default browser. F7 will also perform this. This web interface is explained later.</td>
</tr>
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<td></td>
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<tr>
<td></td>
<td>Open a window via File Transfer Protocol (FTP) to administer the selected box.</td>
</tr>
<tr>
<td></td>
<td>Open the virtual machine of the selected box via Remote Desktop Protocol (RDP). On this virtual machine, you can install and use your preferred software, as a PC to your machine.</td>
</tr>
<tr>
<td></td>
<td>Create a bridge connection to the selected box. Accordingly, you obtain an IP address in the same range as the machine network, configured in section 6.1.5.</td>
</tr>
</tbody>
</table>
5. IQsafeLink™ server web interface

The web interface of the server is available for two types of users. An user without administrator rights can only see the overview of the online clients and use the ‘file area’. An user with administrator rights can additionally also administrate users, groups and boxes. In the following sections an example of possible screens and descriptions of them are given.

5.1 Online Clients

Figure 3 shows which clients within a group are online. Those are both users and IQsafeLink™ boxes.

![Figure 3: List of online clients.](image)

5.2 Management of groups

Browse to ‘List of groups’, to get an overview of all subsets of your group.

![Figure 4: List of sub groups.](image)
Here, new sub groups can be created and existing sub groups be edited or removed.

![Figure 5: Adding of sub groups.](image1)

![Figure 6: Modifying sub group.](image2)

### 5.3 Management of users

Browse to ‘List of users’ to get an overview of all users who are members of your group. It concerns both online and offline users. An user can be edited to click on the ‘Edit’ icon behind the user’s name and membership.

![Figure 7: List of users.](image3)

Only the name and sub groups can be modified by an user. The remaining information is fixed and is linked to the user’s certificate.

![Figure 8: Modifying ‘membership’ of users.](image4)
5.4 Managing boxes
Go to ‘List of boxes’ to get an overview of all IQsafeLink™ boxes of your group. It concerns both online and offline boxes. By clicking on the ‘Edit’ icon behind a box, the sub group of this box can be changed. Thus, this works the same as the management of users (section 5.3), but now it concerns sub groups which however can only be modified. However, this only concerns the changing of sub group, changing of name has to be done through the web interface (section 6.1.1).

5.5 File area
In the ‘file area’, files can be shared with users within the group. On request, new users can be created. Due to security, we will not send the certificates and keys by e-mail. These will appear in the file area, where you can download the files and delete them when desired.

Obviously, as new user you cannot access this without having an account. In that case, the last IQsafeLinkTool will be sent to you on a USB stick along with your IQsafeLink™ box.

5.5.1 IQsafeLinkTool update
If there is an update for your IQsafeLinkTool you will be able to download the installer via the file area.
6. Web interface IQsafeLink™ box

Each IQsafeLink™ box has its own local web interface to have a look at its settings and to modify them. You can enter this interface by surfing in the web browser to its IP address (which can be seen in the IQsafeLink™ Tool).

In case the IQsafeLink™ box is turned on but is offline, you could access the web interface by:

Setting your Ethernet adapter to a static IP address, namely 5.1.2.100. Accordingly, you can now access the web interface by browsing to 5.1.2.1.

A picture of the ‘homepage’ of IQsafeLink™:

![Homepage IQsafeLink™](image)

6.1 Registration of the box
To personalize the IQsafeLink™ box, you have to follow the steps hereinafter.

6.1.1 Alteration name
Alter the name of the IQsafeLink™ box.

![Alteration name](image)
6.1.2 **Change password**
Change the password which is required to gain access to the administration section of the web interface, FTP, bridge connection and of the box.

![Figure 13: Changing password.](image)

6.1.3 **WAN IP settings**
In this menu the network data should be specified. The box is standardly delivered in DHCP. If desired, this can be changed to a static IP address: you simply remove the check mark behind ‘DHCP’.

![Figure 14: WAN IP settings.](image)

The standard user name is: “admin”.

The standard password is: “iqsl”.

The standard user name is: “admin”.

The standard password is: “iqsl”.
6.1.4 WAN proxy settings

![WAN proxy settings](image.png)

*Figure 15: WAN proxy settings.*

**Note!**

All data must be filled in correctly. If this is not the case, the IQsafeLink™ box will no longer be online within the IQsafeLink™ network. In that case, data can only be changed locally by creating a direct LAN connection to the box and hereafter go through the browser to ‘5.1.2.1’
6.1.5 LAN bridge settings
Changing of the settings for the LAN side of the IQsafeLink™.

- IP address = IP address of the LAN side of the IQsafeLink™;
- Subnet mask = subnet mask;
- Start Client pool = initial IP address purposed for range IP addresses reserved for clients;
- End Client pool = end IP address purposed for range IP addresses reserved for clients.

![LAN bridge settings](image_url)

*Figure 16: LAN bridge settings.*
6.1.6 Other settings
Change the protocol to/from TCP/UDP and indicate whether an audible signal is required to indicate the status of the IQsafeLink™. This is on by default.

Figure 17: Other settings.

6.1.7 Online status
At this place the status of the box is displayed. Through pinging the Google DNS servers is verified whether the box is connected to the Internet.

Figure 18: Checking of online status.
6.1.8 Logging
Reading the logging of the IQsafeLink™ box.

![Logging](image)

**Figure 19: Logging.**

6.1.9 Restart and shutdown
Restart and shutdown of the IQsafeLink™ box.

![Reboot or shutdown](image)

**Figure 20: Reboot and shutdown IQsafeLink™.**
6.2 Virtual Machine

6.2.1 Auto start

![Image of Control VM interface showing "Auto start is disabled" and options for CD/DVD management, USB management, and Reboot/Shutdown virtual machine.]

**Figure 21: Virtual machine administration, auto start.**

6.2.2 USB management

By means of USB management, connected USB peripheral devices can be linked to the virtual machine. If the virtual machine is off, a connected USB device can be permanently connected or disconnected. This means that when you start up the virtual machine, the USB device is connected automatically. When the virtual machine is on, the USB device can only be temporarily connected or disconnected.

![Image of USB settings interface showing a list of USB devices connected to host.]

**Figure 22: USB management.**
6.2.3 ISO management

**Figure 23:** CD/DVD ISO management.

6.3 Box file storage

Open a new window to manage the files on the box via FTP. Ditto as via the IQsafeLinkTool.

**Figure 24:** Reboot or shutdown.
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