SOFTWARE MANUAL

ExLRT Intrinsically Safe Loop Resistance Tester

MK TEST SYSTEMS

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SOFTWARE MANUAL

EXLRT

XLR-105-1

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MODIFICATIONS

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1	17/12/2019	Chris de Vere Moss	First Release

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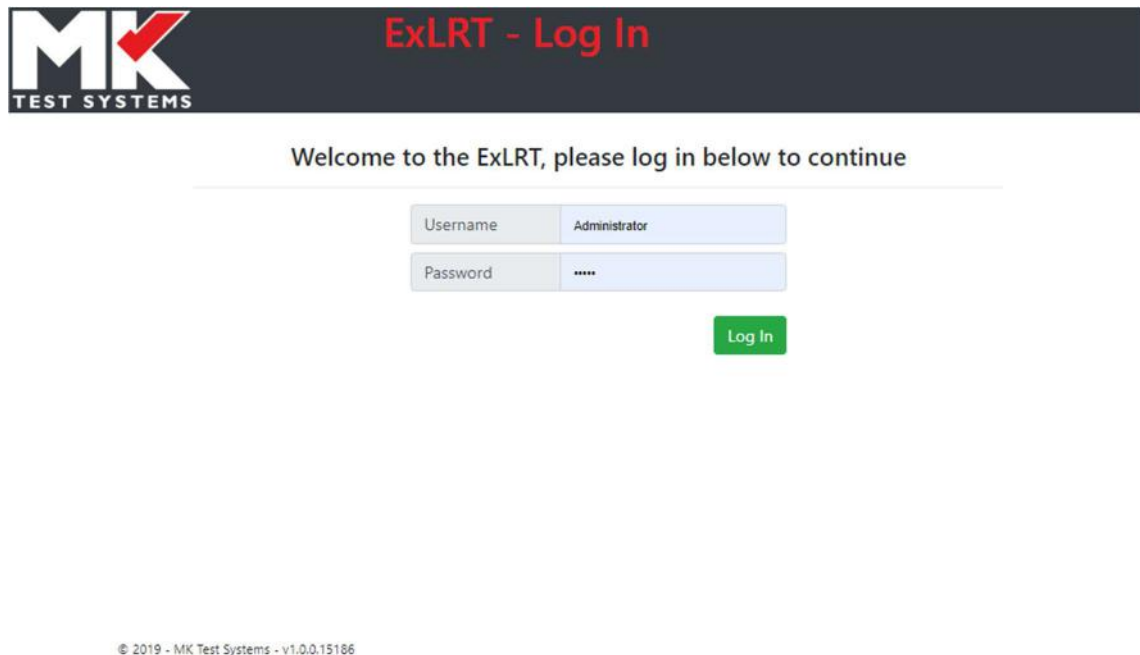
Table of Contents

1   INTRODUCTION

This manual is provided to the end user to understand the operation of the ExLRT PC software application that can be used to configure, adjust and verify the ExLRT device and its associated components.

2   LOGGING IN

Once installed, opening the ExLRT application displays the log in screen show below:


The application is installed with a predefined administrator account to allow for a designated administrator to login and setup further users and manage the user groups. To log in, enter a valid username and password and select the *Log In* button.

3   CONNECTING THE EXLRT TO A PC

- Connect the ExLRT to the PC using the USB cable. The ExLRT will display "*Controlled by PC*".

- The ExLRT can now be selected from the menu at the top right of the application. Once selected, the ExLRT name and com port used will be displayed:
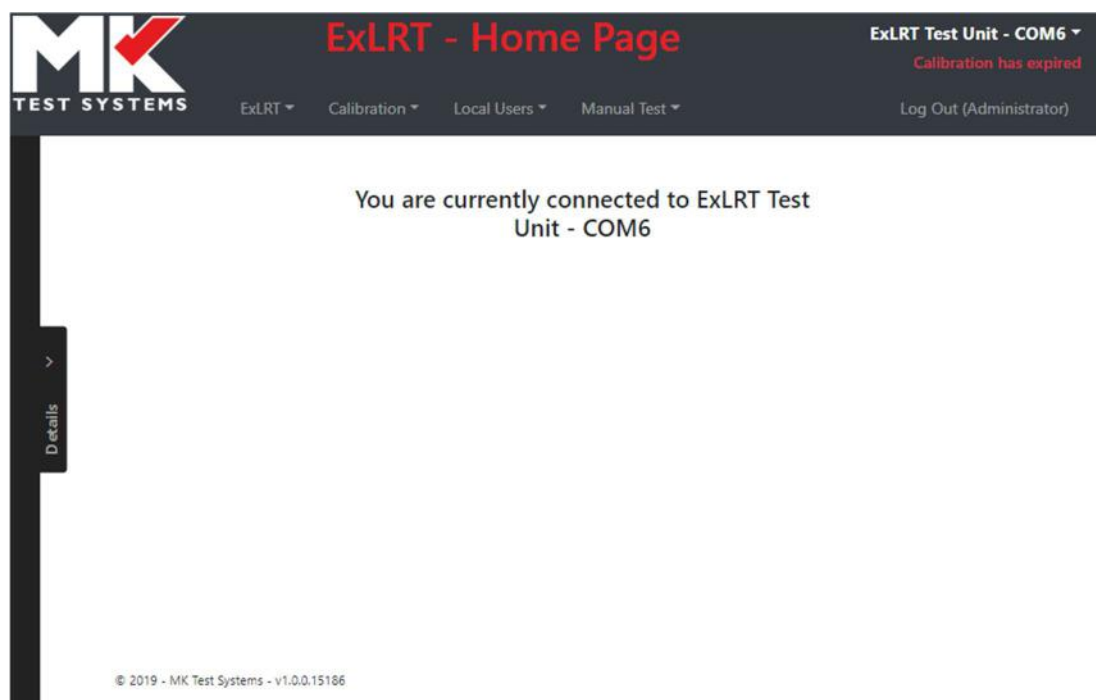
4   LOCAL USER GROUPS

- The ExLRT application comes with two predefined user groups, *Administrators* and *MK Engineers.* (MK Engineers is reserved for maintenance)

- A user group is a set of permissions, applied to a user, that control access to the features of the PC application. A group can be given a name that reflects its user access level. For example:

  - The *Administrators* group allows configuration to almost all areas of the application
  - An *Operators* group could be added that restricts access to only allow a user to run a preloaded verification program.

- Multiple users can be assigned to the same group. For example, if there are two users that require administrator access, they could both be assigned to an *Administrators* group.

- To add a new user group, select *Groups* from the *Local Users* menu and then click *Add.*

- Enter the group *Name* and configure the settings to restrict access as required:
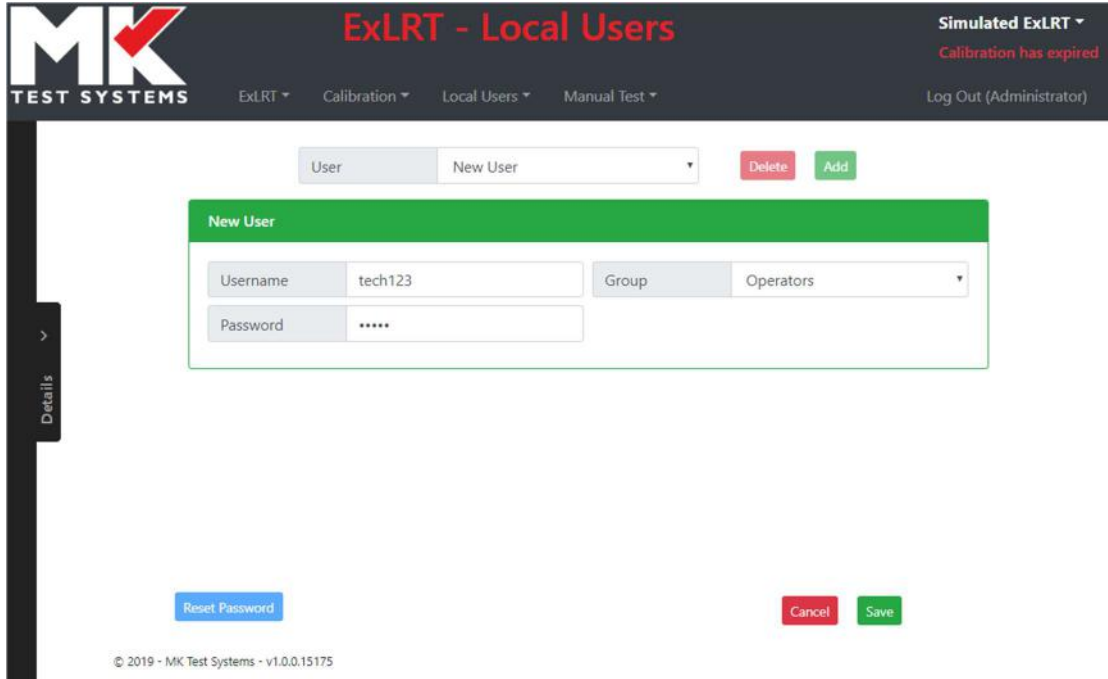

- Select *Save.*
- Note, a user group can only be deleted if there are no users assigned to that group.

5   LOCAL USERS

User accounts can be set up for each operator of the ExLRT application. Each account has a login username and password and is assigned a user group to set the access level.

5.1   Adding a local user

- To create a new user, select *Users* from the *Local Users* menu and then click *Add.*
- Enter a *Username* and *Password*.
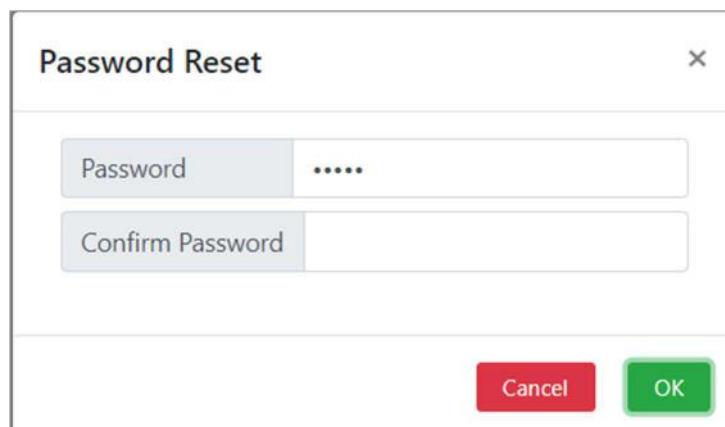- From the *Group* menu, select the required user group from the list.
- Select *Save.*

- Usernames must be unique and passwords must have a minimum of 5 characters.

5.2   Resetting a local user password
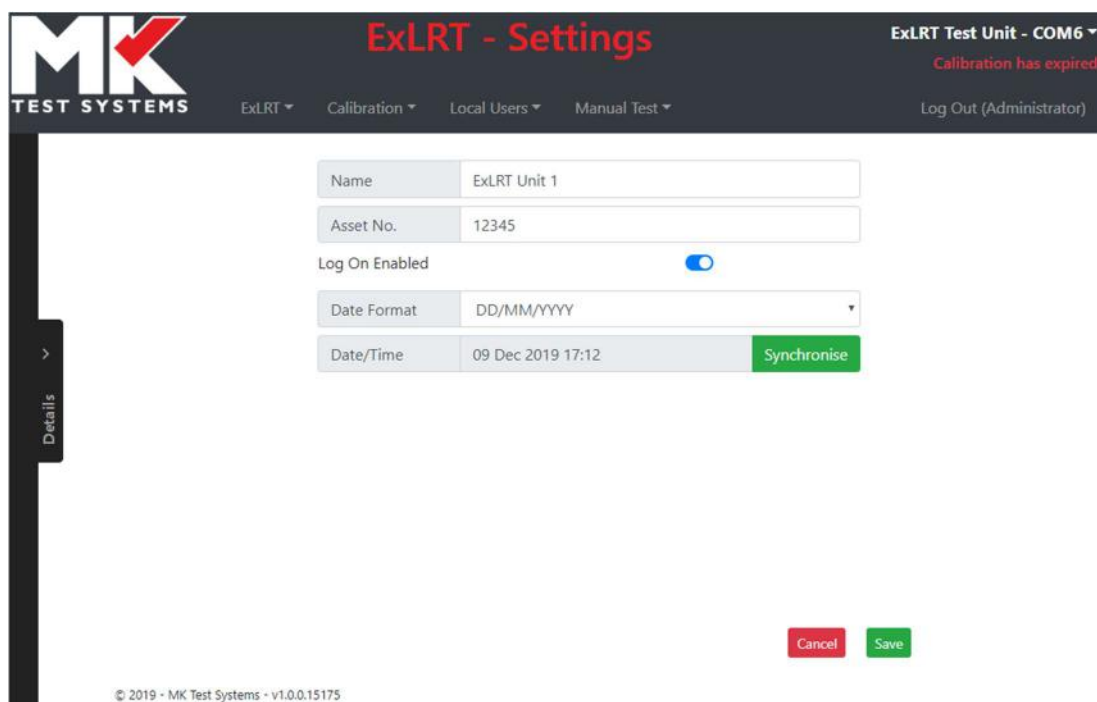
- Select the relevant user from the *User* menu on the *Local Users* screen.
- Click the button.
- Enter the new password in the *Password* and *Confirm Password* fields and click OK.

6   EXLRT DEVICE SETTINGS

- To access the ExLRT device settings, select *Settings* from the *ExLRT* menu.

- The following fields are available:
  - *Name*: Device name (max 24 alphanumeric characters)
  - *Asset No*: Device asset number (max 24 alphanumeric characters)
  - *Log On Enabled*:
    - With this option enabled, the login screen will be displayed when the ExLRT is switched on and a valid username and password will be required to access the device.
    - If this option is disabled, the login screen will not be displayed when the device is switched on and the ExLRT will log in automatically using the selected *Start-up Config Level.*
  - *Date Format*: The date displayed on the ExLRT can be formatted as either *DD/MM/YYYY* or *MM/DD/YYYY.*
  - *Date/Time:* Displays the current PC time and date.
- Selecting the *Save* button transfers these device settings to the ExLRT.

6.1   Setting the time and date on the ExLRT

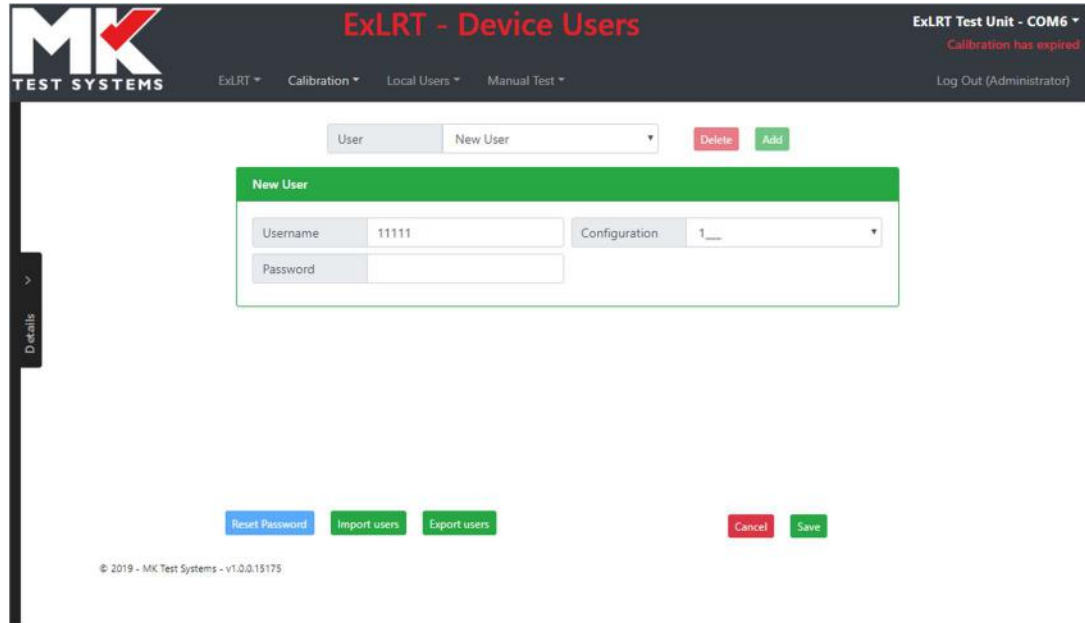- From the Settings screen, select the Synchronise button. The PC time and date will be transferred directly to the ExLRT device.
- To change the date format, select the desired format from the *Date Format* list and then click the *Save* button.

7   Exlrt device users

Device users can be set up for each ExLRT operator. These are linked to a configuration that controls the functionality of the device.

7.1   Setting up a new ExLRT device user

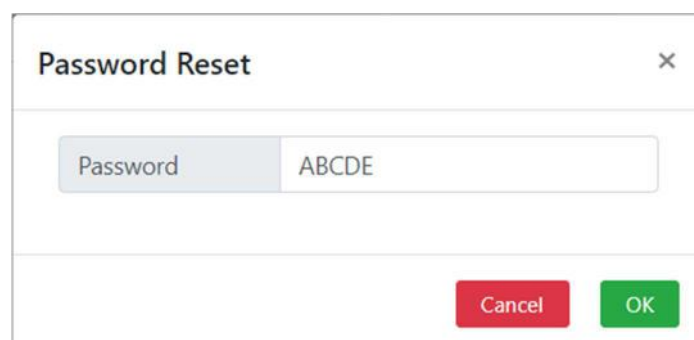To add a new ExLRT device user, select *Users* from the *ExLRT* menu.

Enter the following:

- **Username**: must be made up of 5 numbers and only numbers 1 to 5 are permitted. The username must also be unique.

- **Password**: must be made up of 5 capital letters and only letters A to E are permitted.

- **Configuration:** this is the configuration that will applied to the device when the user logs in. All available configurations that have been set up for this device will be listed here.

Select the *Save* button to transfer the user data to the device.

7.2   Resetting an ExLRT device user password

- Select the relevant user from the *User* menu on the *Device Users* screen.
- Click the   **Reset Password**   button.
- Enter the new password and click OK to confirm.

7.3   Exporting ExLRT device users

Device user data can be exported as follows:

- Select [Export users] button from the *Device Users* screen.

- The export file is automatically transferred to your browser's downloads folder.

- The export file format is *json*.

7.4   Importing ExLRT device users

Device user data can be imported as follows:

- Select [Import users] button from the *Device Users* screen.

- Browse to the location of the user data export file.

- Click *Open*.

- Warning message is displayed:
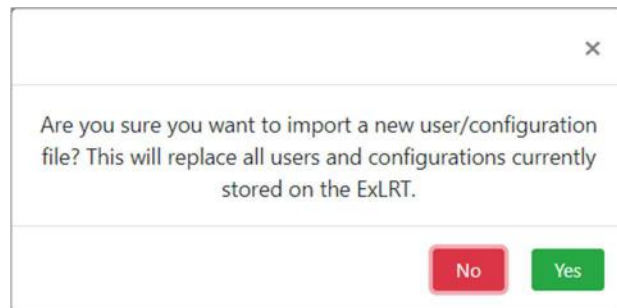
- Select *Yes* to confirm the import.

8   EXLRT CONFIGURATIONS

8.1   Adding a new configuration

- To set up a new configuration, select *Configurations* from the ExLRT menu and click *Add.*

- A configuration *Name* can be selected from the drop-down list of 16 possible names.

- Select the desired settings and then click *Save.*

- This configuration will now be available from the *Configuration* menu when setting up new users. See the section *Setting up a new ExLRT device user* for details.

- Configurations can be deleted by selecting the configuration from the list and clicking the *Delete* button. Note that a configuration can only be deleted if it is not currently assigned to any users.

8.2 Configuration Settings

Modes To Display:

This section controls the functionality available on the ExLRT device.

- **Continuous**: enables continuous measurement mode.

- **Single shot**: enables single shot measurement mode.

- **Default Manual Mode**: If both *Continuous* and *Single shot* modes are enabled, this setting determines which mode will be selected as the default mode on the device.

- **Settings:** enables the *Settings* menu. Disabling this option hides its child menus, Measurement, Calibration & System.

- **Calibration:** enables the *Settings > Calibration* menu.

- **Measurement Parameters:** enables the *Settings > Measurement* menu.

Default Trigger:

- **Trigger on Percentage Active**: enables the trigger on percentage mode. Switching on this option allows the default trigger percentage value to be set.

- **Trigger on Value Active**: enables the trigger on value mode. Switching on this option allows the default low and high trigger values to be set.

Menu Permissions:

This section controls if the specified options are editable on the ExLRT device.

- **Trigger on Percentage**: allows the trigger on percentage mode to be switched on/off on the device.

- **% of Reading**: allows the trigger % of reading value to be changed on the device.

- **Trigger on Value:** allows the trigger on value mode to be switched on/off on the device.

- **Lower/Upper Value**: allows the lower and upper trigger values to be set on the device.

- **Averaging**: allows averaging measurement mode to be switched on/off on the device.

- **Bluetooth**: allows Bluetooth functionality to switched on/off on the device.

ExLRT:

This section controls device specific parameters.

- **Averaging Active**: enable measurement averaging by default.

- **Allow Uncalibrated Probes**: allow measurements to be taken using unverified cables.

- **Bluetooth Active**: enables Bluetooth functionality by default (if available).

- **Allow Uncalibrated ExLRT**: allow measurements to be taken when the ExLRT is not calibrated.
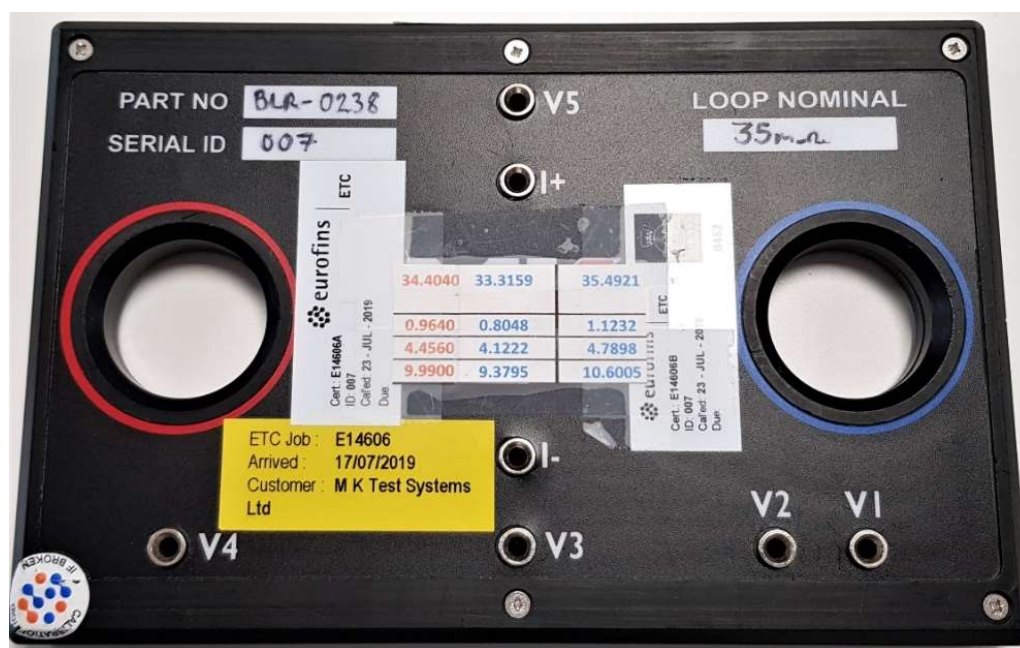
9   CALIBRATION VERIFICATION

It is recommended that the calibration verification process is carried out using 5 calibrated standards which are available from MK Test Systems Ltd. An associated calibration verification program is required which is a text file that holds the precise resistance values for the relevant standards as shown in the example below:

CertNo	PartNo	SerialNo	Definition	Type	Actual	Min	Max
E14606A	BLR-0238	7		Loop	34.404	33.3159	35.4921
E14606A	BLR-0238	7	V1 to V2	Joint	0.964	0.8048	1.1232
E14606A	BLR-0238	7	V1 to V3	Joint	4.456	4.1222	4.7898
E14606A	BLR-0238	7	V1 to V4	Joint	9.99	9.3795	10.6005

The file format for the calibration verification program is *.CSV* and the information required is:

- o **Certificate Number** (Calibration standard certificate number)
- o **Part Number** (Calibration standard part number)
- o **Serial Number** (Calibration standard serial number)
- o **Definition** (Joint measurement points)
- o **Type** (Loop or Joint)
- o **Actual** (Nominal Resistance in mΩ)
- o **Minimum** (Minimum allowable resistance in mΩ)
- o **Maximum** (Maximum allowable resistance in mΩ)

This information is recorded on the calibration standards, see example below:
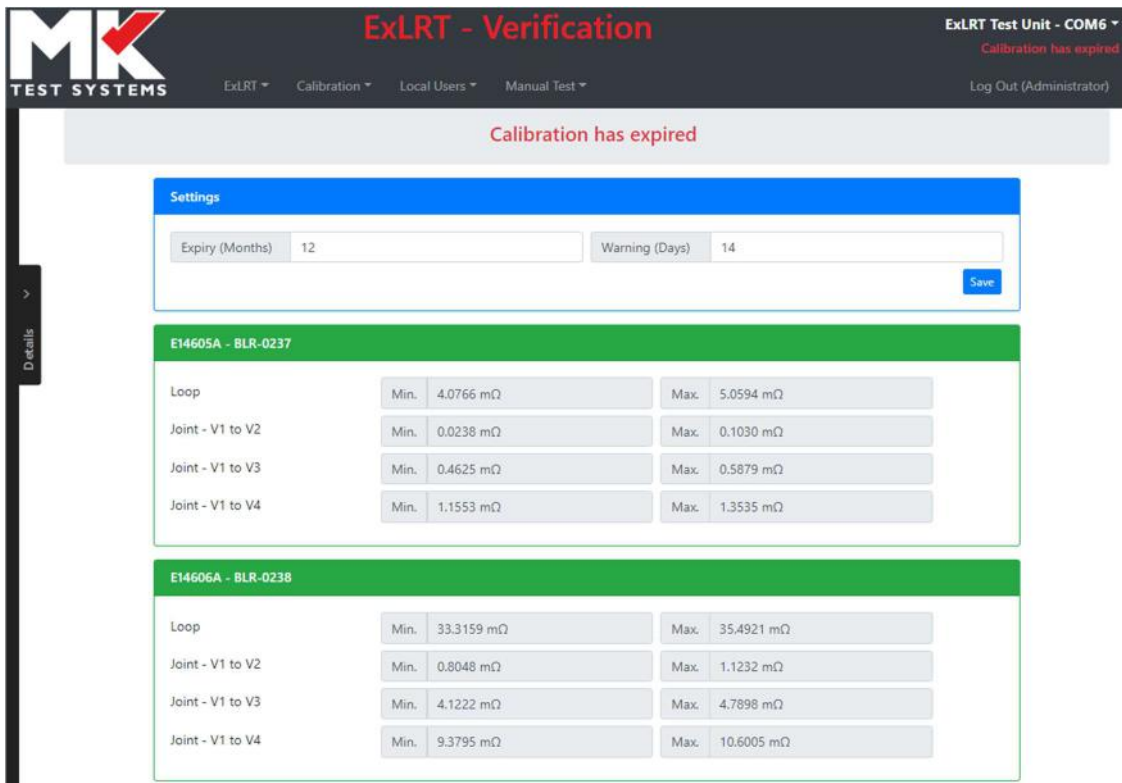
9.1   Importing a verification test program

- Connect the ExLRT to the PC running the ExLRT application using the USB cable.

- Log in to the ExLRT application as an Administrator.

- From the *Home Page*, select *Verification* from the *Calibration* menu.

- Select the *Import* button to load a verification program.

- Navigate to the relevant verification program and select *Open*.

- The following warning message will be displayed:
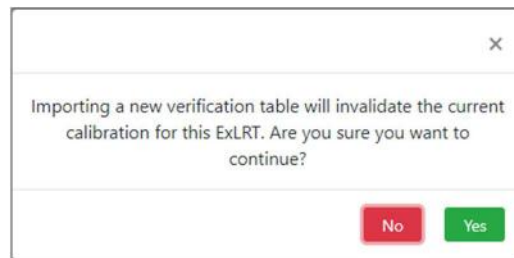
- Select *Yes* to continue

- The verification program will be displayed:
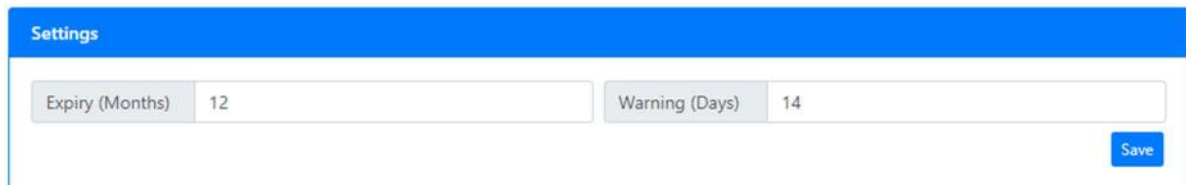
9.2   Setting the calibration expiry and warning period

The calibration expiry period can be set on the *Verification* screen. In addition, a warning can be set to alert the user of the approaching expiry date.
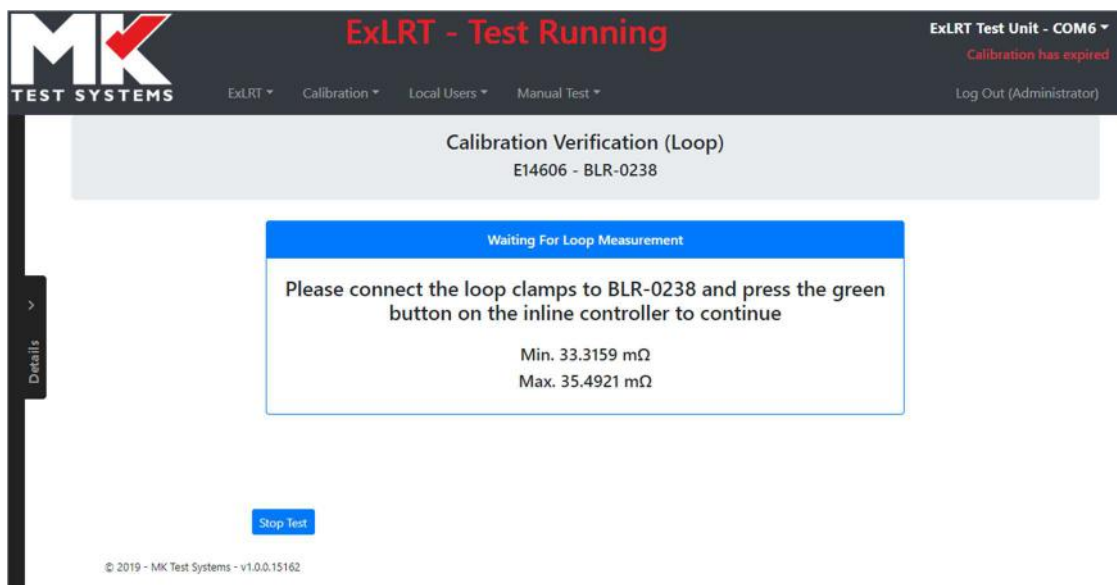
- To set the calibration expiry period, enter the number of months that the calibration will be valid for.

- To set the warning period enter the number of days, prior to the expiry date, that a warning message will be displayed.

9.3   Running a verification
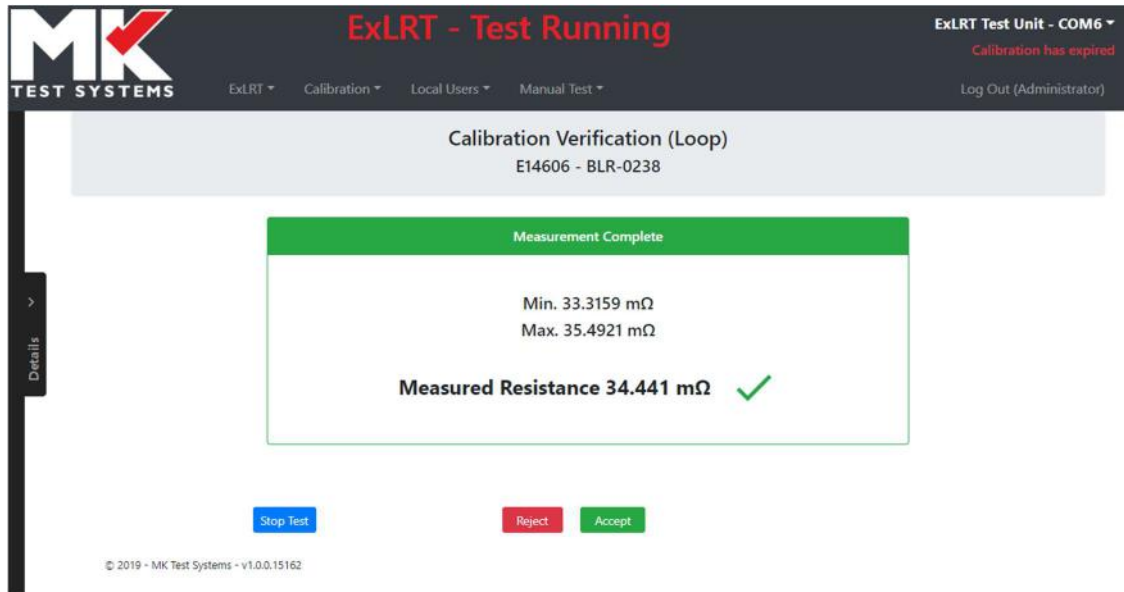
- Ensure that the ExLRT is not connected to its mains charging cable.

- To begin the verification process, select *Run Verification.*

- The operator is instructed to run loop and joint tests on each of the calibration standards in turn. The example below is for a loop test on a 35mΩ standard:

- For the loop measurements, the green LED on the inline controller will light to indicate that a measurement can be taken. Press the green button to proceed.

- The result is displayed automatically once the test is complete. If the measurement is within the acceptable range, the result box is highlighted green and a green tick is displayed next to the result.
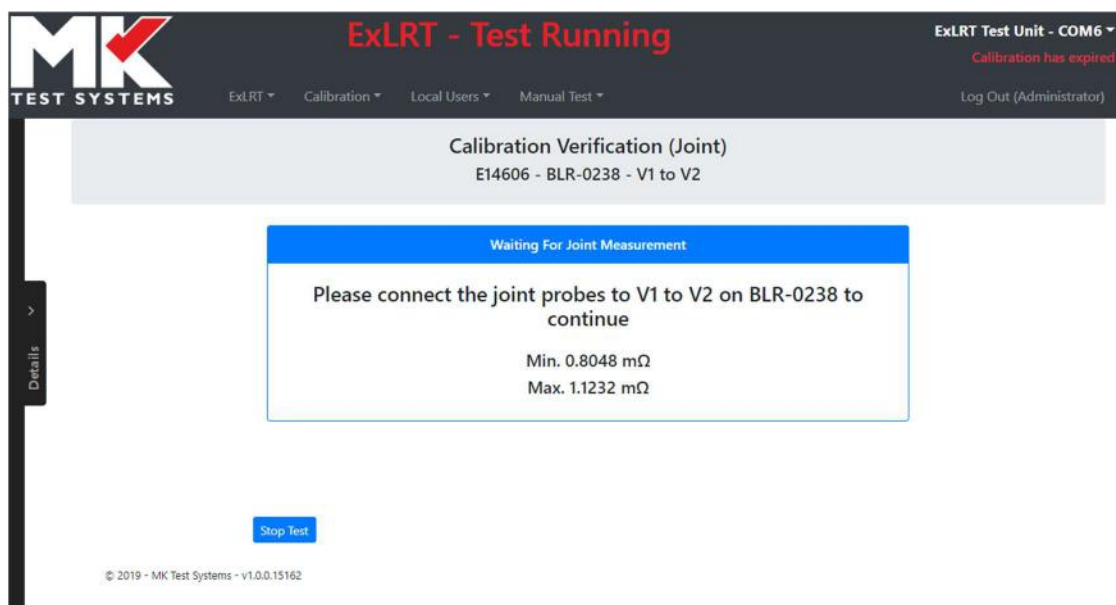

- To accept a loop measurement and proceed to the next measurement, select the *Accept* button. The green button on the inline controller can also be used to accept a loop result.

- If the result is outside of the acceptable range, the result box is highlighted red and a red cross is displayed next to the result.

- To reject a loop measurement and repeat the test, select the *Reject* button. The red button on the inline controller can also be used to reject a loop result.

- For joint measurements, the operator is instructed to connect the probes to specific points on the calibration standard, as shown below.
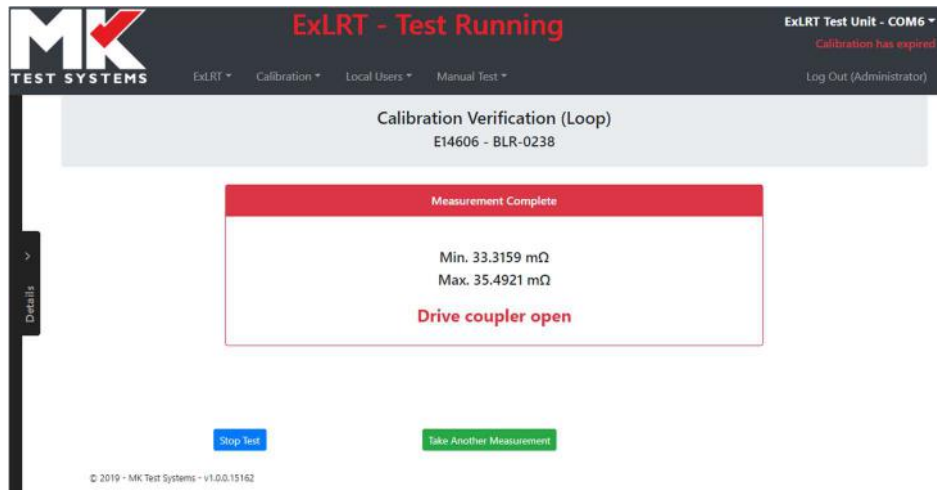

- The test begins automatically when the probes make contact with the calibration standard.

- The result is displayed once the test is complete. For joint measurements, both the loop and joint results are shown.

- If the measurement is within the acceptable range, the result box is highlighted green and a green tick is displayed next to the result.
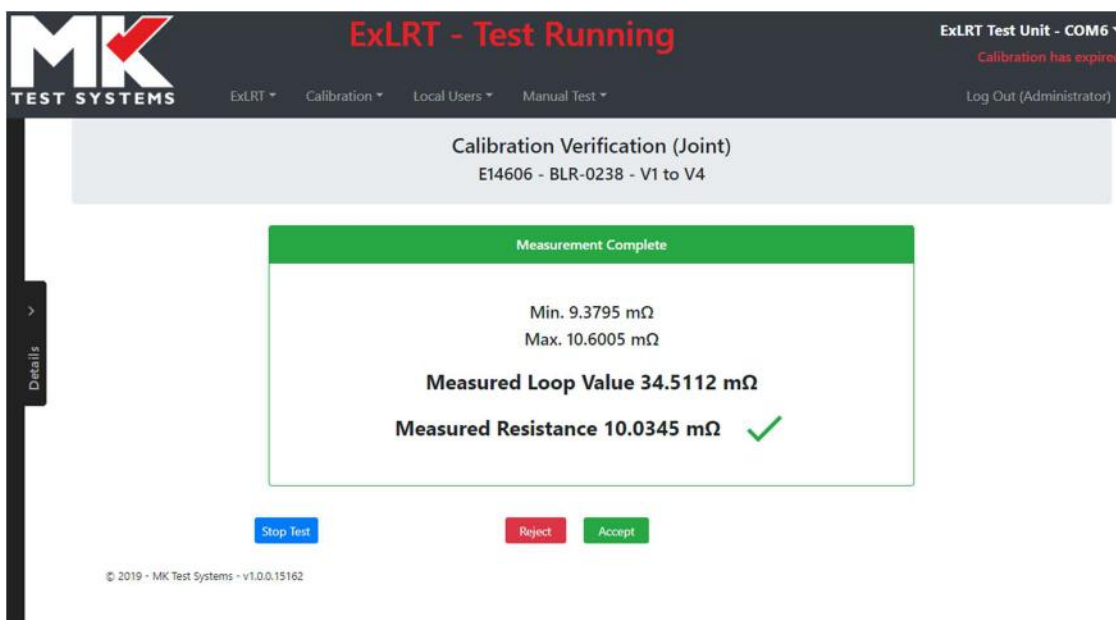
- To accept a joint measurement and proceed to the next measurement, select the *Accept* button. The green button on the probes can also be used to accept a joint measurement.

- To reject a joint measurement and repeat the test, select the *Reject* button. The red button on the probes can also be used to reject a joint measurement.

- If the result is outside of the acceptable range, the result box is highlighted red and a red cross is displayed next to the result.
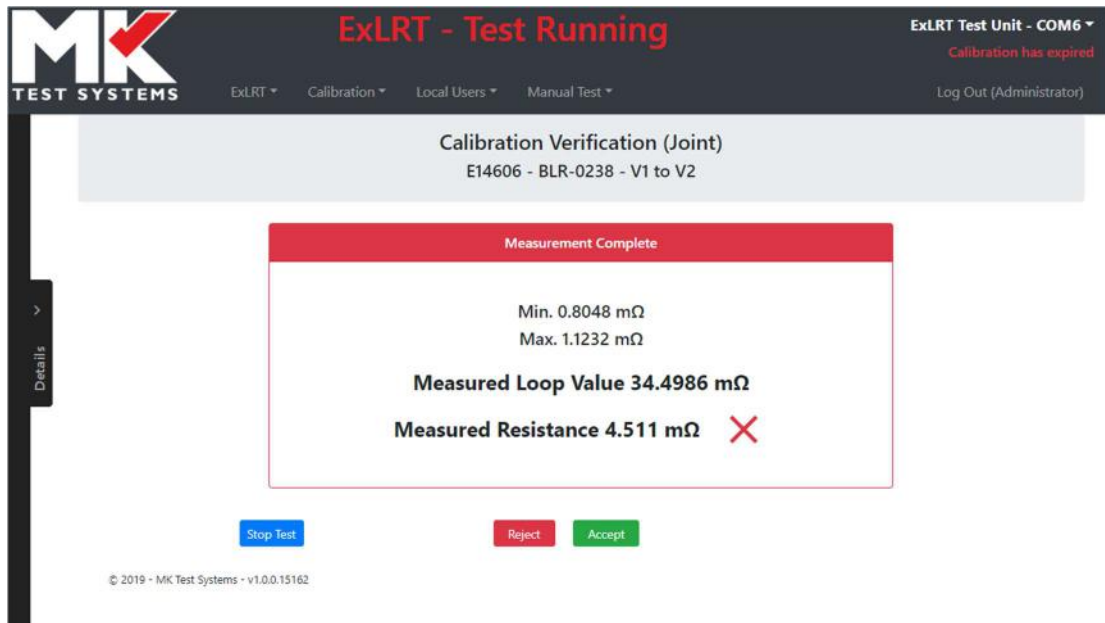
- Once all of the verification tests are complete the following screen will be displayed:
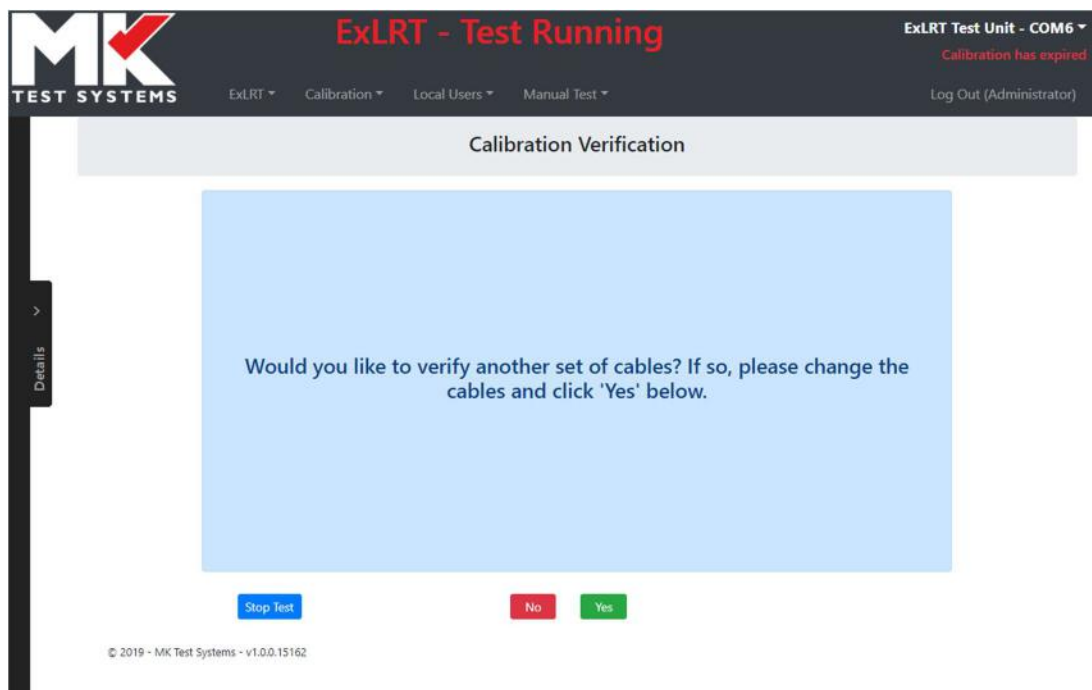
- Select *No* to complete the calibration verification.

- The calibration expiry date will now be displayed on the *Verification* screen.
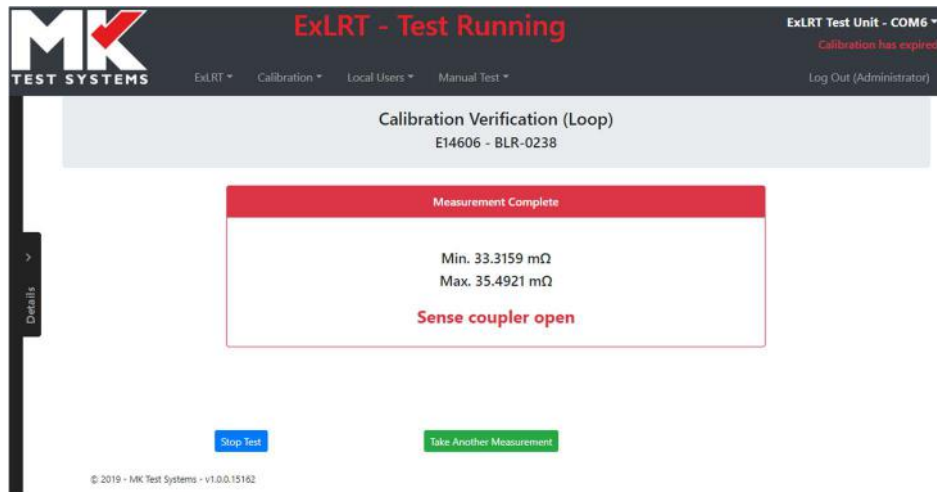
9.4   Verification warning messages

- During a test, if the drive clamp is opened, the following warning message will be displayed:

- If the sense clamp is open, the following warning message will be displayed:

- During a joint measurement, if the probes are lifted off the calibration standard before the measurement has been made, the following warning will be displayed:
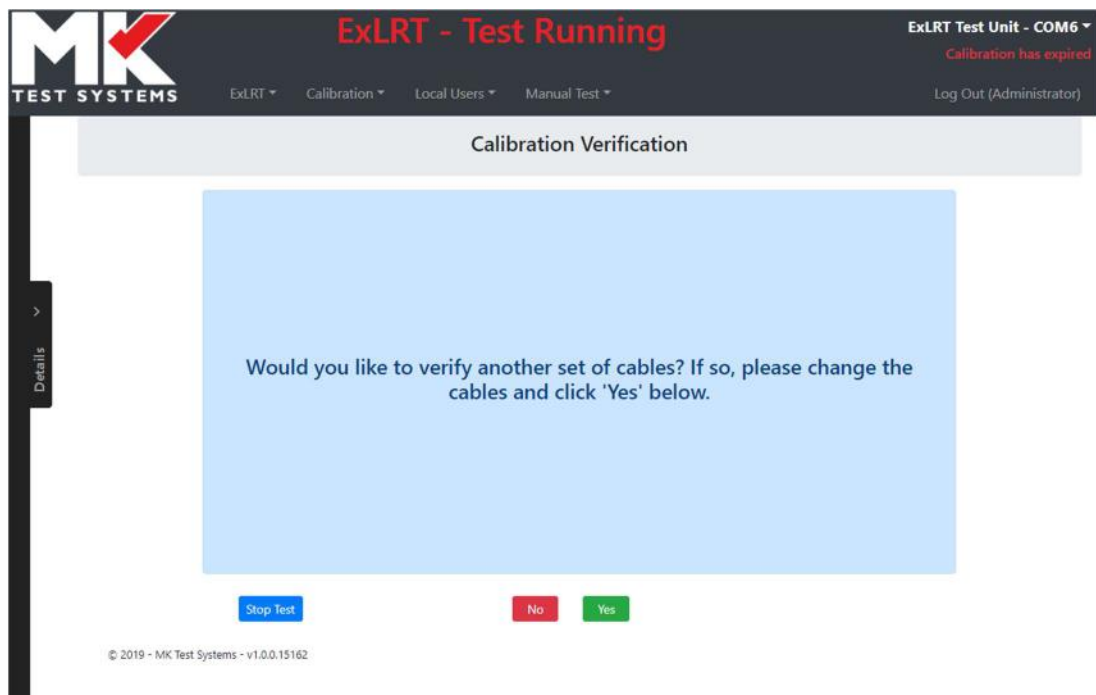
9.5   Running a verification using multiple cables

All cables that are going to be used with the ExLRT must be verified together as part of one calibration verification. The verification program can be repeated automatically for each set of cables.
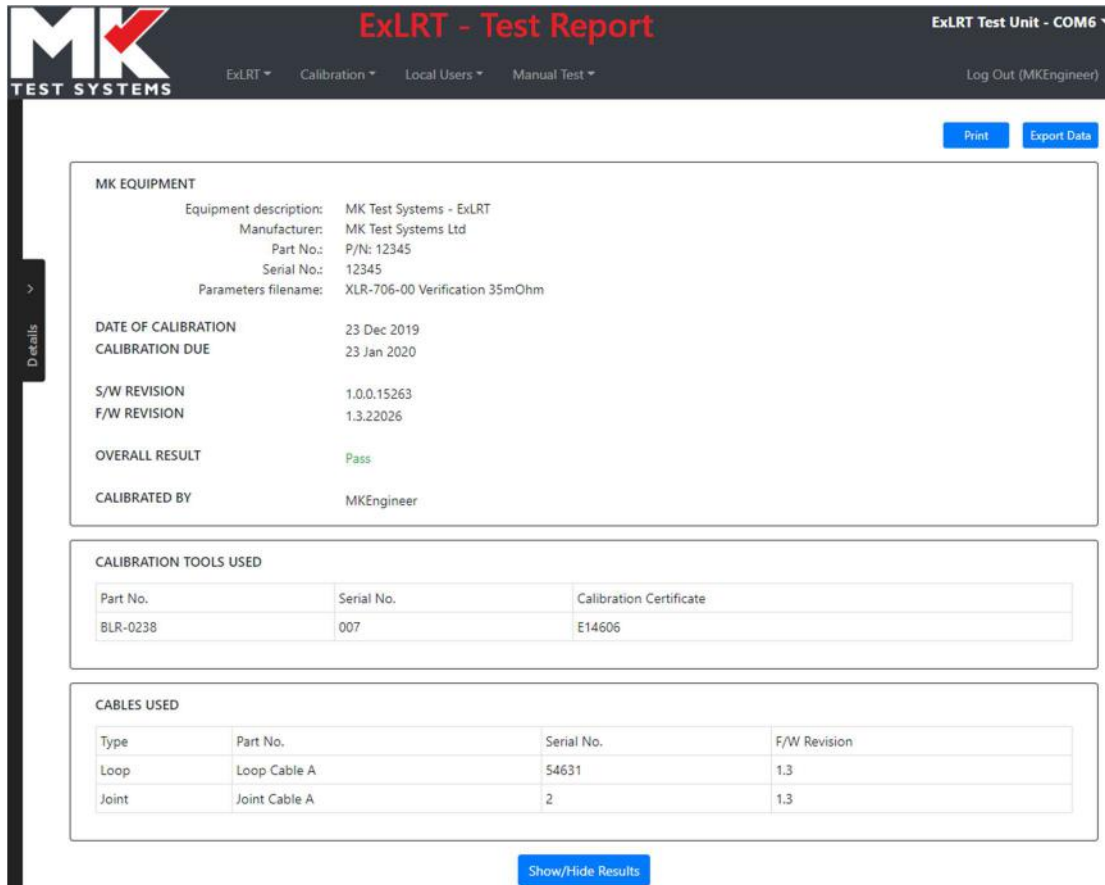
- Once the verification program is complete, the following message is displayed:

- To verify another set of cables, remove the verified cables from the ExLRT, plug in the unverified set and select *Yes*.

- The verification program will then run through all of the verification measurements again from the beginning.

- This process should be repeated for all cables that may be used with the ExLRT.

9.6 Calibration verification certificate

- Once the calibration verification program is complete, the certificate is displayed automatically.

- If all of the measurements are within the allowable limits, the *Overall Result* will show as *Pass*. In this case the *Date of Calibration* will be displayed as well as the *Calibration Due* date.

- If any of the measurements fall outside of these limits then the *Overall Result* will be a *Fail*.

- The certificate includes all the part numbers and serial numbers of the calibration standards and cables that were used during the verification.

- The measurements can be viewed by selecting the *Show/Hide Results* button at the bottom of the certificate.
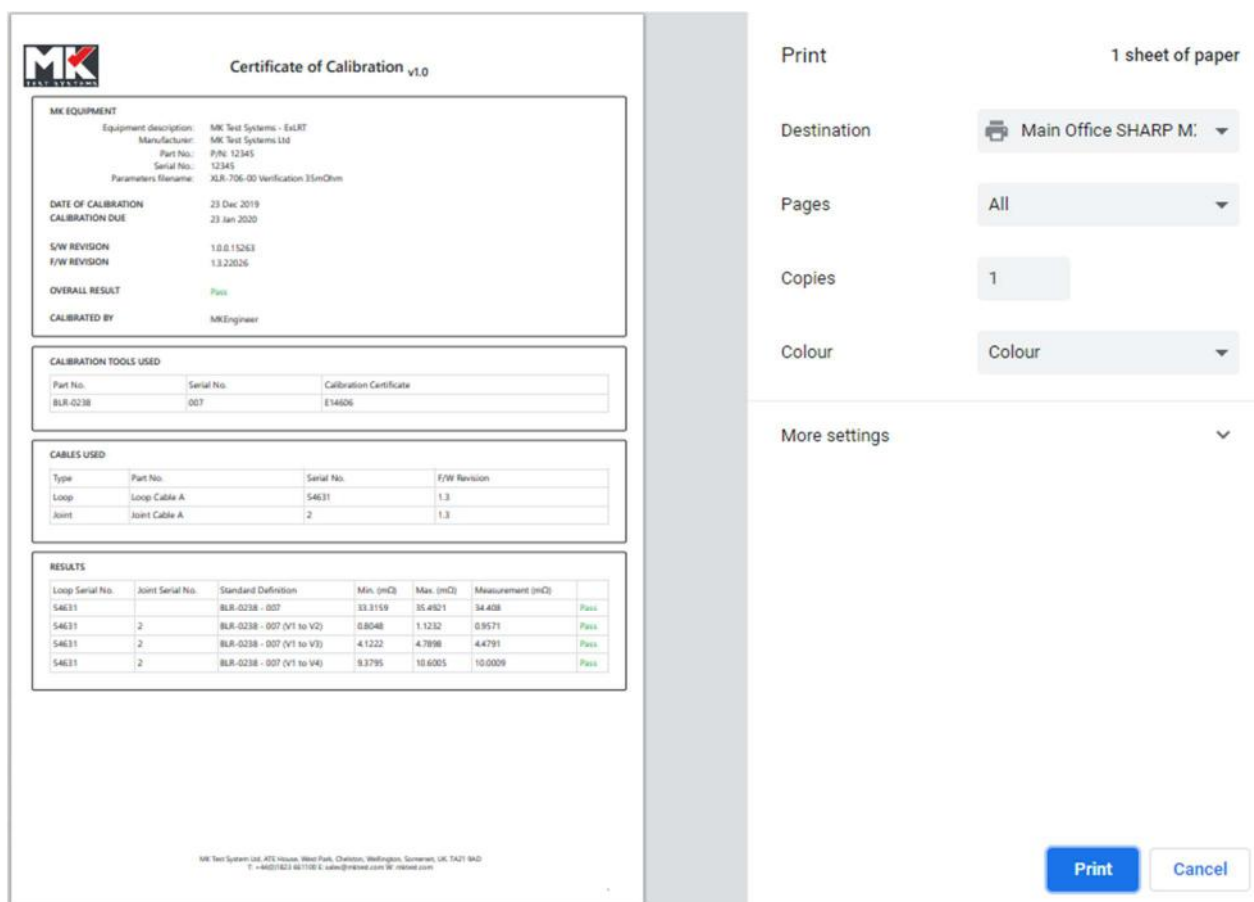

- The *Standard Definition* is made up of the part number and serial number of the calibration standard. For joint measurements, the joint test points are shown in brackets.

- To print the certificate, select the *Print* button and then select the relevant printer from the *Destination* menu and then click *Print*.

- To save the certificate as a PDF, select the *Print* button and then select *Save as PDF* from the Destination menu and then click *Save*. The browser *Save As* window will then open allowing a file name and location to be selected.

- The verification results can also be exported by selecting the *Export Data* button. The export file format is *json* and will be automatically transferred to your browser's downloads folder.

- Following a successful verification, the certificate can be accessed from the *Verification* screen whenever the ExLRT device is connected to a PC by clicking the [View Certificate] button located below the verification data.

- If the calibration verification fails, the certificate is not stored, and the *View Certificate* button will not be visible on the *Verification* screen.
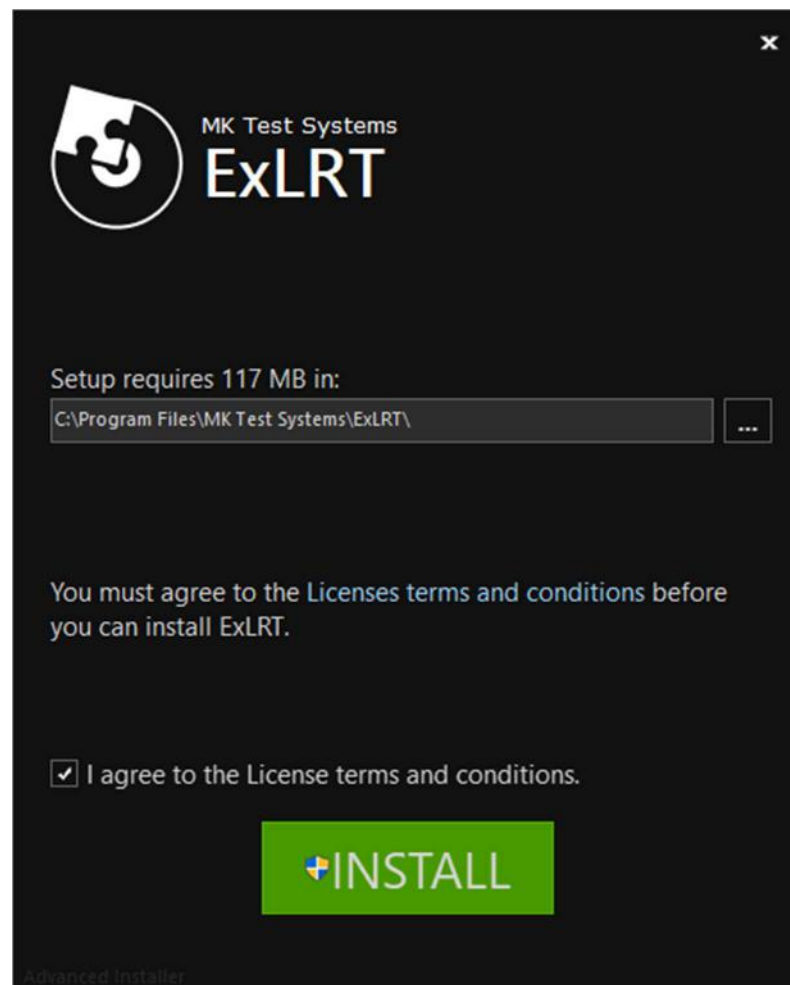
10   APPENDIX

10.1   Installing the ExLRT software on a PC

Example software installer: ExLRTSetup_x.x.x.xxxxx.exe

Note that the software version number is included in the file name

- Copy the ExLRT installer to the PC.

- Double click the ExLRT software installer. The following window will be displayed:


- Note that the installer will automatically check for several prerequisite programs. If these are not present they will be installed first. In this case, it is recommended that the default settings & locations are used, as prompted by the installer.

- The default installation path is shown. This location is recommended but can be amended if necessary.

- License terms and conditions can be accessed by clicking the link.

- Tick the box to agree with the License terms and conditions.

- Click the *INSTALL* button to proceed.

- The Installation will proceed automatically:
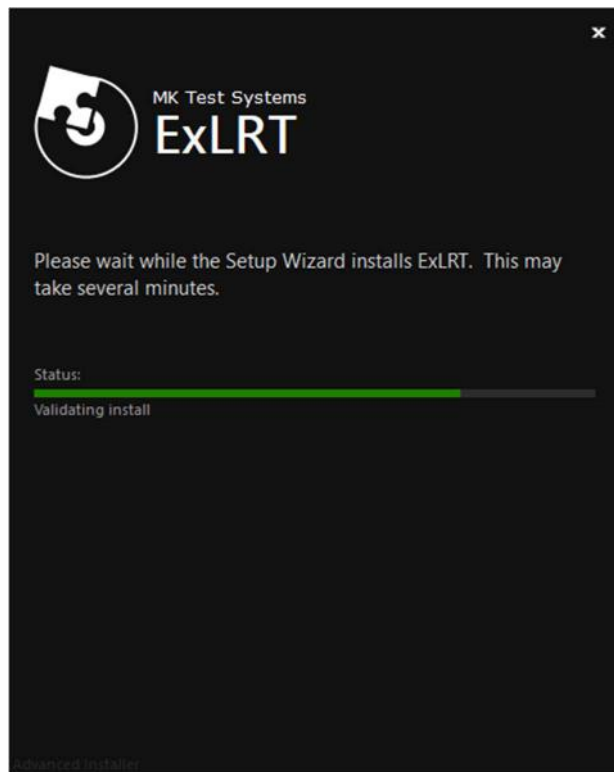
- Once the installation is complete, the following confirmation will be displayed:
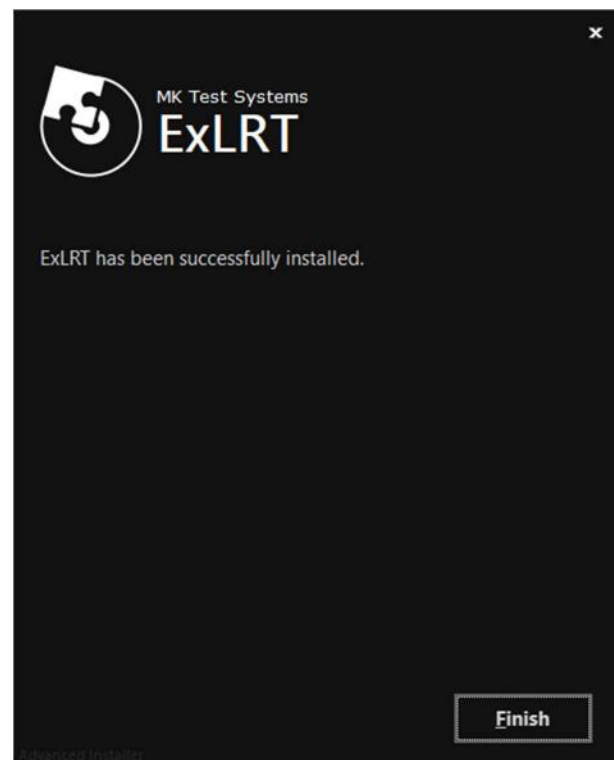
- Click *Finish.*

- A shortcut will now be present on the PC's Desktop.

- Open a web browser. *Google Chrome* is recommended.

- Double click the ExLRT shortcut Icon.

- The ExLRT application will open automatically in a new browser window.