Accord Server

User Guide

Document: **Accord Server V4.10 User Guide.Docx**

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1   Introduction

Accord Server is a configurable service which manages data for Accord HMI Clients and other Accord modules. The service manages all aspects of a Scada data service centrally and may be configured for redundancy configuration with automatic switchover.

The server software sets up and maintains the controller data during downloads and uses this data for all interactions afterwards, which allows systems to be built without tags.

The platform for Operations is given by object linking between PLC Data and the Accord Controls. Engineering functionality is provided in data logging and reporting services, along with a number of diagnostics tools.

Using Accord Server, Engineering personnel can manage consistent projects developed using Accord Designer. It is not possible to add, change or remove individual aspects of the control system through Accord Server.

This document, which is intended for use by engineering personnel, describes how to install configure and manage Accord Server.

Accord Server provides services to modules in the Accord suite, namely Accord HMI and Controls, Accord Reports, Plan/MES and Recipe Manager applications. Accord Server is usually installed on a dedicated PC, which also hosts OPC Server and Microsoft SQL Server.

Accord Server is capable of operating independently of Accord Designer after a project has been imported and downloaded to the PLC however, it is not possible to modify the project configuration through Accord Server; Process Models and HMI configurations can only be changed using Accord Designer with subsequent deployment.

1.1   Accord Platform Overview

Accord is an easy-to-use framework platform for process automation systems, containing modules for Control, HMI, Reporting, Recipe Management and MES Functions.
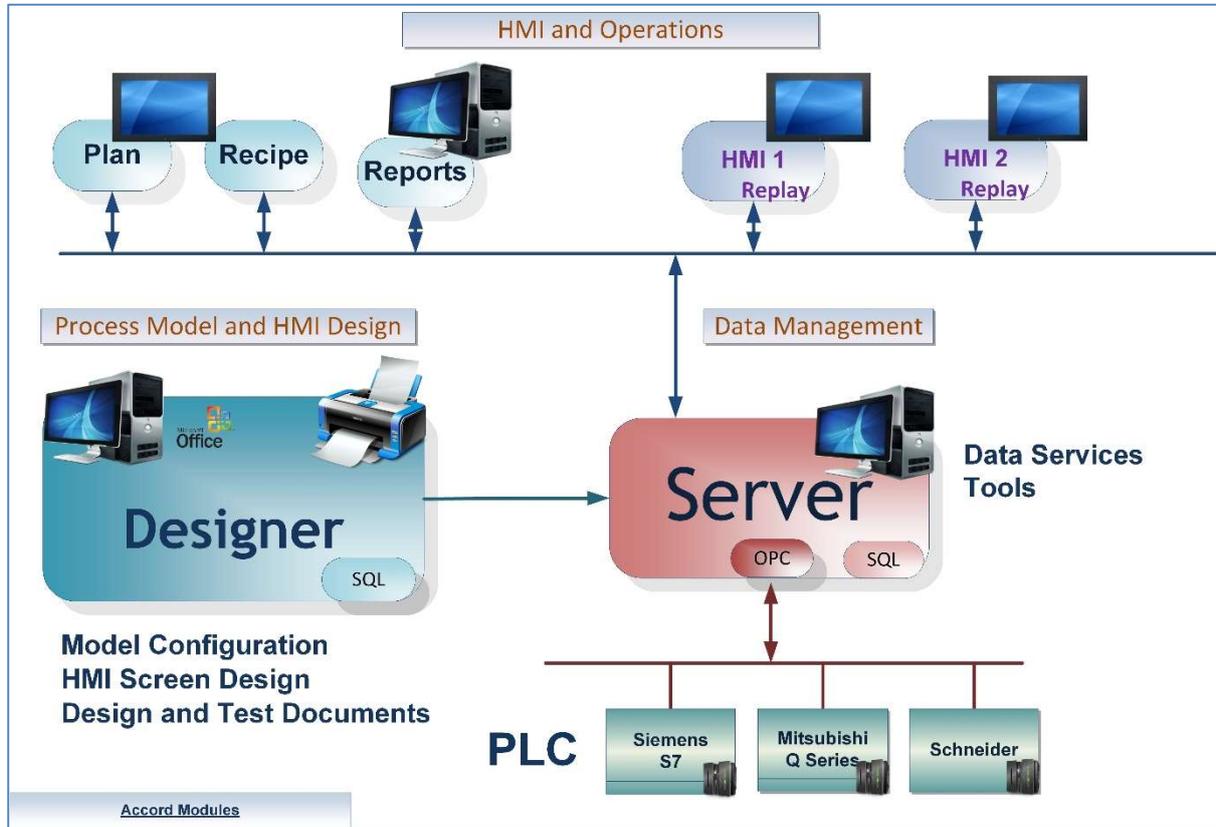
Accord Platform Modules

The Accord Modules may be hosted on single PC or distributed across many PC's.

1.2 List of Accord Platform Modules

Designer	Application for configuring Process Model and HMI screens
PLC Library	PLC Runtime Library to implement control of the process in standard PLC.
Server	For management of PLC communications including download to PLC, Data for HMI's and modules, Logging, Redundancy, Security, Recipes and MES functions. PLC Emulation for multiple instances simultaneously is also provided.
HMI	A runtime application showing the plant and providing device and program control. The screens are set-up and configured in Designer.
Recipe Manager	For generation and management of recipes of Setpoints, Selection Decisions and Step Times.
Plan / MES	This provides scheduling of program starts or other required actions in sequence and at selectable times.
Process Audit	For query of the Server Database to generate time or event based reports of Programs and Devices values and states, with export to various formats.
Security Audit	For query of all interactions with the control system.
Relay	This provides transfer of Data to and from networked PLC's.
Emulation	This module provides PLC Emulation for multiple PLC's
Simulation	This module provides simulation of Inputs to PLC for Emulated PLC's

1.3 General Definitions

Plant	The process plant or machine or system to be modelled and controlled.
Database	The information for configuration and documentation of the control system project is contained in a SQL Server Database.
Controller	A container for the PLC setup information and the process model information. The PLC controls the Plant using Process Model data and PLC Library. The library is downloaded to the PLC using the standard PLC editor.
Process Model	The configuration of data representing the Equipment and the Programs contained in the Controller container.

2   Installation

2.1   Requirements

Accord Server requires a good standard PC, i5 with 8GB Ram, running Windows 10 or 11, preferable a Pro or LTSC version. Installation for a large plant with multiple controllers may may require a high performance PC or workstation, with i5 and 16Gb RAM or better.

2.2   Installation

Server is installed from Accord Setup Installer.

Accord Setup.exe
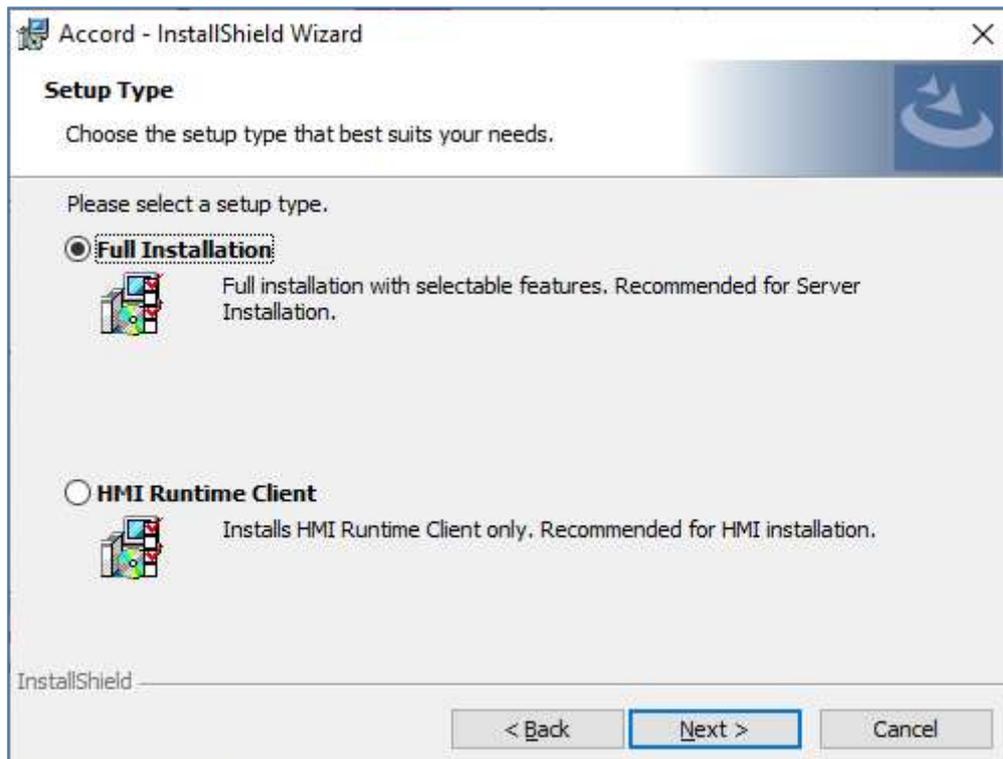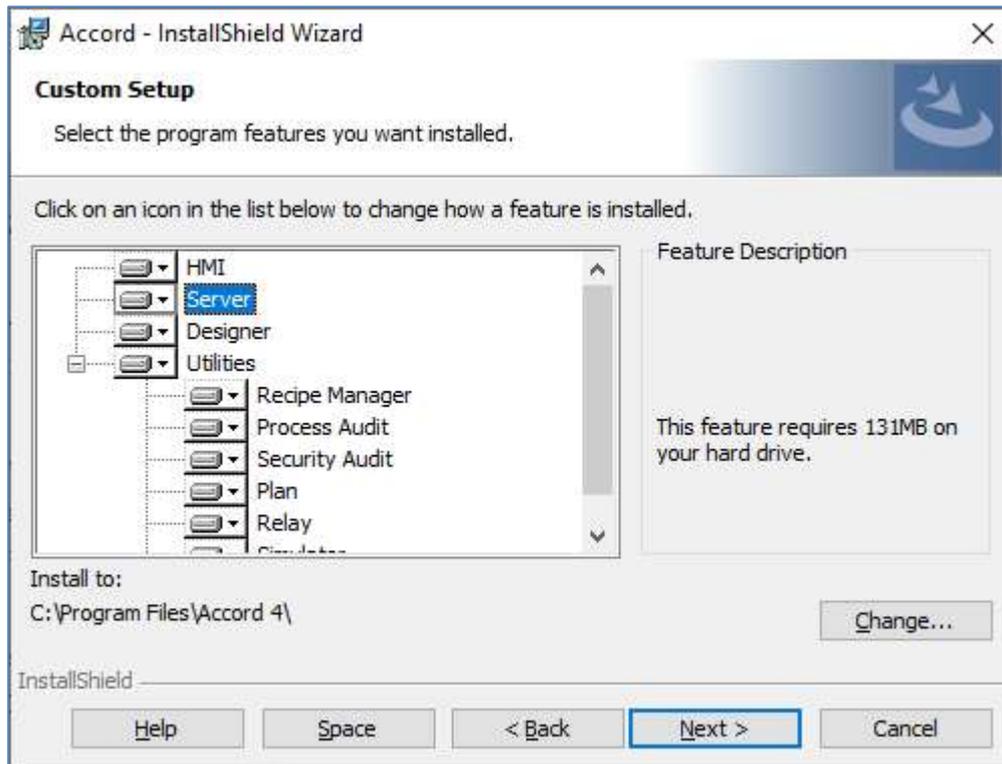
1. Entry of User Name and Organisation
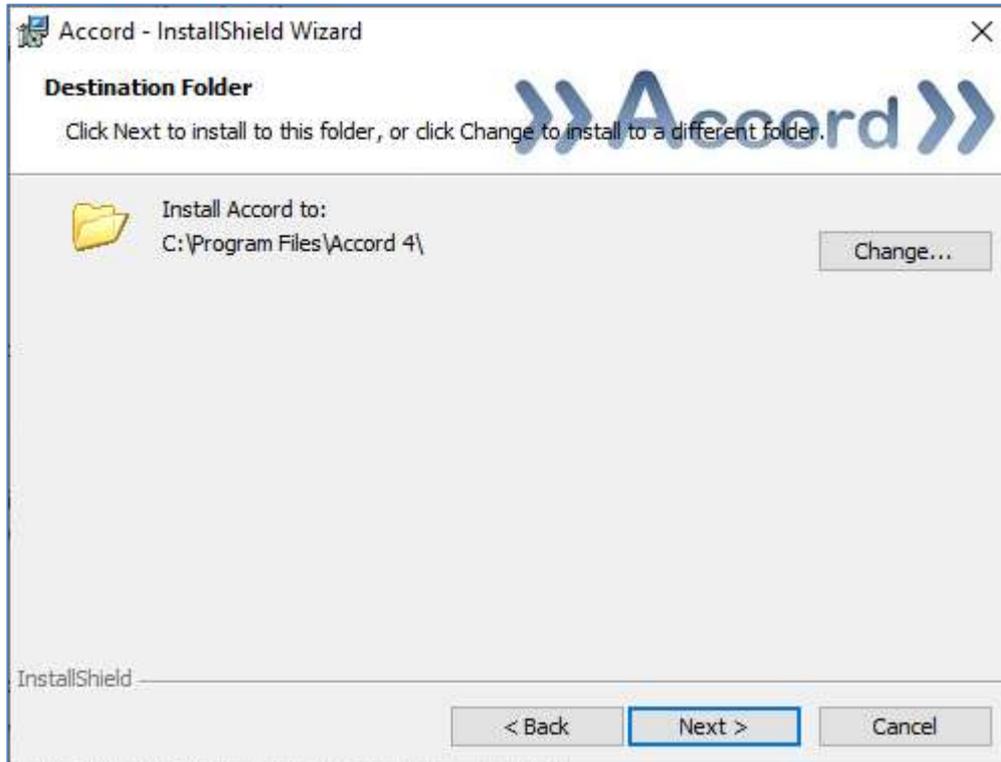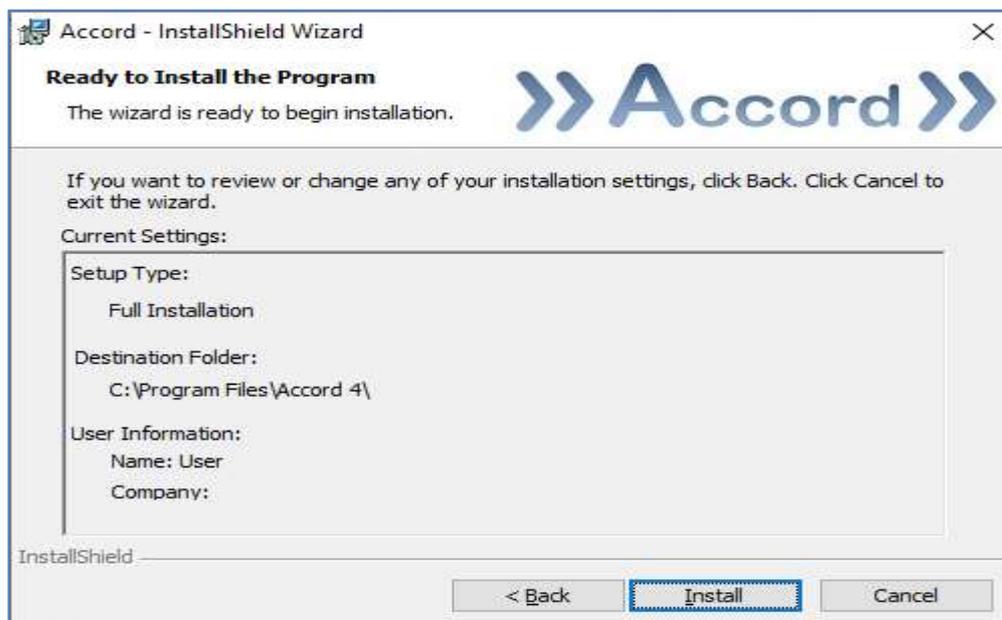
2. Installation Folder selection

3. Installation selection

4. Selection of **Server** and any other required modules. The installation is to a ProgramFiles folder but may be changed.

Note: Modules are selected to be installed by default. Right-click to deselect installation of a module.

5. Installation is completed on pressing Install.

2.3   Initial Configuration

A setup wizard is started when Accord Server is first opened. The Setup Wizard is designed to assist in the configuration of some of the more commonly used components of Accord Server, making it easy to get the system running very quickly. The following sections describe each screen, in order, that are presented at first opening.

This is mostly relevant for confirmation of settings after re-installation or upgrades.

2.3.1   Database Management

Accord Server requires a MS SQL Server database to host configuration and operation data. The Database Management prompt allows selection of MS SQL Server manager. The setup may be continued if a Database Manager is not selected but some features may not be configurable.
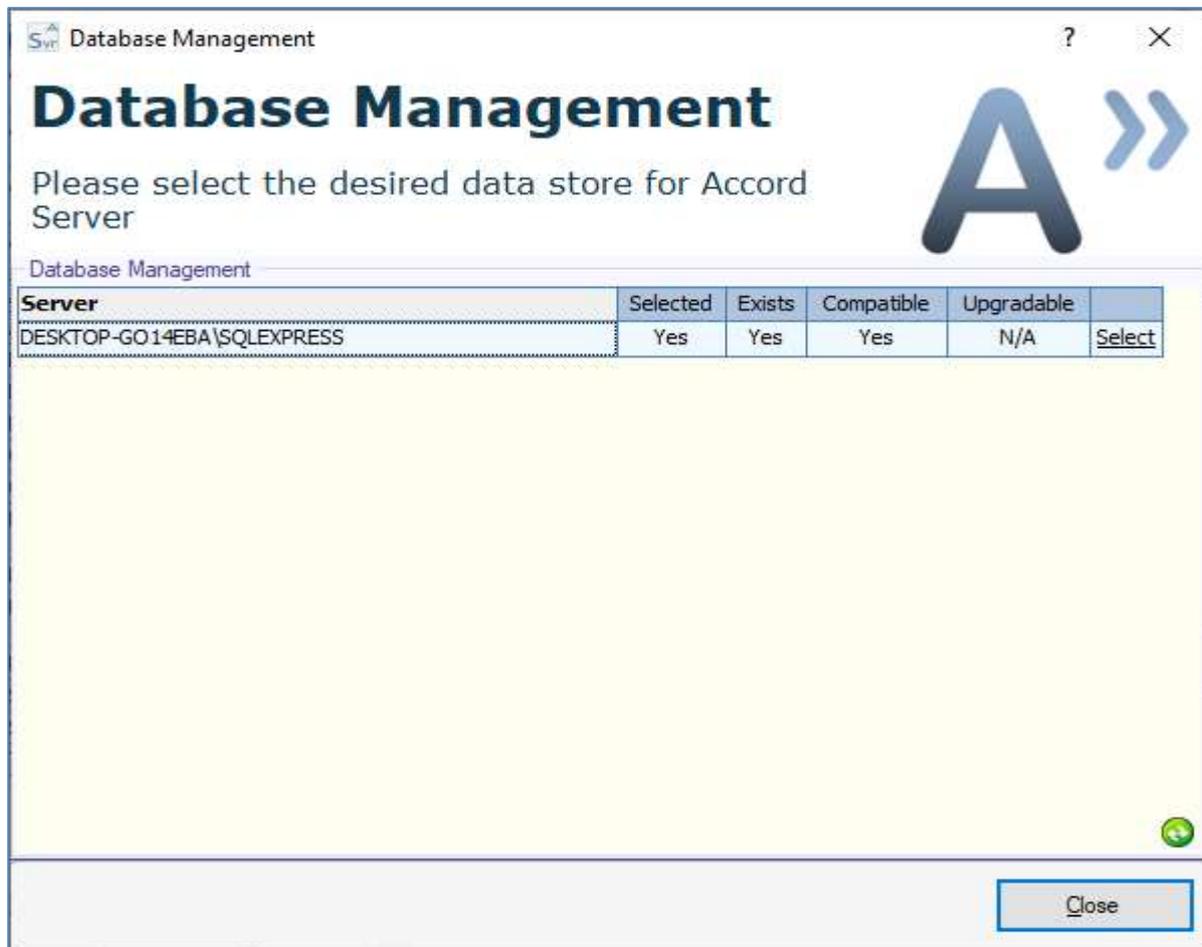
Setup Wizard – Database Management

Click the green '**Refresh**' button to request another scan, and click '**Select**' to accept a database manager.
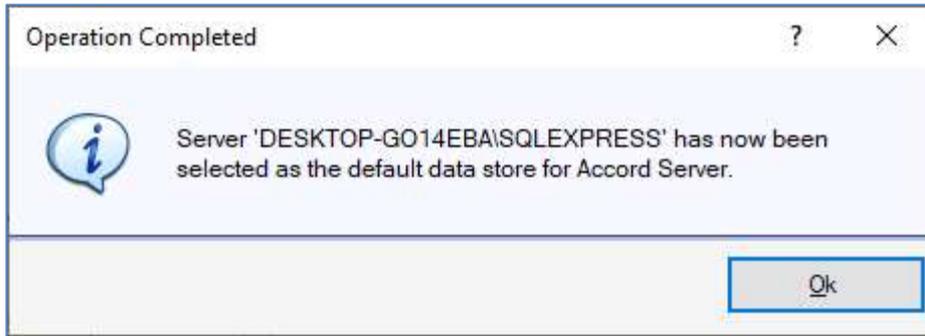
Setup – Database Manager selected

Note: If an existing Accord Server setup is present, Accord Server may require it to be upgraded in case of a later release of Server. Accord will prompt for an upgrade.
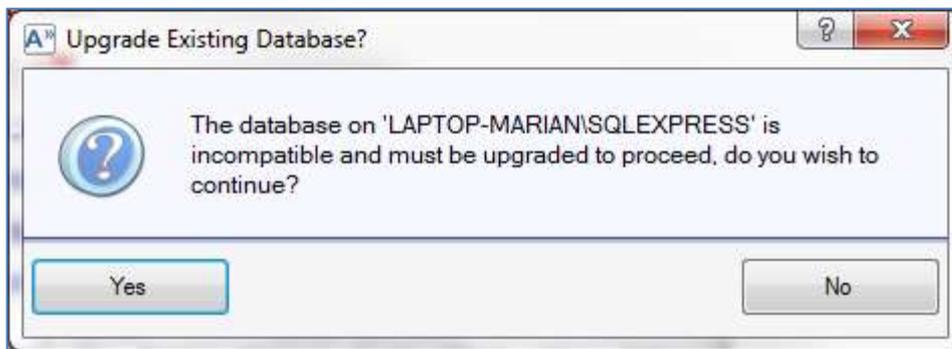
Click **'Yes'** to perform the upgrade

2.3.2   Advanced Communications
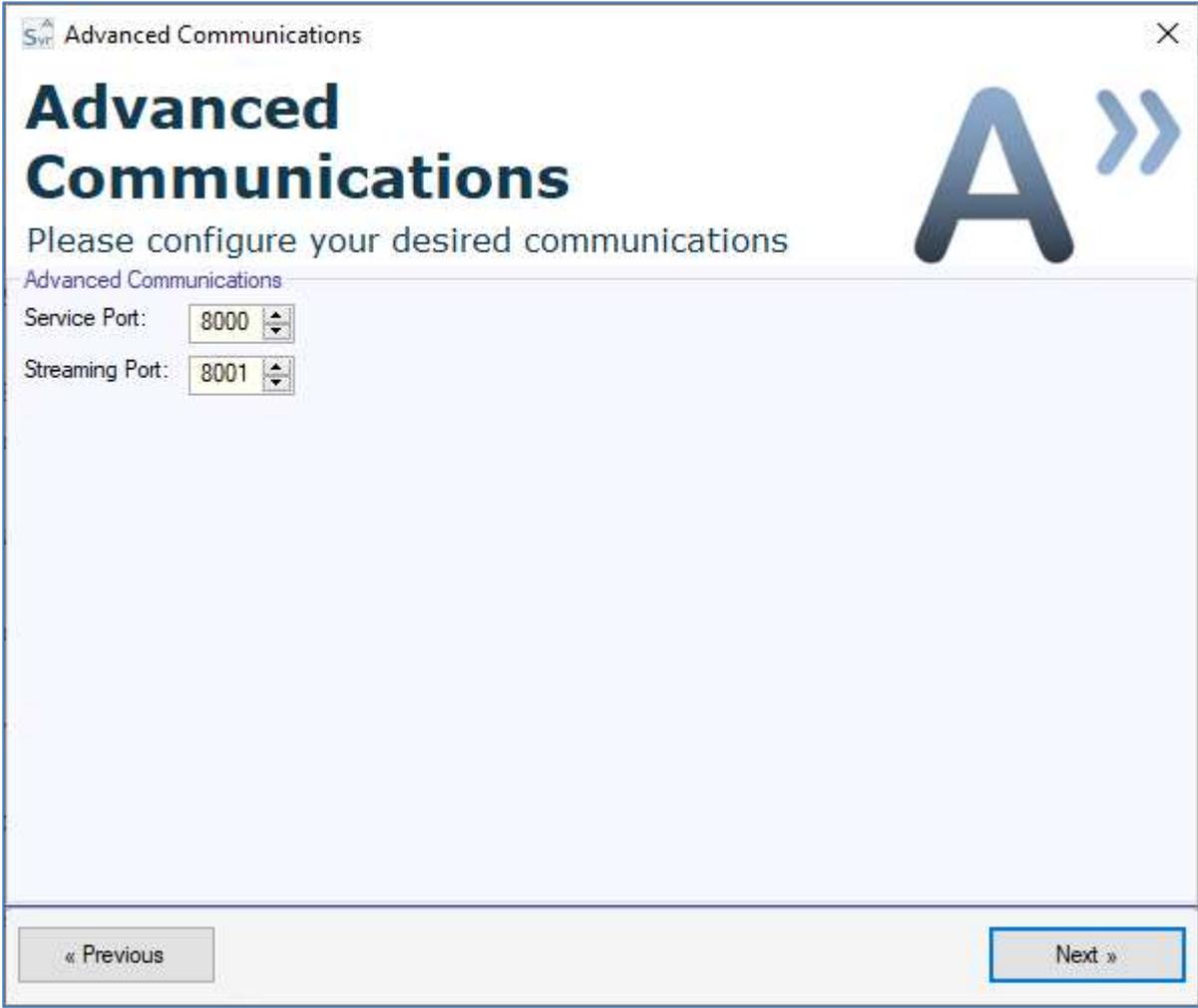
Accord Server provides communication services to a variety of different possible clients. Accord Server will attempt to automatically configure this section to the optimal settings for the target PC, by selecting the fastest of the available active connections.

Note: It is strongly recommended that the selected interface uses a wired and uses a static IPv4 address.

2.3.3 Service Redundancy

Service Redundancy enables an Accord Server installation to act as a backup for another networked Accord Server Service installation.

Select '**Primary Service**' to enable Accord Server as a Primary service. It is not necessary to change the default '**Communications Port**', unless the internal network policy requires otherwise.

Select '**Partner Services**' to configure Accord Server as a Partner service, and select the Primary Accord Server installations by clicking the '**+**' button, highlighted on the right.

A Primary service will be selected and the required Primary service must be running at this time to be discoverable.

On selection as a Partner Service Accord will obtain all the necessary information from the database on the Primary PC. Accord may not have any existing projects in a Primary manner when it is selected as a Partner Service.

2.3.4   User Management

User Management enables the configuration of users that may be assigned to projects deployed using Accord Server. Click the '**+**' button and provide the '**User Name**', and '**Password**', and E-Mail address (for automatic forwarding of reports.) to add a new user, and click '**Ok**' to confirm. Any user created here can be administered later.

Groups and Users

2.3.5   Archiving

Over time, the Accord Server database may grow in size, particularly when historical logging is active. To prevent Accord Server from exceeding the maximum database size permissible by the selected SQL Server, Accord Server will monitor the database and archive data once it reaches a user-defined point, reducing the working database in size significantly.

Data Archiving management

It is also possible to configure Accord Server to automatically delete archives after a specific number of days, which is highly recommended. Lastly, to ensure the archiving procedure does not potentially hamper performance during periods of high activity, Accord Server can be configured to only perform the archiving procedure during a specific time period.

Accord Server sets the limit as '**Max Size(GB)**' to 3 gigabytes and the setting can be changed.

In addition, archive deletion is automatically enabled for every 60 days. The number of days can be modified by adjusting the value for '**Days**', or disabled entirely by un-ticking '**Delete Archives Automatically**'. To specify an optimum window for archiving to occur, tick '**Off Peak Only**' and select the desired '**To**' and '**From**' times.

2.4   Uninstallation

The system can be uninstalled from Add / Remove programs <u>or</u> using the Accord Setup.exe.

Run '**Accord Project Setup.exe**' file and select '**Remove**' on the '**Program Maintenance**' screen.
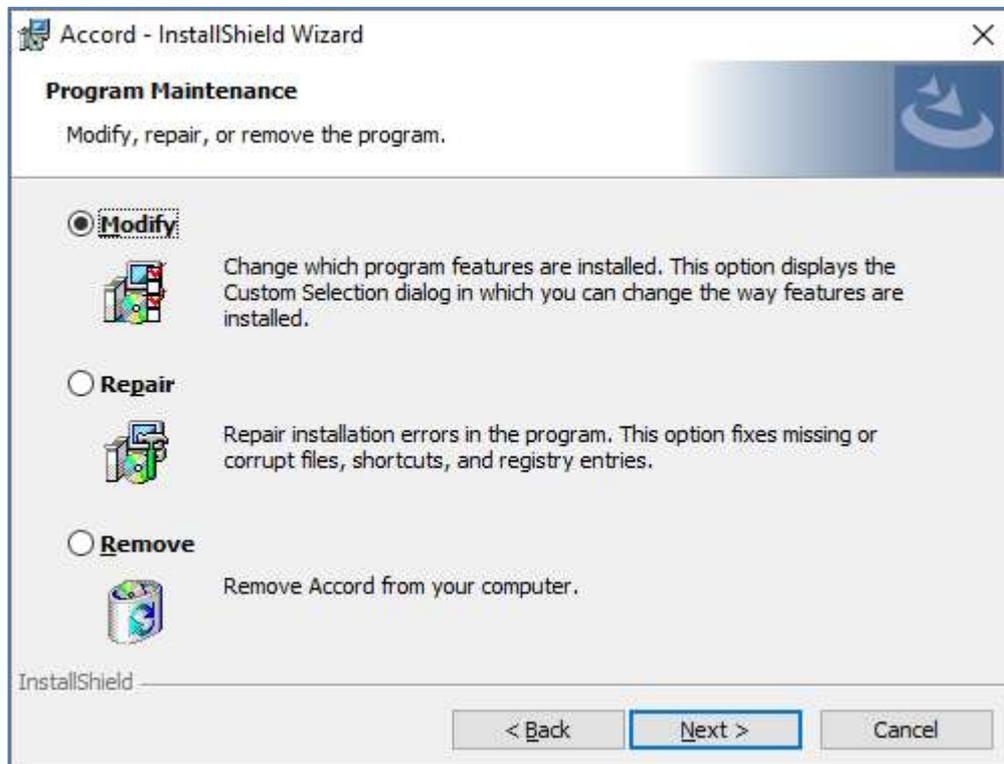
Program Maintenance

1. Click '**Next**'.
2. Click '**Remove**' to confirm removal, otherwise click '**Cancel**'.
3. Upon completion of the uninstallation process, click '**Finish**'.

3 Summary

The Accord Server user interface encapsulates all of the functionality provided by Accord Server and its related modules. The following sections discuss the functionality provided in each section of the Accord Server user interface.

3.1 Service Manager Panel
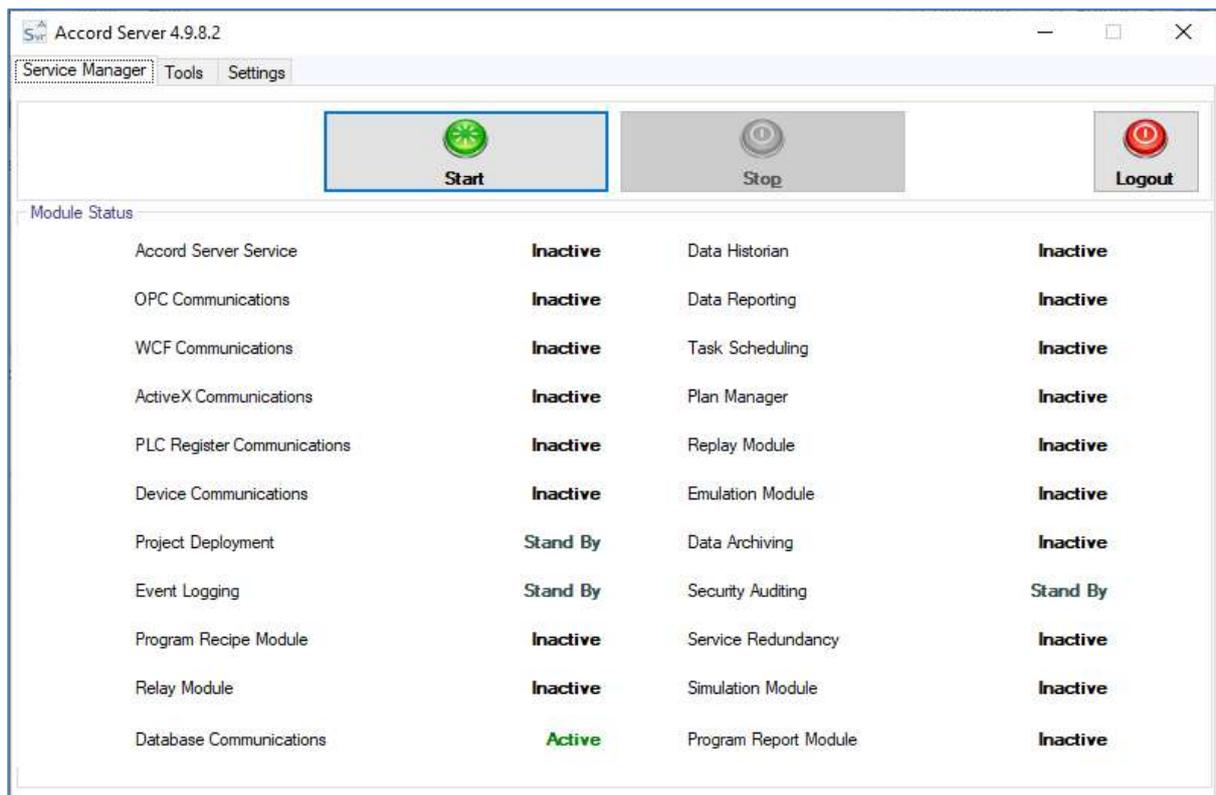
The Accord Server Service Manager

3.1.1 Service Control

The Start/Restart and Stop buttons allow toggling of the state of the Accord Server Service. Both buttons may be temporarily disabled during Starting.

3.1.2 Restarts
The service must be restarted after changes to the following:

o Device Logging – any device being newly logged or not logged or change to a deadband
o Archiving – any change to Archiving thresholds or enablers.
o Communications Settings – changes to Port Numbers, for Advanced, Redundancy or ActiveX
o External Tags – any changes to External PLC Tags in the system

3.1.3   Module Status

The Module Status section displays the current status of all Accord Server modules. These modules perform specific roles in Accord Server. Some modules, such as the Data Historian are optional and other modules, such as Database Communications, are required. There are a number of possible status messages that a module can display on this screen. These are as follows:

Status	Description
Active	The module is currently running normally.
Inactive	The module is currently not running.
Activating	The module is attempting to start.
Deactivating	The module is attempting to stop.
Waiting	The module is waiting for an event, such as another module starting.
Busy	The module is currently processing a complex task.
Stand By	The module is Active but not processing any task and has entered a state of hibernation to reduces the resources the module needs but it can quickly respond when needed.
Not Required	The module is not needed and is deactivated automatically. This may happen if a projects configuration removes the need for the module to run. For example, the Data Historian will not activate if there are no valid devices enabled for logging.
Notice	The module has an important piece of information to convey. Notice takes priority over any preceding status message and must be acknowledged before the status of the module can change.
Warning	The module has encountered a minor problem, typically an invalid request. Warnings take priority over any preceding status message and must be acknowledged before the status of the module can change.
Error	The module has encountered a problem that has prevented it from performing an important task. Errors take priority over any preceding status message and must be acknowledged before the status of the module can change
Critical	The module has encountered a serious problem that likely prevents it from performing any tasks. Critical Errors take priority over any preceding status message and must be acknowledged before the status of the module can change

The following is a list of functions in Accord Server

Name	Description
Accord Server Service	Provides the status of the service as a whole but is not a module in itself.
OPC Communications	This module provides a mapping between Accord Server's other modules and the PLC items.
Data Archiving	This module automatically archives the current database when its size reaches a user defined threshold.
Data Historian	This module performs data logging on selected devices.
Data Reporting	This module automatically generates data reports based on user-defined events in the PLC or on a schedule.
Task Scheduling	This module automatically performs updates to the PLC based on a user-defined schedule.
Advanced Communications	Shows the Status of communication for other modules such as HMI.
ActiveX Communications	Shows the Status of communication for Accord ActiveX Controls.
PLC Register Communications	This module allows users to view information for aspects of devices.
Device Communications	This module acts between the Advanced Communications module and the OPC Communications module.
Service Redundancy	This module enables the Accord Server service to act as a Primary and/or Partner service, enabling redundancy between Accord Servers.
Project Deployment	This module directly manages the process of Project Download & Synchronisation.
Event Logging	This module automatically logs module related messages.
Security Auditing	This module automatically logs user actions.
Database Communications	This module provides access to the Accord Server database.
Program Options	This module controls Program Recipe configuration and loading to PLC
Relay	This module controls transfer of Data between PLC's.
WCF Communications	This module acts between the Accord Controls and the OPC Communications module.
Plan Manager	This module controls sequencing in User defined Plans
Replay	This module provides playback of historical information in the HMI
Emulation	This module provides PLC Emulation for multiple PLC's
Simulation	This module provides simulation of Inputs to PLC for Emulated PLC's
Program Reports	This module provides the configuration and population of User defined program reports.

Hover the mouse over the status for tooltip, or click on the module name to view the status of a module.
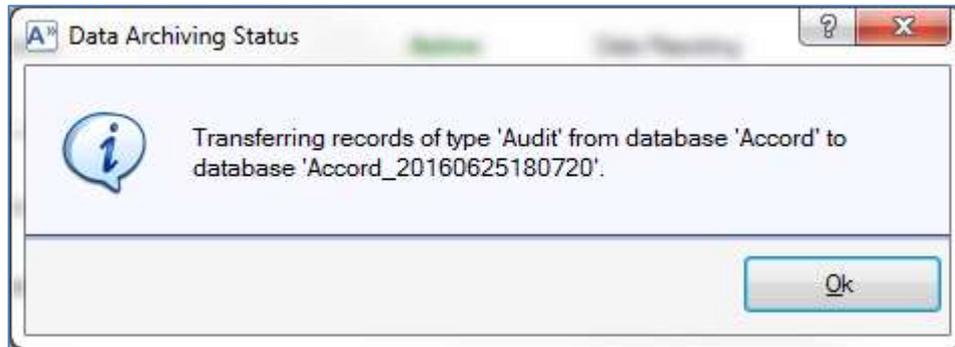
Viewing the Status of a Module

3.1.3.1 Acknowledging an Event Status

Notice, Warning, Error and Critical take priority over any other status that precedes it. This means that if the status of the module changes from Critical to Inactive the Module Status screen will continue to display Critical until a user acknowledges that they have seen the message. There are two methods of acknowledging a modules status.

1. Click on the status of the module. After clicking '**Ok**' on the status dialog the module will change status to its current status.
2. Stop/Start or ReStart the Service.

3.2 Tools Panel
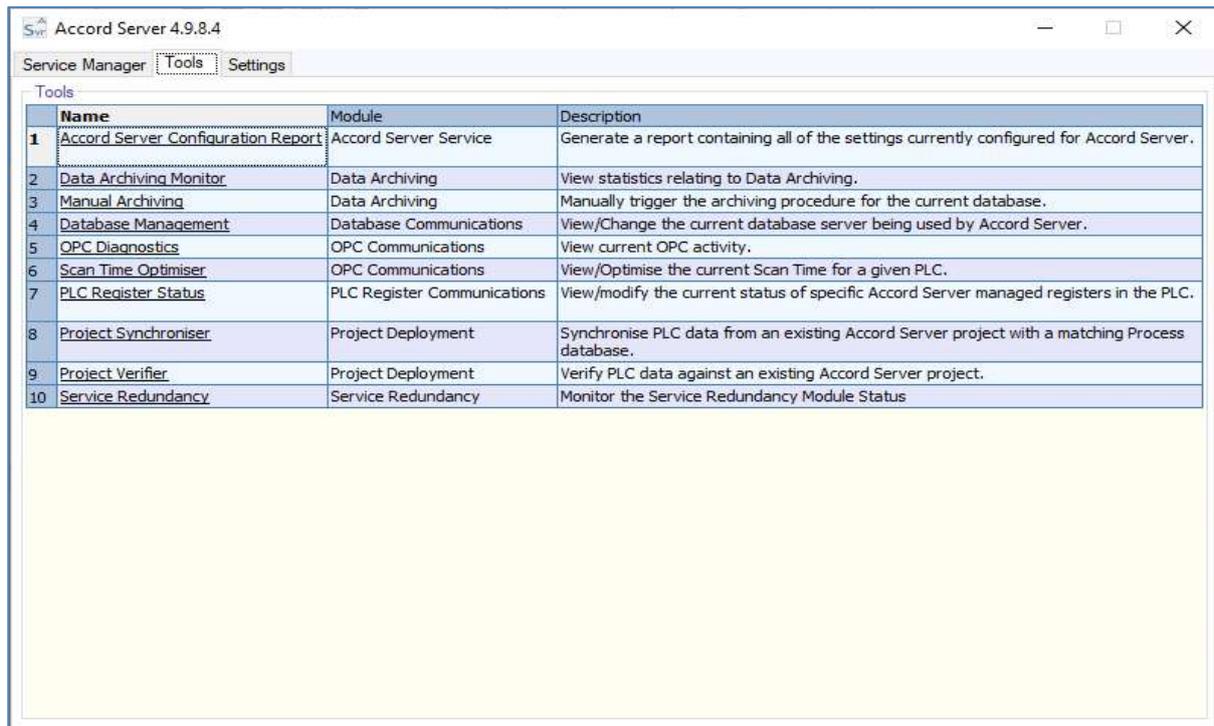
Accord Server Tools

Accord Server contains tools for maintenance of the system, along with the diagnoses of potential issues, such as issues relating to communications and performance.

Name	Description
Accord Server Configuration Report	Generation of a Word Document (docx) containing the current configuration of Accord Server. Microsoft Word does not need to be installed to use this feature.
Data Archiving Monitor	Shows statistics relating to the Data Archiving module, such as current database size and date last archived.
Manual Archiving	Allows for manual archive of data currently stored in the Accord Server database.
Database Management	Allows change of the SQL Server used by Accord Server. It is not possible to change SQL Server while the service is active
OPC Diagnostics	Displays detailed information relating to the current status of the OPC Communications module, such as current OPC data for an active device and the quality of the read.
Scan Time Optimiser	Allows users to monitor and optimise the scan time for any PLC configured for a given OPC Profile, by configuring the number of items that are processed per scan.

PLC Register Status	This tool displays detailed information relating to the current status of any property available to the OPC Communications module, such as current OPC data for the property and the quality of the read.
Project Synchroniser	This tool allows users to synchronise an existing Accord Server project with a project generated using Accord Builder, matching the project with the configuration of various equipment and parameter values currently stored on the PLC. Once synchronised, any differences between the project on the PLC and the configuration will be matched in the configuration.
Project Verifier	This tool allows users to check the configuration of the PLC against the Model. Any differences are listed at the top of the section and may be resolved using Download.
Service Redundancy	Shows Status of Redundancy and Consolidation.

3.3   Settings Panel
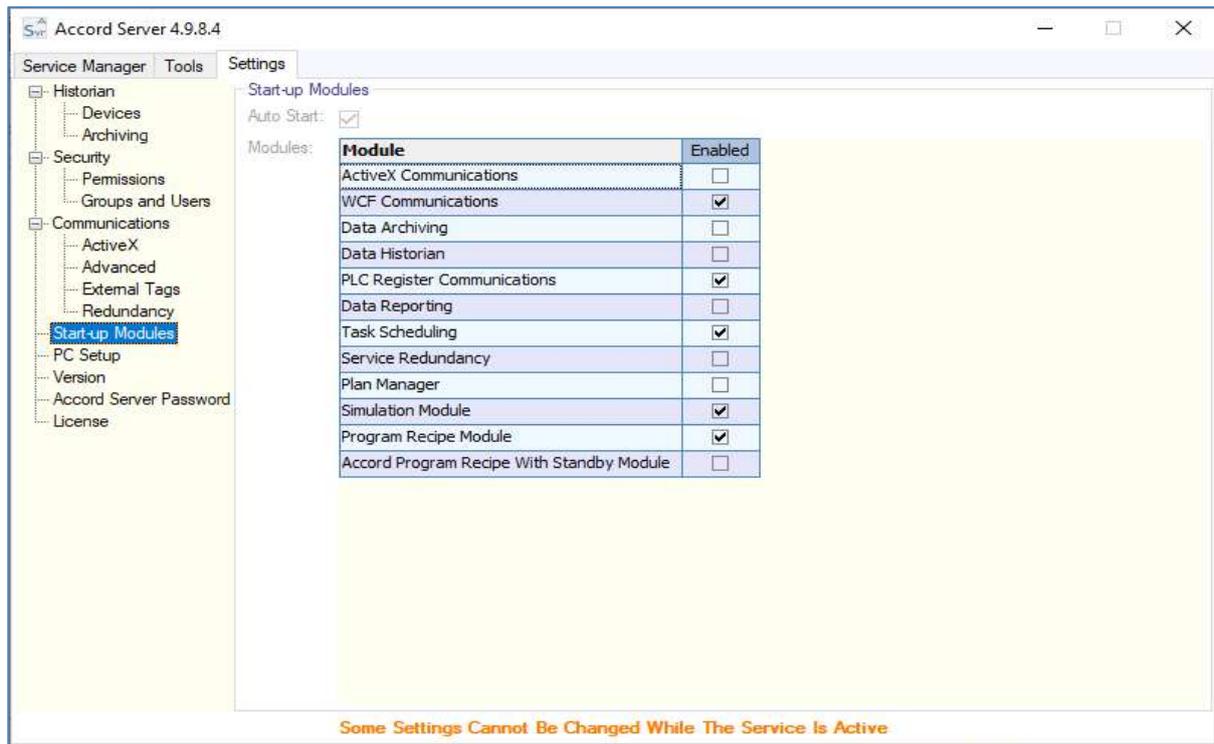
Accord Server Settings

Accord Server contains various settings for configuration of the service.

Historian	Accord provides logging for all devices in all projects. Configuration of Logging is carried out here.
Security	The User Groups and Users for the Plant, with associated emails and passwords, and Permissions for each User Group, is set up here.
Communications	This provides access to network and setup settings for ActiveX and HMI communications, External Tags and Server Redundancy.
Start-up Modules	Accord Server and modules of Accord can be configured to Start automatically on PC Start, or Reboot here.
PC Setup	This contains summary information for the hosting PC and a memory threshold can be set here.
Version	This shows the Accord Version and provides a summary of all assembles for Accord Server with their version numbers.
Server Password	Access to Accord Server Settings, Tools and Engineering is protected by a password. The default password is 'default'. This may be changed at any time. Care should be taken to record the new password safely.
Licence	The License section provides a summary of the current license applied to modules of Accord Server. The modules for Accord are licenced here, in a common quick licence section.

3.4 Understanding the Service

Accord Server does not run as a Windows Service, instead Accord Server runs as a standard windows based application, configured and managed using the Accord Server user interface. This has the added advantage of allowing the Accord Server user interface to provide the user with real time status and diagnostic information relating to its current activity. Once installed, Accord Server will automatically run silently upon windows start-up and automatically activate all configured Service modules. For simplicity, these Service modules are referred to as the Accord Server Service, since they provide service functionality.

3.5 Determining Service State

The Accord Server Service tab displays information relating to the current state of each of the Accord Server modules. Additionally this tab also displays the status of the service itself in two different ways.

The first method Accord Server uses to display the status of the service is in the current state of the '**Service Control**' buttons. The following is a list of their possible states and their related meaning:

Start	Stop	Description
Enabled	Disabled	The service is currently not running and can be activated by clicking '**Start**'.
Disabled	Enabled	The service is currently running and can be deactivated by clicking '**Stop**'.
Disabled	Disabled	The service is currently running however, it is in a busy state and cannot be deactivated at this time. Typically this state occurs during activation or deactivation of the service.

The second method Accord Server uses to display the status is in the status of the '**Accord Server Service**' status indicator under '**Module Status**'. The Accord Server Service status indicator represents the state of the Accord Server Service itself, rather than the state of a particular module therefore, if this indicator shows an Active status, the service is considered active, even if the other modules are in different states. This is particularly useful since Accord Server modules may encounter errors during start-up and it may not be obvious at a glance if the modules are currently active or inactive since their Notice, Warning, Error or Critical states take priority over any other status.

3.6 Starting the Service

Click '**Start**' or **'Restart'** on the front panel to Start the Service.
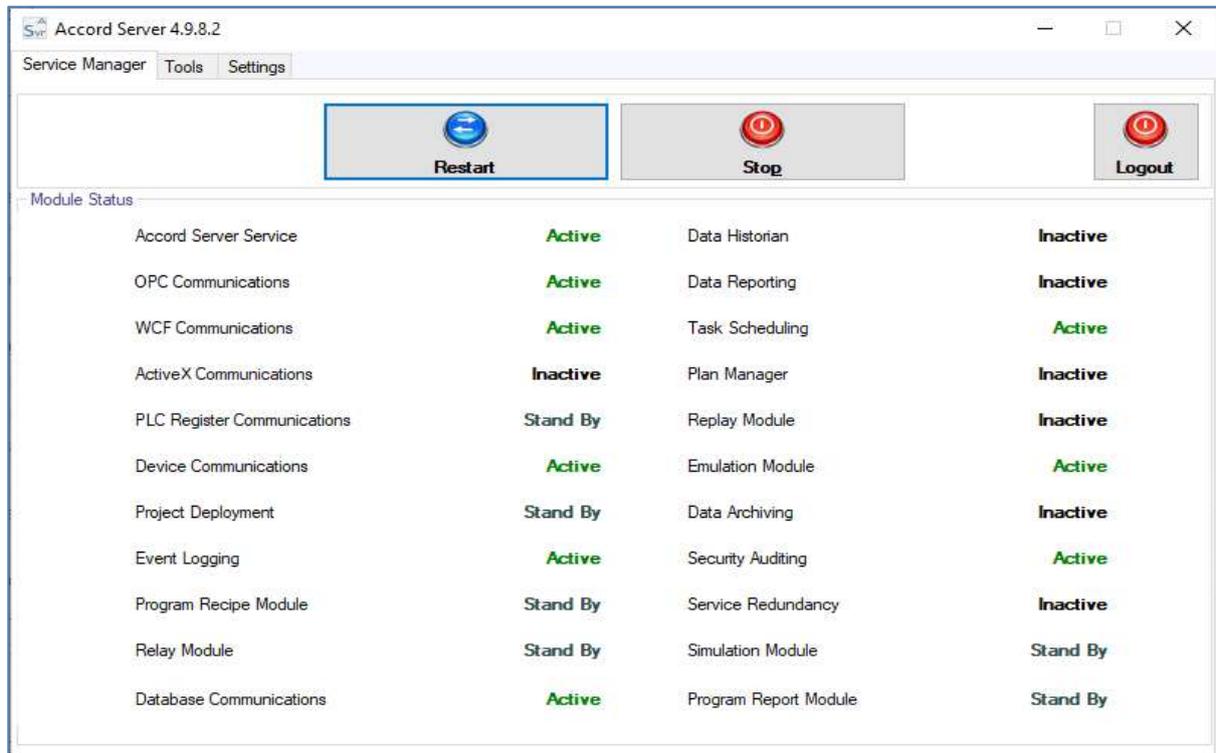
Accord Server while Active

When successfully activated, Accord Server will display Active or Standby for each module that has been activated. The module will display a status of Not Required or Inactive if it is not needed.

3.7 Stopping the Service

Click '**Stop**' on the front panel to stop the service. This stops all services.

If the '**Stop**' button is not enabled, Accord Server is currently processing a request and cannot be stopped at this time. Accord Server will only enable the '**Stop**' button if it is safe to perform a stop or clean shutdown of the service.

3.7.1   Shutting Down Windows

Accord Server can automatically detect a Windows Shutdown in progress and will attempt to perform a clean shutdown of the Accord Server service when this occurs. Under normal circumstances, Accord Server will deactivate quickly, without adding a delay to the Windows Shutdown procedure. A forced shutdown of Accord Server may leave it in an inconsistent state and should be avoided.

3.8   Exporting Data from Accord Server

Each grid based list displayed on Accord Server possess the option to export. This export option supports a variety of different file types. To perform an export:

Right-click on the desired grid, and click '**Export As**' , then select the export location for the file and select the export type from the '**Save as type**' list.

Alternatively, when using the Diagnostics Manager:

When the desired tool is selected, click '**Export**' in the top toolbar, then select the export location for the file and select the export type from the '**Save as type**' list.

4   Utilities

Accord Server contains tools and diagnostic utilities for system maintenance.

4.1   Accord Server Configuration Report

The Accord Server Configuration Report allows users to export a Document (docx) containing the current configuration of Accord Server as a snapshot. Microsoft Word does not need to be installed to use this feature. The document may be useful as after commissioning snapshot.

The following information is stored in the document:

Item	Description
Modules	The list of modules currently available in Accord Server along with an indicator stating if the module has been selected for use.
System Configuration	Various settings and useful pieces of information relating to the computer Accord Server is currently installed on. The following is the list of items displayed here: • Archiving Limit • Computer Name • SQL DB Version • SQL Server • Domain • Install Date • Install Location • Logging • Operating System • Performance • Accord Builder Version • Processor Count • Memory • SMTP Server • Windows User
OPC Configuration	Contains a listing of all OPC Profiles along with all settings relating to an OPC Profile, such as update rates, OPC Server and Channel/Device setups.
Project Configuration	Contains a listing of all Projects including detailed list of all entities in each project (Alarms, Programs, Devices, etc.), deadband & logging setup, security settings and project related schedule information.

Select '**Accord Server Configuration**' in the '**Tools**' tab to generate a Configuration Report.

4.2 Data Archiving Monitor

The Data Archiving Monitor allows users to view statics relating to the Data Archiving module. These statistics are only available while the Data Archiving module is running. The Data Archiving Monitor tool automatically updates without the need to manually refresh.
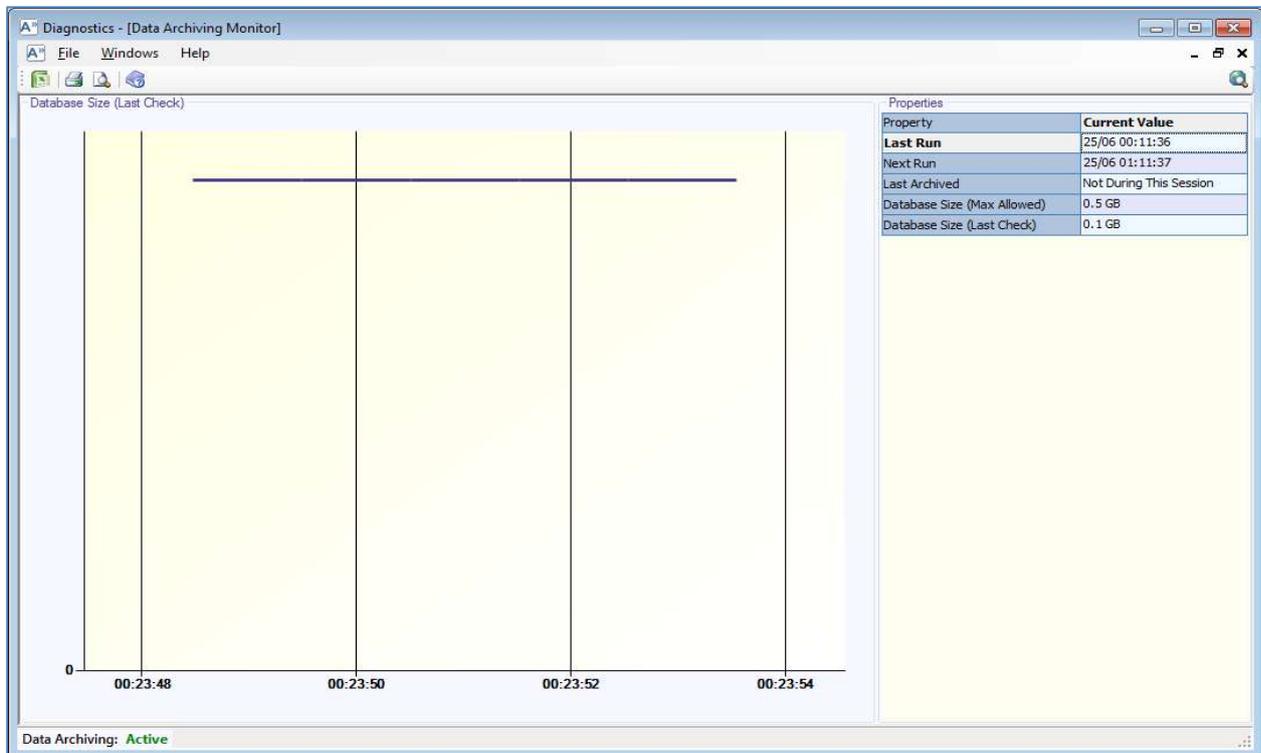
The Data Archiving Monitor

The statistics displayed by this tool are as follows:

Statistic	Description
Last Run	The date and time when the module last checked to determine the size of the current database.
Next Run	The date and time when the module next plans to check the size of the current database.
Last Archived	The date and time (if any) when the module last performed an archiving procedure during the current session.
Database Size (Max Allowed)	The maximum allowable database size (GB) as configured by the user for the current session.

Click '**Data Archiving Monitor**' in the '**Tools**' tab to access the feature.

4.3 Manual Archiving

Under normal circumstances, Accord Server will only archive the current database when it reaches the threshold as defined by the user. This approach helps ensure Accord Server historical queries perform optimally. The disadvantage of this approach is that on a particularly busy system, Accord Server may be forced to initiate the archiving at an undesirable time. To overcome this potential issue Accord Server allows users to manually trigger the archiving procedure.

Click '**Manual Archiving**' in the '**Tools**' tab to access the feature.

Note 1: While archiving is in progress, the Data Archiving module will display a status of Busy. As a result, it will not be possible to Stop or Start the service during the archiving procedure.

Note 2: Archiving can be performed while the Service is active or inactive.

4.4   Database Management

The Database Management tool allows users to manually change the SQL Server Accord Server is currently using. Once a new server has been selected, Accord Server will attempt to establish a connection. If a connection can be successfully established, Accord Server will then check if there is an existing Accord Server database on the SQL Server , a new database will be created. If however, the existing Accord Server database is incompatible with the current version of the product, Accord Server will offer to upgrade the database to the current version. If for any reason, the database cannot be upgraded, Accord Server will request permission to delete the database instead, and create a new, blank database, in its place. Upon successful completion of this check, Accord Server will disconnect from its current database and use the database on the new SQL Server. It is not possible to change SQL Server while the service is active.
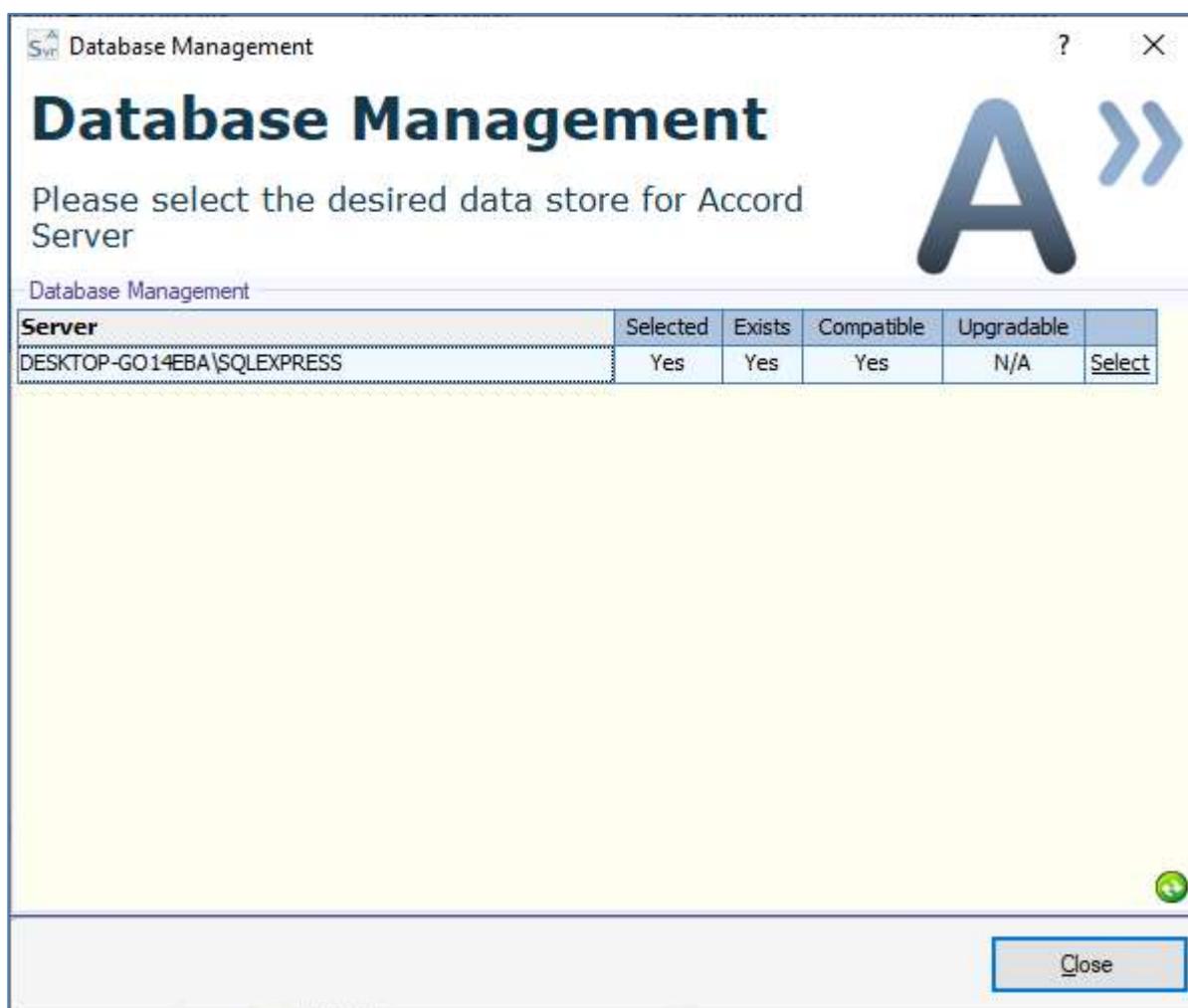
SQL Server Selection

Click '**Database Management**' in the '**Tools**' tab to access the feature.

4.4.1   Selecting a SQL Server

Open the '**Database Management**' panel and select the desired server from the '**Servers**' list to select a new SQL Server.

SQL Server should be local PC if possible.

If the desired SQL Server is not listed, click the green 'Refresh' button at the bottom right of the SQL Server listing, as soon as it becomes available.

If an existing Accord Server database is present, Accord Server will attempt to upgrade it automatically however, if the database is not upgradable or compatible with the installed version of Accord Server, the existing database will be deleted with a loss of all data contained. Accord Server will prompt for confirmation prior to performing either an upgrade or a deletion.

4.5 Project Synchroniser

The Project Synchroniser allows users to synchronise an existing Accord Server project with the last Accord Designer project that was used to download the project. This is useful in order to capture all current changeable settings before performing modifications to the project in Accord Builder, or perhaps before performing a subsequent download through Accord Server. Once synchronised, any differences between the three possible sources of download information will be consolidated based on the user's selections. The following is a list of synchronisable properties for each device group:

Group	Properties
Analog Device	o Min Range o Max Range
Analog Input	o Min Range o Max Range o Alarm High High Setpoint o Alarm High Setpoint o Alarm Low Setpoint o Alarm Low Low Setpoint o Time Setpoint o Hysteresis Setpoint
Digital Device	o Alarm Setpoint o Lift Alarm Setpoint o Delay On Setpoint o Delay Off Setpoint o Pulse Cycle Time o Pulse Cycle Setpoint
Digital Input	o Delay On Setpoint o Delay Off Setpoint
Parameter/Setpoint	o Current Value
PID	o P (Gain Setpoint) o I (Integral Setpoint) o D (Derivative Setpoint) o Store Integral when Steady State o Steady State Hysteresis
Step	o Time Setpoint

After project synchronisation has been performed, any modifications to the target Accord Designer configuration will result in that configuration being flagged as inconsistent, requiring a consistency check to be performed prior to any subsequent download attempt.

Click '**Project Synchroniser**' and select the desired project from the '**Projects**' list to access the tool.

4.5.1 The Synchronisation Panel

Once the Project Synchroniser has been launched, a list of all supported devices and synchronisable properties is loaded, presenting the values in each of the possible data sources.

Project Synchronisation

The information presented by the Project Synchroniser is as follows:

Item	Description
Type	The category for which this device belongs.
Name	The name assigned to the device.
Property	The aspect of the device that will be synchronised.
Stored Value (Accord Server)	The value last downloaded and currently stored within Accord Server for the property.
Actual Value (PLC)	The current value for the property in the PLC.
Synchronise Action	The action to be performed for this property.

There are four possible actions using the Project Synchroniser:

Action	Description
Do Nothing	Upon synchronisation, ignore the selected property.
Apply Actual (Upload)	Upon synchronisation, upload the value stored in the PLC and apply it to the Accord Designer database and the Accord Server database.
Apply Configured (Download)	Upon synchronisation, download the value stored in the Accord Designer database to the PLC and update the Accord Server database to reflect this change.
Apply Stored (Restore)	Upon synchronisation, download the value stored in the Accord Server database to the PLC and update the Accord Designer database to reflect this change.

4.5.1.1 Synchronisation Aids

Whenever an action is selected, the appropriate source value is highlighted in orange, indicating that this value is considered the to be the correct value. All adjacent columns for the configured value will update, changing colour depending on how their state relates to the selected state. For example, if the state matches the selected state, the value will be coloured in a neutral ivory colour, otherwise it will be highlighted in orange, indicating that the value will be changed to match the selected value once the '**Synchronise**' button is clicked.

4.5.2 Performing Synchronisation

To perform synchronisation:

1. Launch the Project Synchroniser..
2. Configure the desired '**Synchronise Action**' for each of the required properties.
3. Click '**Synchronise**' to confirm and Click '**Ok**' for process completion.
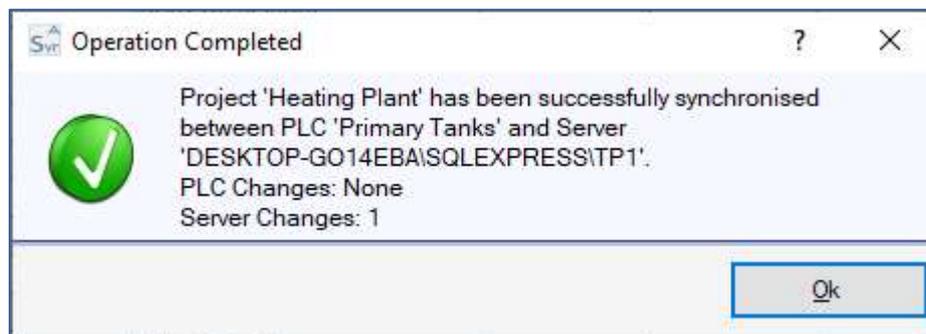
Synchronisation Confirmation

4.6   Project Verifier

The Project Verifier allows users to compare all settings for a project in Server with the setup in the PLC. This is for system security, as all PLC systems should be checked regularly.

The verification related to 'fixed' settings; that are not changeable from HMI and should only be changed within the Model in Designer.

Group	Properties
Analog Device	o Scaling Factor o Type o Manual Only o I/O Address
Analog Input	o Scaling Factor o Type o Indication Only o Place Unit/Program in Alarm o I/O Address
Digital Device	o Type o Manual Only o Place Unit/Program in Alarm o I/O Addresses o Remain Active in Hold o Reserved for Auto
Interlock	o Enabler Type o Enabler Item o Interlock Type
Digital Input	o Place Unit in Alarm o Result as Alarm o Indication Only o I/O Address
PID	o Analog Device o Process variable Type o Process Variable
Program	o Hold on PLC Startup o Single Step o Step On in Hold/Alarm o Reserve Units
Step	o Timing in Msec o External Transition o Normal Step On Type o Normal Step On Reference o Alternative Step On Types

	o Alternative Step On Reference s
Alarm	o Enabler Type o Enabler Reference o Alarm Type
Comparison	o Setpoint Type o Setpoint Reference o Source Type o Source Reference
Delay	o Enabler Type o Enabler Reference o Time Base o Timing Setpoint Type o Timing Setpoint Reference o Active in Hold
Combinations	o Item Type o Item Reference o Gate o Active in Hold
Write Value	o Source 1 Type o Source 1 Item o Source 2 Type o Source 2 Item o Target Type o Target Item o Enabler Rule o Enabler Type o Enabler Item o Active in Hold o Re-Enable after a Step Change
Write Program	o Command o Step o Target Program o Active in Hold o Re-Enable after a Step Change
Lists	o All reference Lists

There should not be any differences between the Model and the settings in PLC, but it is possible to download from Model to resolve any differences.

The items with differences are returned at the top of the results and there is a download option for each row with difference. The selected rows may then be altered by clicking on the Download Button at the bottom of the panel.

The '**Project Verifier**' is accessed by selecting the verifier and project from the '**Projects**' list.

4.6.1   Verifier Panel

The appropriate values are presented, with differences at the top of the results.

	Type	Name	Property	Stored Value (Accord Server)	Actual Value (PLC)	Download
1	Alarm	Tk01 LSH01 High Level	Place Unit in Alarm	True	False	Yes
2	Valve	Tk01 V01 Inlet	Device Type	2	2	No
3	Valve	Tk01 V01 Inlet	Enable Reserve for Automatic	False	False	No
4	Valve	Tk01 V01 Inlet	Place Unit in Alarm	True	True	No
5	Valve	Tk01 V01 Inlet	Remain Active In Hold	False	False	No
6	Valve	Tk01 V01 Inlet	Start List Interlocks	0	0	No
7	Valve	Tk01 V02 Outlet	Device Type	2	2	No
8	Valve	Tk01 V02 Outlet	Enable Reserve for Automatic	False	False	No
9	Valve	Tk01 V02 Outlet	Place Unit in Alarm	True	True	No
10	Valve	Tk01 V02 Outlet	Remain Active In Hold	False	False	No
11	Valve	Tk01 V02 Outlet	Start List Interlocks	16	16	No
12	Valve	Tk01 V03 Vent	Device Type	2	2	No
13	Valve	Tk01 V03 Vent	Enable Reserve for Automatic	False	False	No
14	Valve	Tk01 V03 Vent	Place Unit in Alarm	True	True	No
15	Valve	Tk01 V03 Vent	Remain Active In Hold	False	False	No
16	Valve	Tk01 V03 Vent	Start List Interlocks	24	24	No
17	Valve	Tk02 V01 Inlet	Device Type	2	2	No
18	Valve	Tk02 V01 Inlet	Enable Reserve for Automatic	True	True	No
19	Valve	Tk02 V01 Inlet	Place Unit in Alarm	True	True	No
20	Valve	Tk02 V01 Inlet	Remain Active In Hold	False	False	No
21	Valve	Tk02 V01 Inlet	Start List Interlocks	28	28	No
22	Valve	Tk02 V02 Outlet	Device Type	2	2	No
23	Valve	Tk02 V02 Outlet	Enable Reserve for Automatic	True	True	No
24	Valve	Tk02 V02 Outlet	Place Unit in Alarm	True	True	No
25	Valve	Tk02 V02 Outlet	Remain Active In Hold	False	False	No
26	Valve	Tk02 V02 Outlet	Start List Interlocks	40	40	No
27	Valve	Tk02 V03 Vent	Device Type	2	2	No

Download   Close

Project Verifier Result

The information presented by the Project Verifier is as follows:

Item	Description
Type	The category for which this device belongs.
Name	The name assigned to the device.
Property	The aspect of the that will be synchronised.
Stored Value (Accord Server)	The value last downloaded and currently stored within Accord Server for the property.
Actual Value (PLC)	The current value for the property in the PLC.
Download	Choice to Enable Download for each row with difference.

Whenever a difference is returned the Stored Value is shown in Yellow and the Controller Value in Orange. There is a choice of actions for each difference

Action	Description
Download Yes	Write the Model / Server value to PLC Controller
Download NO	Do not change the PLC Value

### 4.6.2   Performing Verification Synchronisation

A synchronisation may be performed by selecting the desired '**Download Action**' for any rows with differences and selecting '**Download**' to confirm and **'Ok'** for process completion.

Verification Synchronisation Confirmation

4.7   OPC Diagnostics

The OPC Diagnostics tool displays detailed information relating to the current activities of the OPC Communications module. The purpose of the OPC Diagnostics tool is to help diagnose potential issues that may arise, such as missing devices, bad quality reads and communication delays.
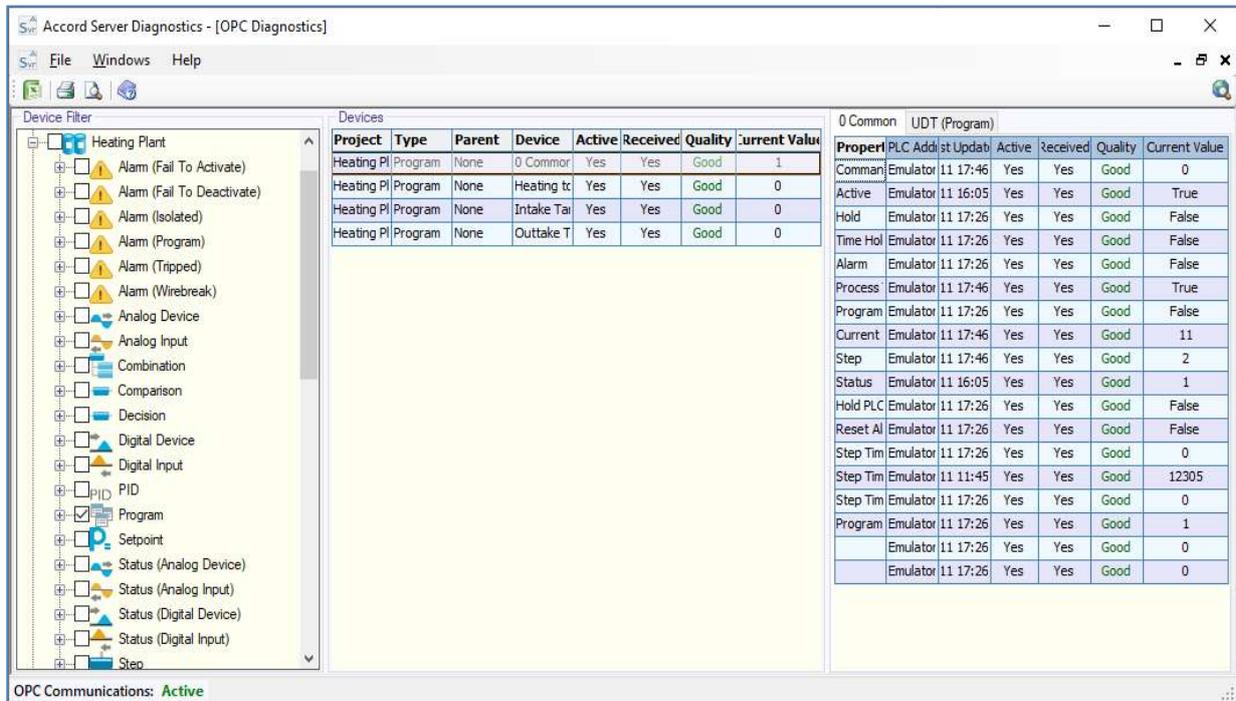
OPC Diagnostics

Upon opening the OPC Diagnostics tool, users are presented with a list of each active device configured for the current session, along with summary details for each device selected. Selecting the summary details for a device produces additional information relating to that device on the right-side panel.

The device listing summarises the following pieces of important information for each device currently available to the OPC Communications module:

Item	Description
Project	The name of the project the device belongs to.
Type	The type of the device, e.g. Digital Input, Program etc.
Parent	The name of the devices parent, typically a unit.
Device	The name of the device.
Active	A flag indicating if the module is currently actively reading data for this device. The following may result in a device being active: o An Accord Controls control is currently monitoring the device. o The Device Communications module has produced an active proxy for the device. o The Data Historian is logging device data for this device. o The Data Reporting module is watching the device as part of a trigger or file name value. o A scheduled task is currently in the process of performing a write. o The user has manually activated the device by selecting it on the OPC Diagnostics list.
Received	A flag indicating if the module has successfully received any data for this device, whether it is good or bad.
Quality	A flag indicating if the OPC Server has reported (in general) a good or bad quality read for this device. A device typically possesses multiple properties to read, if any of these properties have a bad quality read the device will be given a Bad quality flag.
Current Value	The default value as last read by the module for the device. If the device is not current active then this value may not be the value in the PLC.

Click '**OPC Diagnostics**' in the **'**Tools**'** tab to access the Tool.

4.7.1   OPC Device Communications Diagnostics

The OPC Device Communications Diagnostics tool provides a detailed display of each property for a given device on the right-side panel. This tool is useful when attempting to diagnose potential communications related issues. The following information is displayed for a given device:

Item	Description
Property	The name of the OPC property for the current device.
PLC Address	The OPC Address used by the OPC Communications module to retrieve data from the selected OPC Server.
Last Updated	The date and time when this property was lasted updated by the OPC Server, typically when the property last changed.
Active	A flag indicating if the module is currently actively reading data for this property. The following may result in a property being active: o The device itself has been activated, thus reading all properties for the device. o A HMI/Control being served by the Advanced Communications module is currently monitoring the property.
Received	A flag indicating if the OPC Communications module has successfully received data for the property, whether it is good or bad.
Quality	A flag indicating if the OPC Server has reported a good or bad quality read for the property.
Value	The value for the property as last read by the OPC Communications module.

4.7.2   UDT Layout Viewer

The UDT Layout viewer displays the definition for each property being read for a particular group. Whenever a device is selected, the UDT information is automatically displays along with the device information on the right-side panel

Item	Description
Property	The name of the property of the UDT.
XML Tag	The XML tag used by the ActiveX Communications module to represent the property.
PLC Address	The prefix of the OPC Address used by the OPC Communications module to retrieve data from the selected OPC Server.
Offset	The address offset in the PLC for the current property.
Min	The minimum physical acceptable value for the current property.
Max	The maximum physical acceptable value for the current property.
Modify	A flag indicating if the property can be modified using Accord Server.
Extended	A flag indicating if the property is used exclusively for diagnostic purposes.

4.8   PLC Register Status

The PLC Register Status tool displays detailed information relating to the current activities of individual property managed by the Accord Server Service. Using the OPC Communications and PLC Register Communications modules, this provides access to every property of each device available to the Accord Server Service. Unlike the OPC Communications Diagnostics tool, the PLC Register Status tool provides direct access to all extended properties of a device UDT. In addition, the PLC Register Status tool allows for the creation of profiles that can be customised to suit the specific needs of the user, facilitating easier diagnosis of potential problems that may arise.   It is also possible to modify the current value of any modifiable property using this tool, removing any requirement to refer to a Scada component or third party tool. Properties configured for a given Profile are referred to as Tags.

Upon opening the PLC Register Status tool, users are presented with a list of currently selected Tags, if any. These Tags belong to the Profile selected in the Profiles section, on the bottom right-side panel. By default, Accord Server creates a profile known as 'Default' for which users can customise. This profile is required and cannot be deleted. Once a profile is selected, the Tags list will display a summary for each configured property. Selecting the summary details for a property produces additional information relating to that property on the top right-side panel.

The property listing summarises the following pieces of important information for each device currently available to the OPC Communications module:

Item	Description
Name	The custom name given for the property by the user.
Last Updated	The date and time when this property was lasted updated by the OPC Server, typically when the property last changed.
Current Value	The value for the property as last read by the OPC Communications module.
Modifiable	If the property is modifiable, a '**Change**' hyperlink will be presented, enabling write access to the property, otherwise the value will read as '**Read Only**'.

Click '**PLC Register Status**' in the '**Tools**' tab to access the Tool.

4.8.1 Managing Register Profiles

Open the '**PLC Register Status**' tool and click the '**+**' button at the right of the '**Profiles**' list and type a new unique name for the profile and select type and click '**Ok**'.
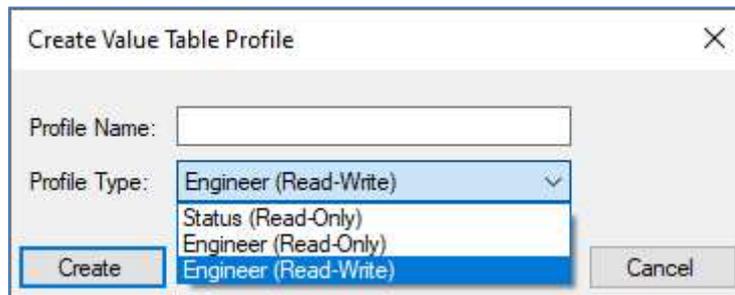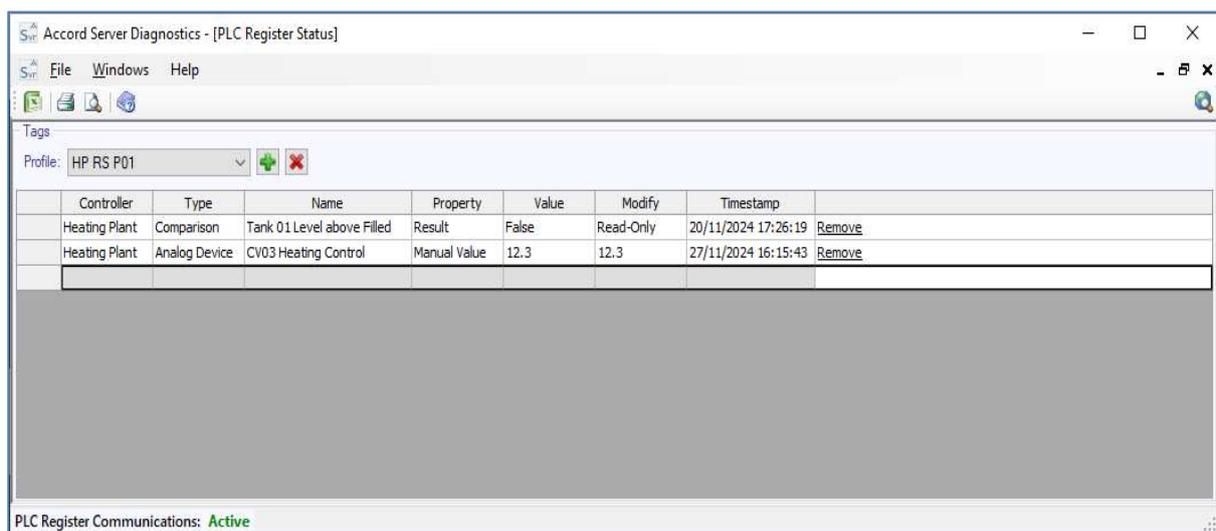

Adding a Register Profile

The 3 types of Profiles are

1. Status
2. Engineer Read Only
3. Engineer Read Write

Status provides overview only.

Engineer Read-Only allows access to detailed information.

Engineer Read-Write allows access to detailed information and allows values to be changed in the PLC. This should only be used by Design Engineering Personnel as changes to values in PLC can mean sudden changes to Plant Operation.
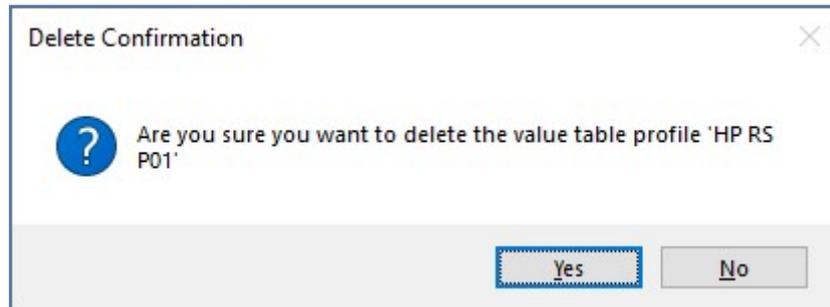

Register Profile list

The screen shows OPC values for 2 items
The result of a comparison, which cannot be written-to, and
The Manual Value for an Analog Device, which is written to using the panel.

Open the '**PLC Register Status**' tool and Select the desired Profile and click the '**X**' button at the right of the '**Profiles**' list to delete a Register Profile:

Deleting a Register Profile

4.8.2   Managing Registers in Profile

Fill a Row by using Drop Down to select the object and the register in the object to read or write to.
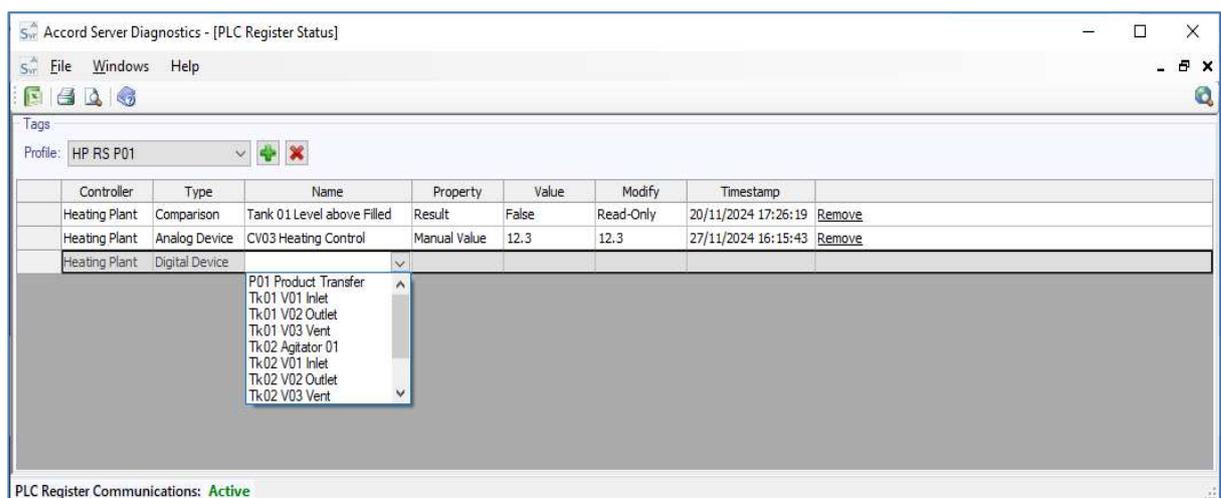

Item Selection

A changeable value may be modified by clicking on entering a new value in the Modify Column and clicking change.

Click the Remove link to delete a Row or item in the Profile:

4.9   Scan Time Optimiser

The Scan Time Optimiser enables the ability to monitor the current PLC scan time for a specific OPC Profile and optimise it, by configuring the number of items to process per scan. Using the Scan Time Optimiser, an engineer can determine if the performance of the target hardware meets project requirements and can make the necessary adjustments to improve performance where necessary. The Scan Time Optimiser uses the OPC Configuration for the General OPC Group to monitor the PLC. If this group has been disabled, or has otherwise been configured incorrectly, the current scan time will be unavailable. The Scan Time Optimiser can only be performed against projects currently deployed to PLC's using Accord Server.
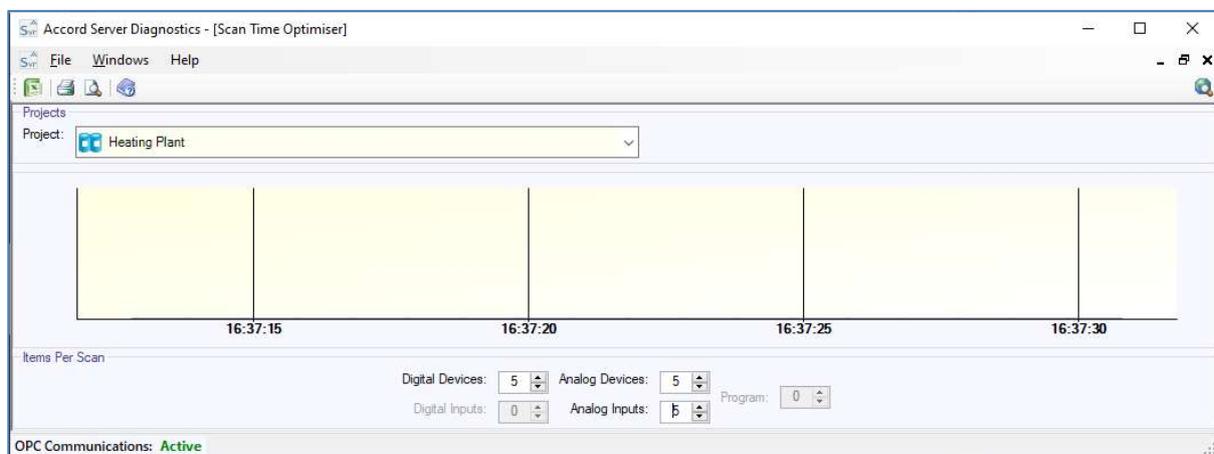
The Scan Time Optimiser

The graph shows effect of reducing Items per Scan down,

Click '**Scan Time Optimiser**' in the 'Tools' tab and select the desired project from the '*Project*' list to access the Tool.

### 4.9.1   Optimising Scan Time

To optimise the PLC Scan Time:
1. Adjust one of the three possible values for '**Items Per Scan**'.
2. Observe the effects of the changes on the '**Scan Time**' prior to making additional changes, adjust as required until desired result is achieved.

Note: Making scans longer may have an effect on PLC interrupt processing outside Accord PLC, such as for processing items such as pulses for Flowmeters.

5　　　Configuration Settings

Accord Server contains a variety of different settings that allows users to configure Accord Server to meet their needs. Some of these settings cannot be configured while the service is running. If the service is running a warning message will appear at the base of the Settings tab to inform the user that some changes are not allowed at this time.
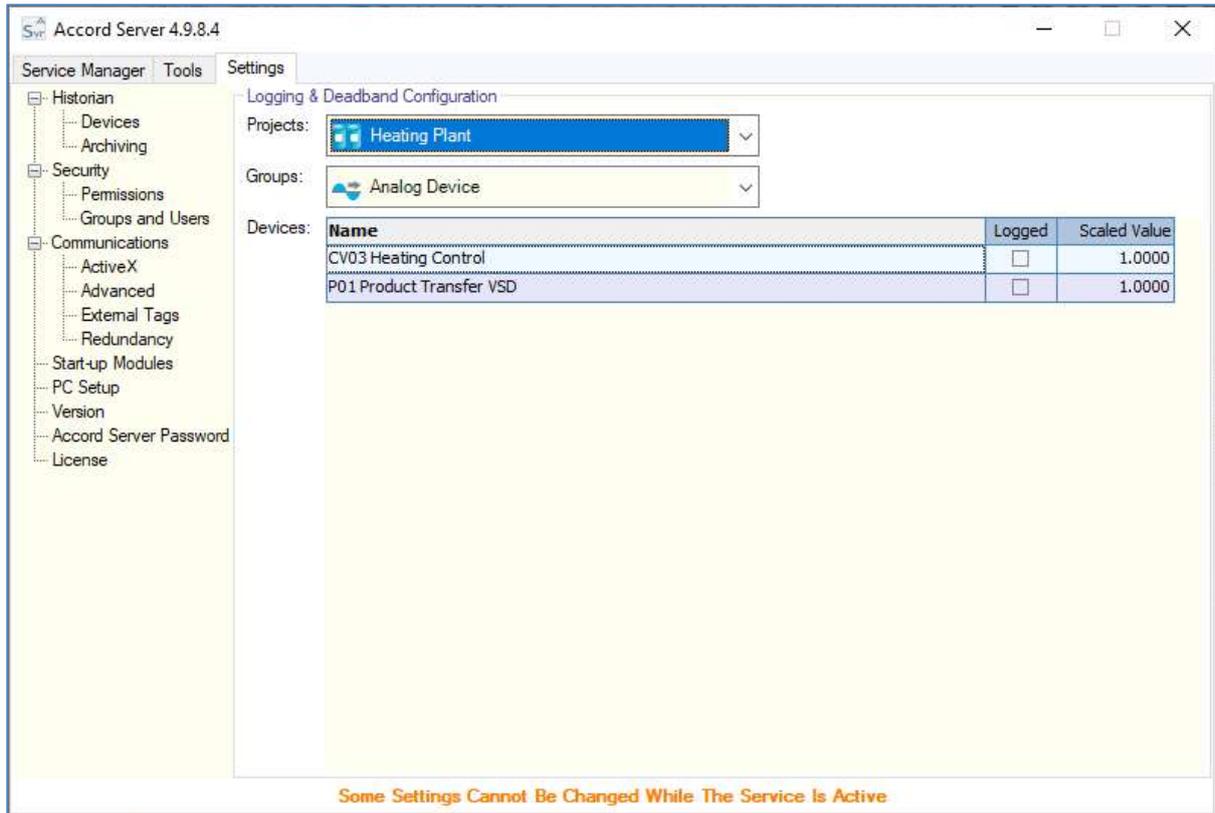
The Settings Tab while the Service is Active

5.1 Historian

5.1.1 Devices

Devices allows users to configure the Logging and Deadband settings for specific devices on a given Project. By default, all Alarms and Program are automatically logged. Although it is not possible to deselect logging for Alarms, it is possible to deselect logging for Programs. Logging on Programs should only be deselected if information relating to them is no longer required for reporting purposes. Additionally, some groups, such as Analog Device, contain configurable Deadbands. Deadbands are used as a logging threshold for a given device and can help avoid large quantities of unnecessary data being logged in the database.

5.1.1.1 Activating/Deactivating Logging

To Activate/Deactivate Logging on a particular device:

1. Select '**Devices**' under the '**Historian**' node from the settings tree.
2. Select the desired project from the '**Project**' list.
3. Select the desired group from the '**Group**' list.
4. Tick the '**Logged**' box for the appropriate device. Set the Deadband as appropriate.

Un-tick the '**Logged**' box to deactivate logging on a device

Note 1: It is not possible to configure logging for Alarms. By default, all alarms are logged.

Note 2: Deactivating Logging for a device will not delete any history previously recorded for that device.

5.1.1.2   Understanding Deadbands

Accord Server allows define deadbands on a number of properties for various devices for efficiency for storage space. When a deadband is defined, Accord Server will only log data for a device under the following circumstances:

1.   If the change was greater than or equal to the amount defined deadband.
2.   If any other property changes regardless of the deadband amount.

It is important to understand the second condition, as it may result in confusion when viewing historical data. For example, an Analog Input has a Value property and an Alarm LL property. If Value has a deadband of 1.0 applied and the last logged Value was 3.0, then based on rule 1, the next time a log entry should be created is when the value rises or falls by 1.0 or more. If however, the Alarm LL trigger is the value of 3.5, and Value changes to 3.5, triggering the Alarm LL flag, then a new entry will be created, saving both the Alarm LL flag and the Value regardless of the deadband. The reason for this is because Accord Server ensures all data saved in the historical log is consistent, and since the Alarm LL was triggered by a Value of 3.5 and not 3.0, it is necessary for this to be reflected in the historical data.

Note: Not all groups have configurable deadbands. Configurable deadbands always appear adjacent to the Logged column.

5.1.2   Archiving

Archiving allows users to define the maximum allowable database size before data is automatically transferred to a new archived database. An archived database contains all information contained in the current database, including data and configuration settings, up to the moment the archiving procedure was triggered. Once archiving has completed, all historical data and security audit logs present in the archived database are deleted and the database compressed to free up space for additional logs.

Archiving allows for the configuration of automated deletion of archive databases beyond a specified age to manage disk space. Archiving allows configuration of an off-peak schedule for scheduling archiving to only occur between required times to manage PC performance.
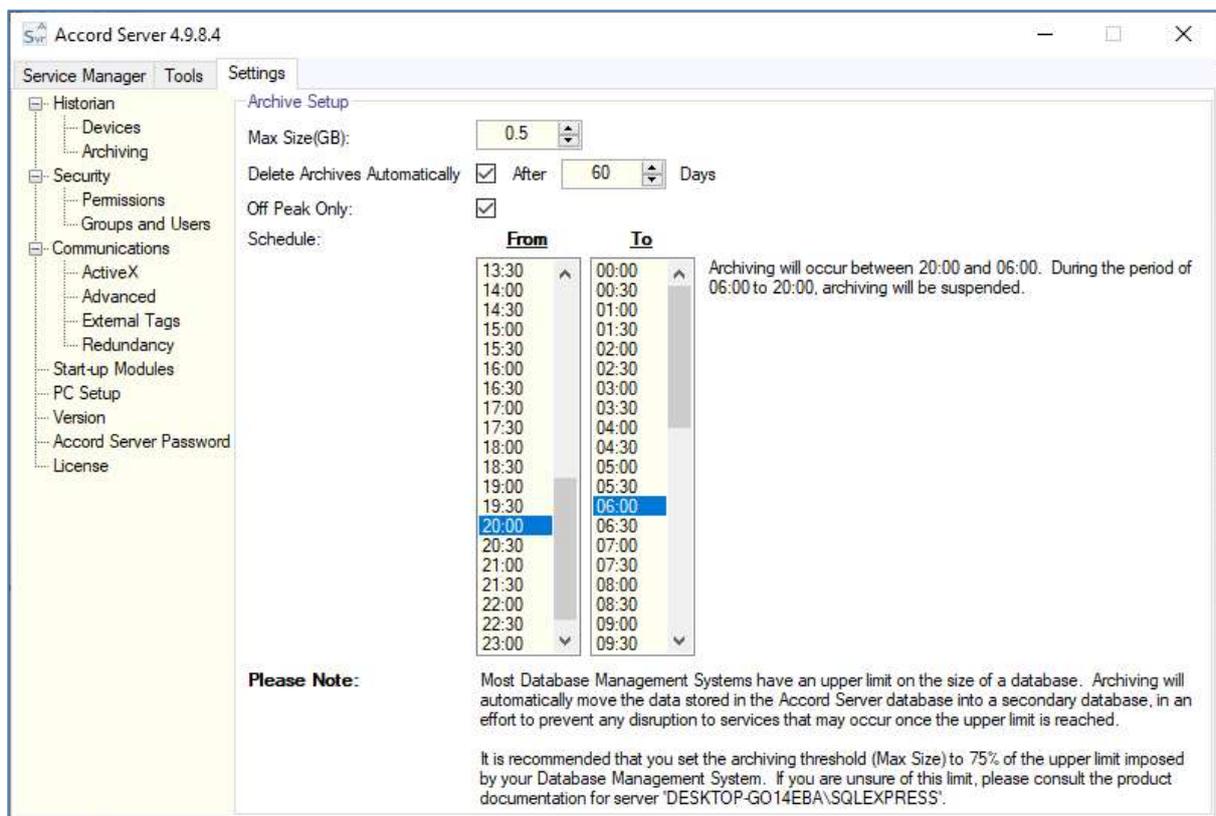
Archiving Setup

Enter required value for the Maximum Size of archives.

Enable Auto Deletion of archives by ticking the selection and select the age in '**Days**'. Archives older than this 'Days' value will be auto deleted.

Select '**Archiving**' under the '**Historian**' node from the settings tree to access editing of the off-peak schedule.

Tick '**Off Peak Only**' to enable the feature and select the appropriate times using the from the '**To**' and '**From**' fields to define the time frame for the Off Peak Schedule.

5.2 Security

5.2.1 Permissions

Permissions allows the user to apply permissions for functions on HMI. A logged in user is permitted access to functionality if the user has been assigned to the permitted User Group, or the function is enabled for all users.

HMI Permissions allow Operation on HMI screens for the function,

Common Controls are for other modules – Reports and Plans etc, and this has two levels: Operate and Edit. Operate allows the user to run Reports, and Start and stop Plans, and Edit permission allows the user to create or edit Reports or Plans. Edit is an Engineering or Management level permission.

Permissions must be assigned, if they are blank then there is no access for the group.
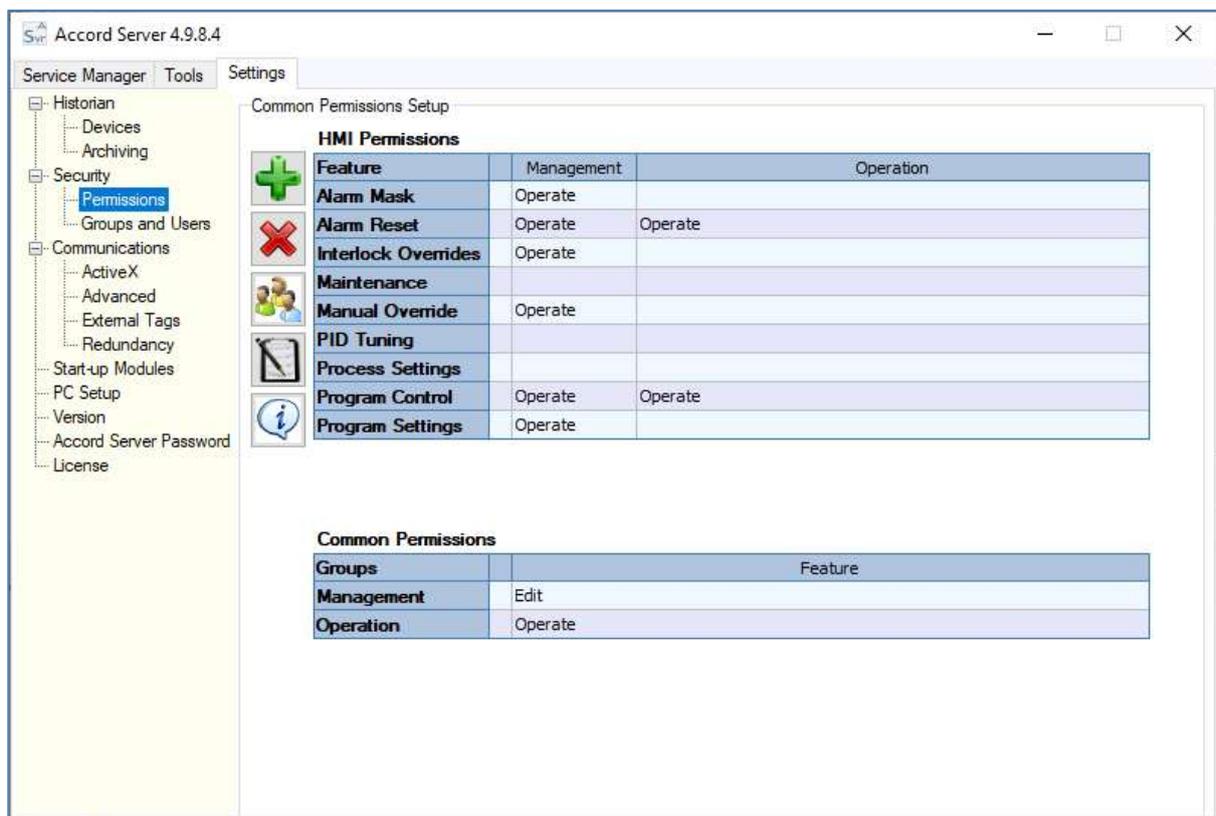
Permissions

5.2.1.1   Configuring an Access Level

Select permission level for required group to the right of the permission feature.

Set Permissions

Click on permission to bring up Apply to All option, using it will set all permissions for the selected group to have same value as the selected one.

Apply to All

5.2.1.2 Adding a new User Group

Click the '**+**' button on the top left of the permissions listing and Enter a unique name for the new group.

Create Group

5.2.1.3 Remove User Group

Select a group by clicking anywhere on the table under the group name and click the '**x**' button on the top left of the permissions listing.

Remove Group

5.2.1.4 Display Group Members

Select a group by clicking anywhere on the Press anywhere on the table under the group name to select a group and click the persons button to display the table with the users.
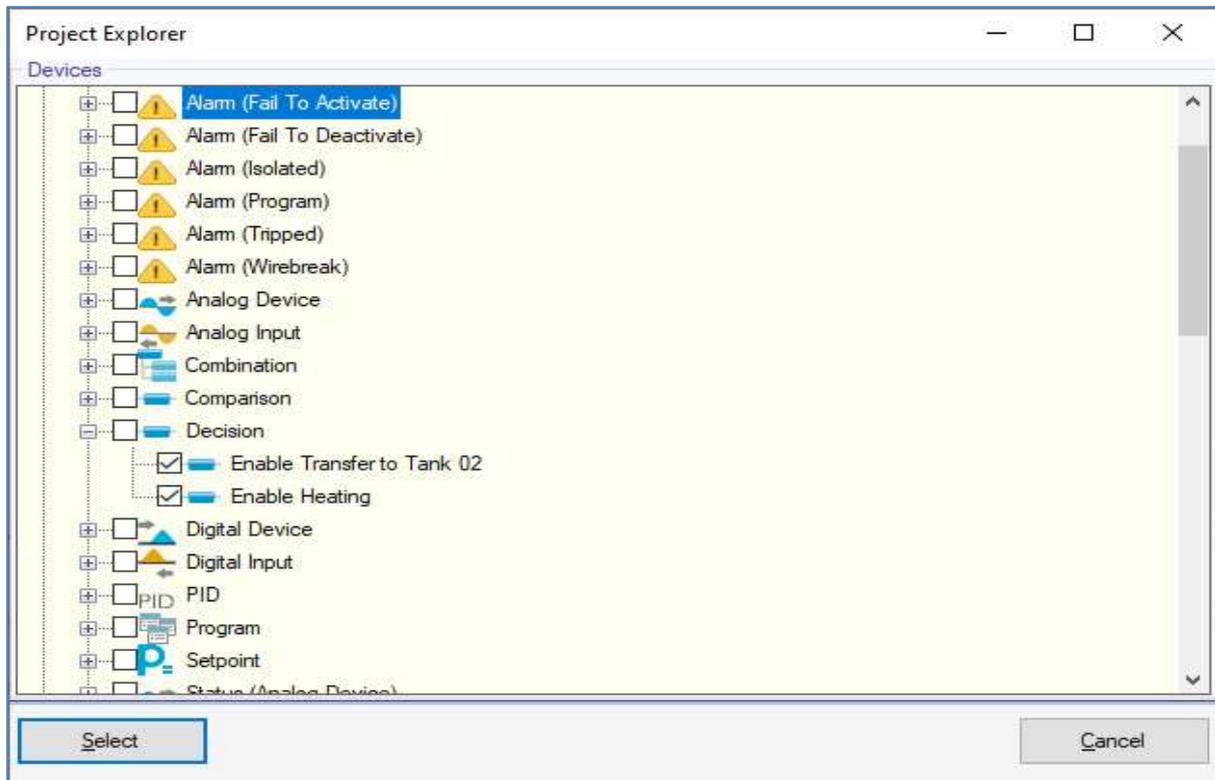

Button Icon

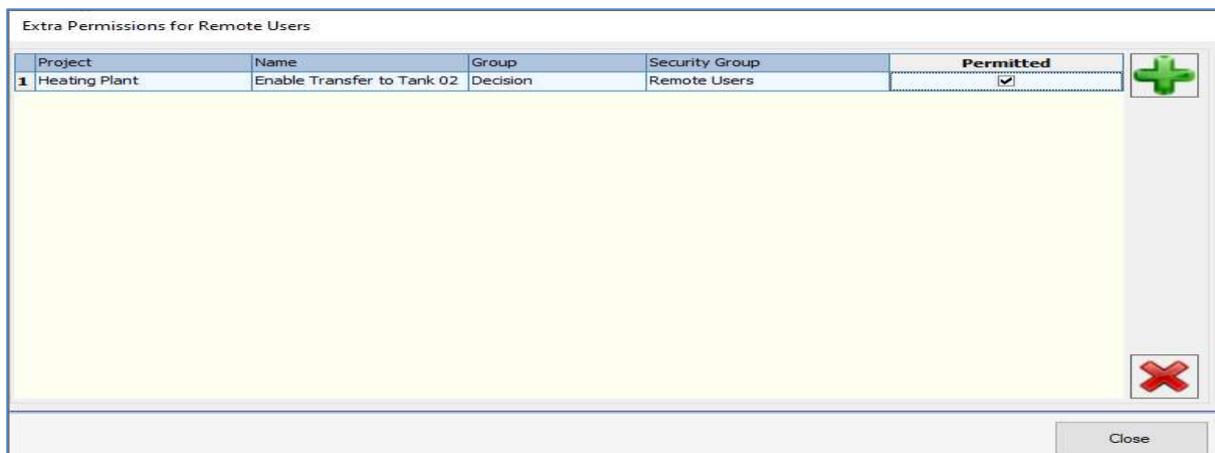**5.2.1.5   Add Extra Permissions**

To add extra permissions, click on the group to which permissions must be added. Click on

the icon   , it will open the window where Extra Permissions can be selected.

Click "**+**" icon to open Project Explorer.

Select device required from the list by ticking a checkbox.

One or more devices can be selected at the same time. When all required devices selected, click Select button to confirm selection.

Extra Permissions form shows all the permissions selected. To remove a permission click on required permission and then click the X button to remove it from the list.

5.2.1.6 Display HMI Aspect Info

To show HMI aspect info, do the following:

1. Select '**Permissions**' under the '**Security**' node from the settings tree.
2. Click the info button to display the HMI Aspect Info table with the users belonging to the group.


Button Icon

3. HMI Device aspects table will be loaded. Table displays what device types applicable to different HMI permission aspects.

Aspects	Device Types	Applicable to
		PR - Program, AD - Analog Device, AI - Analog Input, DD - Digital Device, DI - Digital Input
Alarm Mask	Digital Device	[DD - Alarm Masked]
Alarm Reset	Program, Digital Device, Analog Input, Digital Input	[PR - Program Alarm], [AI -Wirebreak], [DD,DI - Alarm]
Interlock Overrides	Digital Device	[DD - Intl Override, Override RFA.]
Maintenance	Analog Device, Analog Input, Digital Device, Digital Input	[AD, AI, DD, DI - Maintenance]
Manual Override	Analog Device, Analog Input, Digital Device, Digital Input, PID	[DD -Manual Mode, Manual Command], [AD, PID -Manual, Manual Value], [AI, DI - Override, Override Value]
PID Tuning	PID	[PID - Proportional, Integral & Derivative Setpoints, Int Reset Value, Derivative Deadband, In Steady State, Resp Lag Time, SS Dband, Store Int in SS]
Process Settings	Analog Device, Analog Input, Digital Device	[AD -Min Range, Max Range], [AI - Min Range, Max Range, Alarm HH, H, L, LL, Hysterisis, Alarm Time], [DD -Fail Activate Time (Time SP), Fail DeActivate Time (Lift Alarm SP), Delay On, Delay Off, Pulse Cycle Time, Pulse Time SP]
Program Control	Program	[PR - Program Setpoint, Step Time]
Program Settings	Program	[PR - Command]

Device Aspects

5.2.2 Groups and Users

Groups and Users allows for the configuration of users and assigning to groups. Users are set-up with password and assigned into an access level group and may have an email address, for automatic email of reports.
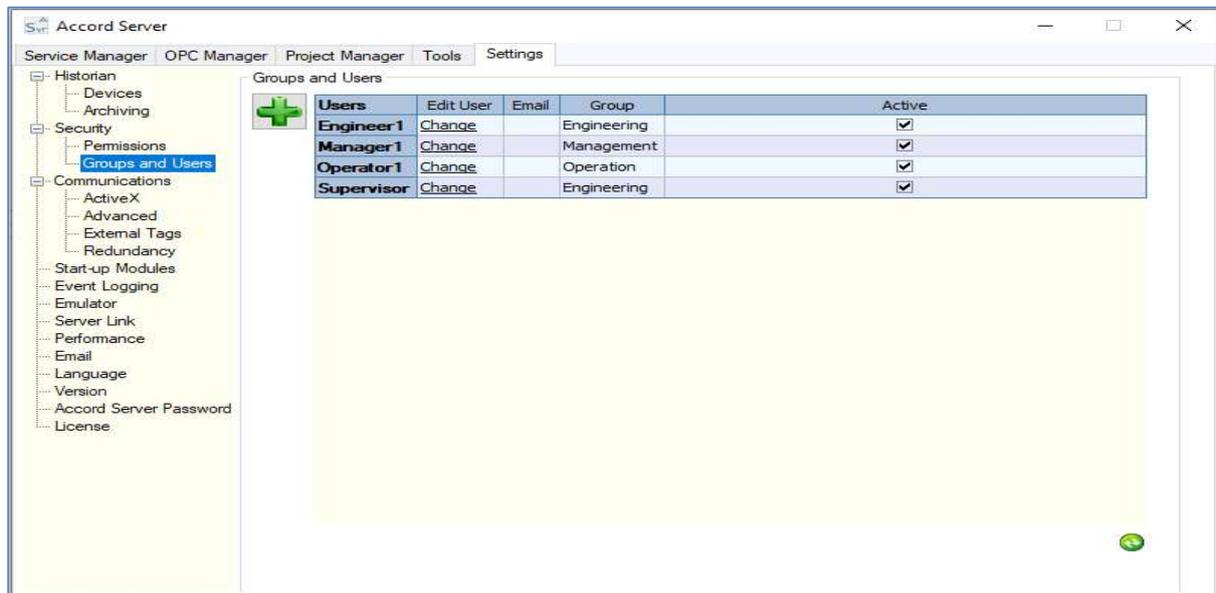
Users in Groups
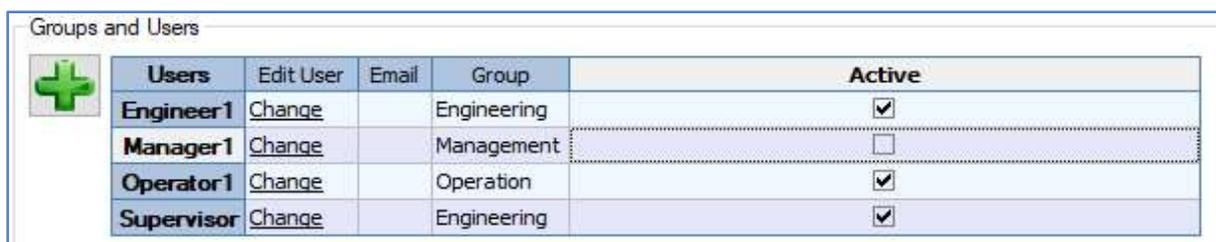
5.2.2.1 Adding a User

Click the '**+**' button on the top left of the users listing and provide a unique name for the user. Enter a password and also enter an email address if the user is to receive e-mail reports.
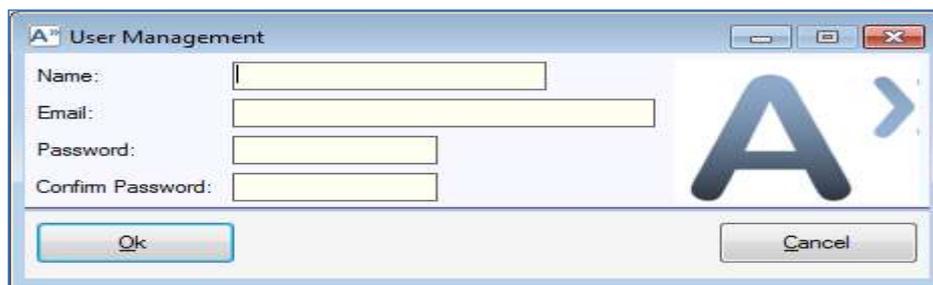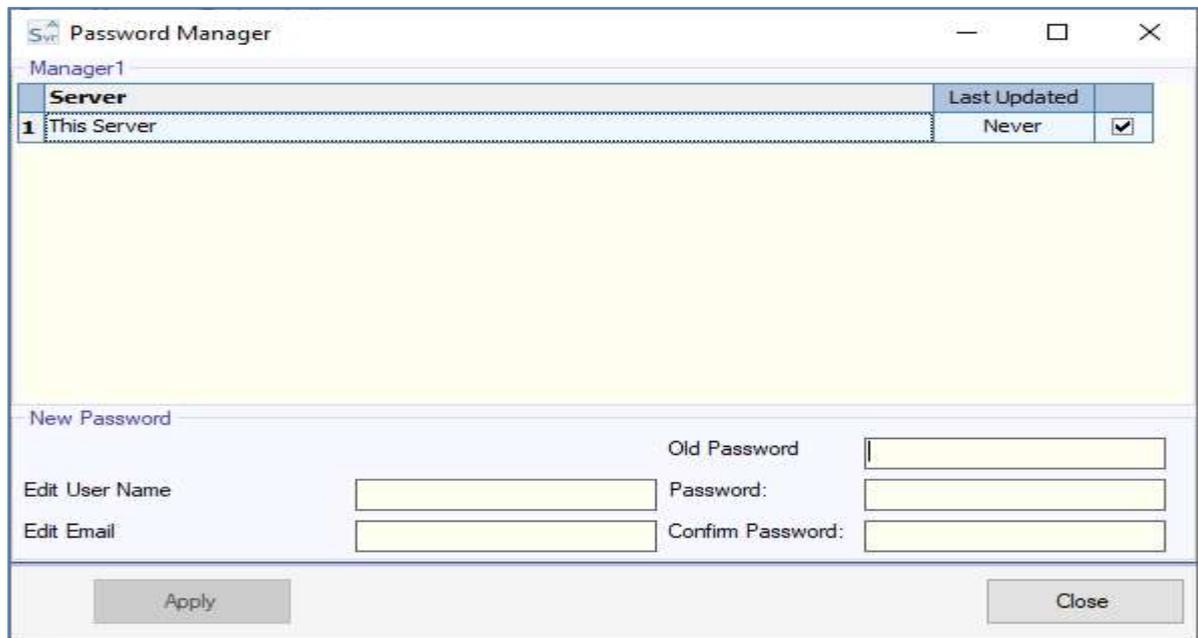

User Management

5.2.2.2 Disabling a User

Select the desired user from the '**Users**' list and untick the active box to disable user.

Disabling a User

5.2.2.3   Managing a User

Click the '**Change**' hyperlink for the desired user to display the Manager panel for the User.

To change a particular user's password:

Type old password into the '**Old Password**' field, to enable '**Password**' and '**Confirm Password**' fields. Type the new password into the '**Password**' field and confirm it by re-typing it into the '**Confirm Password**' field.

Once applied, the passwords for the selected server will be updated and the Password Manager will update to reflect this change. For security reasons, it is not possible to see existing passwords.

To change a User's email:

 Enter the new email address into '**Email**' field. Clear the '**Email**' field to remove the address.
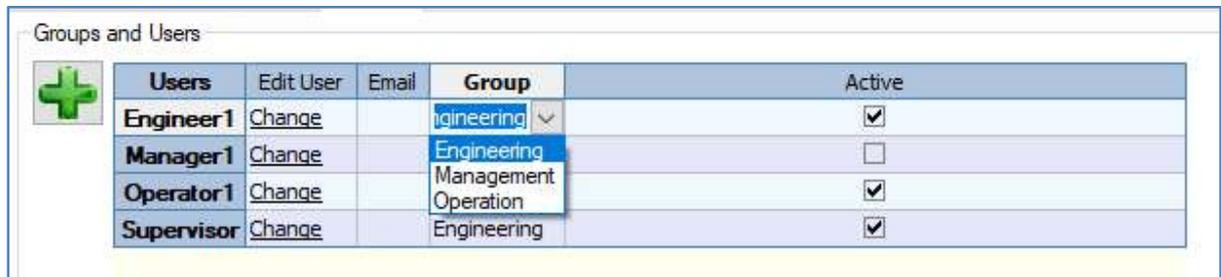
To change a Users UserName:

Type the new Username value into '**User Name**' field.

Press '**Apply**' button to save any edits

5.2.2.4 Assigning a User Group to a User

To assign a User Group to a user:

1. Select '**Groups and Users**' under the '**Security**' node from the settings tree.
2. Click on '**Group**' field for selected user and select group name.


Assign Group

5.2.2.5 Create User Email

To create user email:

1. Select '**Groups and Users**' under the '**Security**' node from the settings tree.
2. Click on '**Edit User**' field 'Change' text for the user where email must be created. See image below for reference.

Users	Edit User	Email	Group	Active	Domain
Engineer1	Change		Engineering	✔	None Configured
Manager1	Change		Management	✔	None Configured
Operator1	Change		Operation	✔	None Configured

3. Type in email address in the 'Edit Email' location and press 'Apply' button.
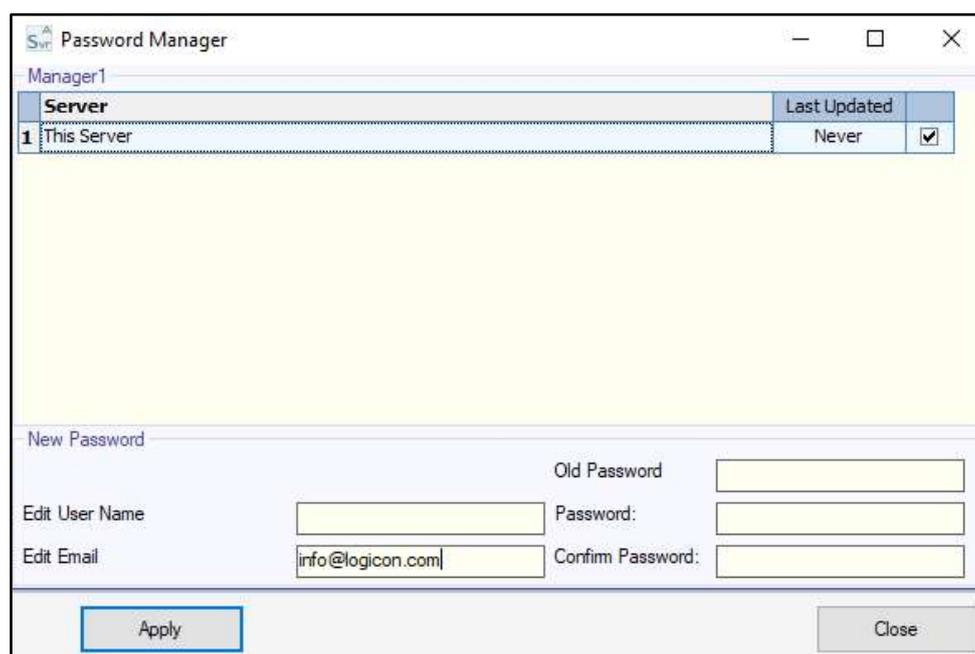
4. Email address for selected user is now displayed in the 'Email' field.

Users	Edit User	Email	Group	Active	Domain
Engineer1	Change		Engineering	✔	None Configured
Manager1	Change	info@logicon.com	Management	✔	None Configured
Operator1	Change		Operation	✔	None Configured

Defined reports and Process Audit report works using built in simple mail transfer protocol. Reports are emailed using designated Accord email address reports@accordscada.com. User is not required to set anything for email function to work.

5.2.3   Data Integrity

Data Integrity provides access to continuous project Verification. During which data in the PLC is compared to the data in SQL database. Any differences are emailed to the selected personnel. Verification can detect unauthorised data changes in the PLC and inform authorised personnel about those changes.

Interval determines how often Verification check will run, the minimum and default value is 1 hour.

When Enabled checked, then Verification process in enabled, if not checked, then disabled.
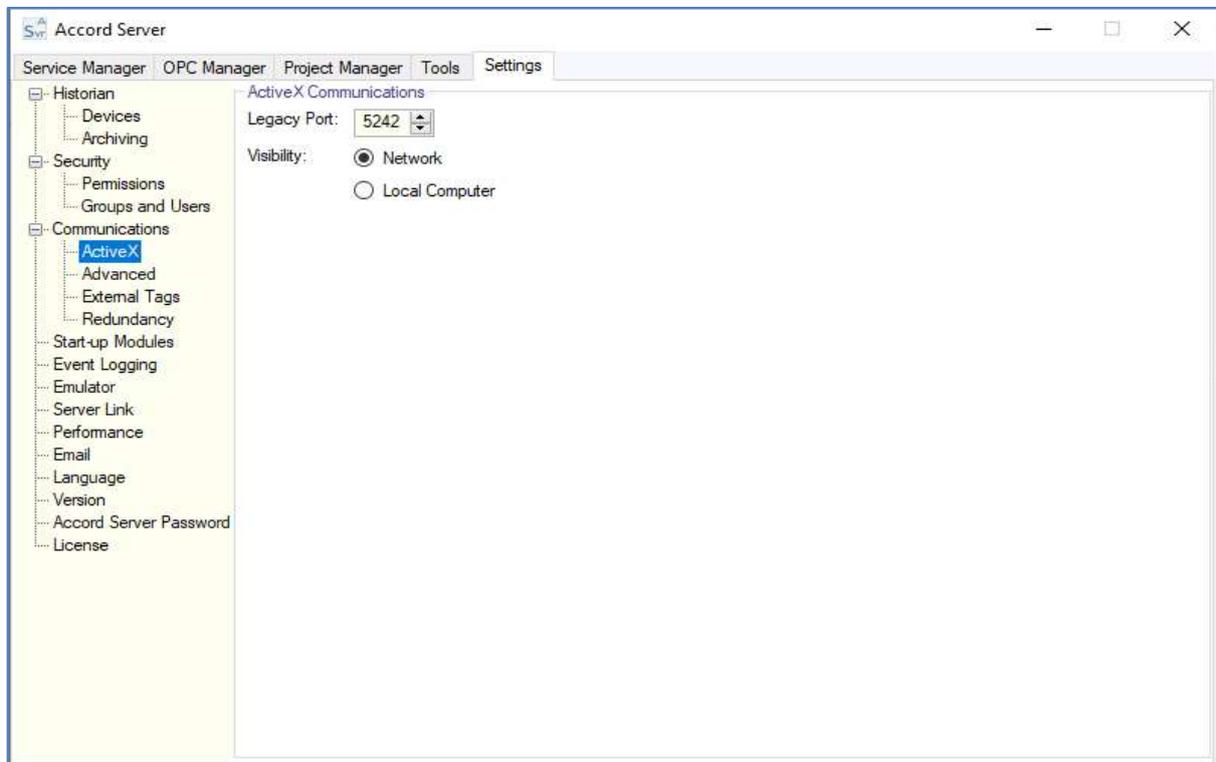
See Defined Reports user manual on how to setup users to receive Verification results by email.
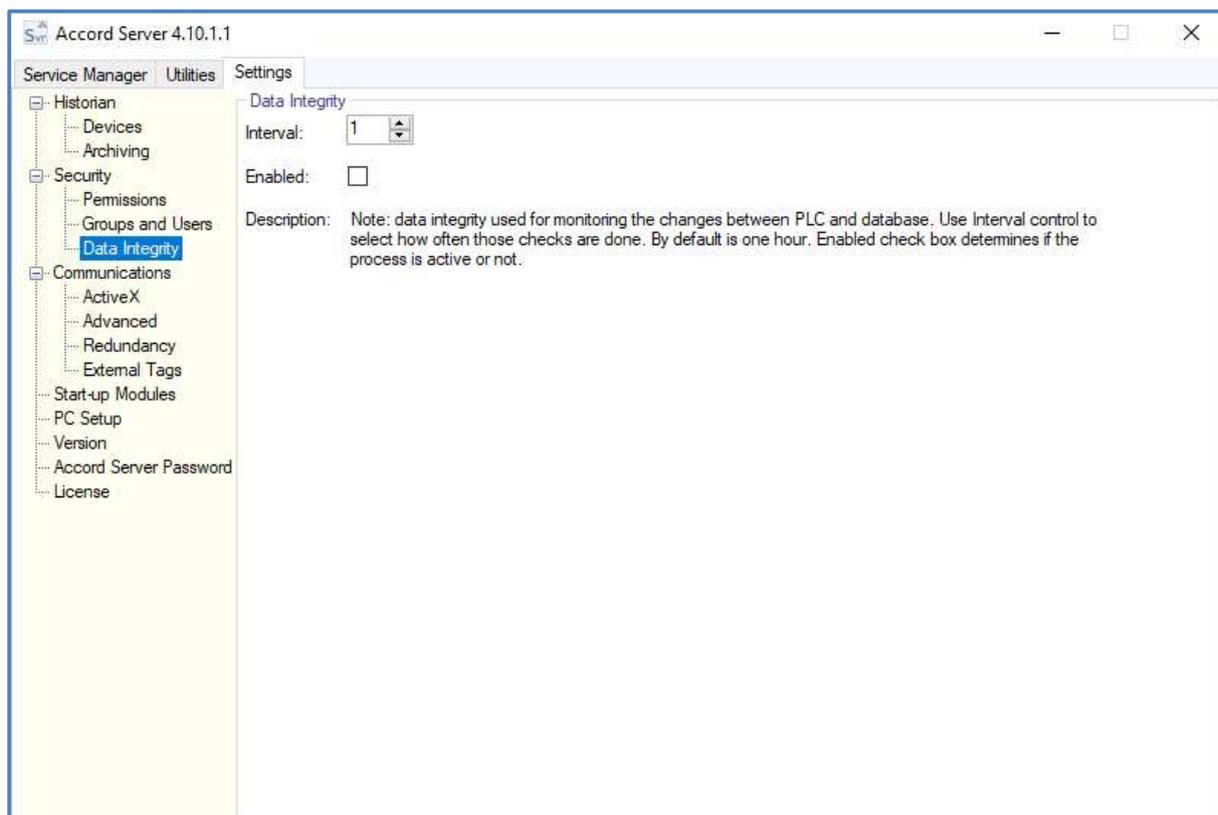
5.3 Communications

5.3.1 ActiveX

ActiveX Communications allows for the configuration of TCP related settings for ActiveX Communications module.

ActiveX Communications

The Legacy Port refers to the TCP Port number the ActiveX Communications module binds to when the service starts. It is important that this number is unique and does not conflict with any other services running on the host computer.

Type the desired Port number into the '**Legacy Port**' field to change the port.

In some situations, it may be desirable to only allow ActiveX connections on the local computer and this is managed using the visibility option.

To allow connections from any computer on the network, select '**Network**'.
To restrict connections to the local computer only, select '**Local**'.

5.3.2   Advanced Communications for Accord HMI Controls

The Advanced Communications module uses TCP in order to communicate with client controls. By default, the Advanced Communications module will provide services using the first available network connection. The following should be checked when setting up for Network comms:

1. IP version 4 is enabled.
2. A static IP address has been configured.
3. The DNS (if any) is configured correctly.
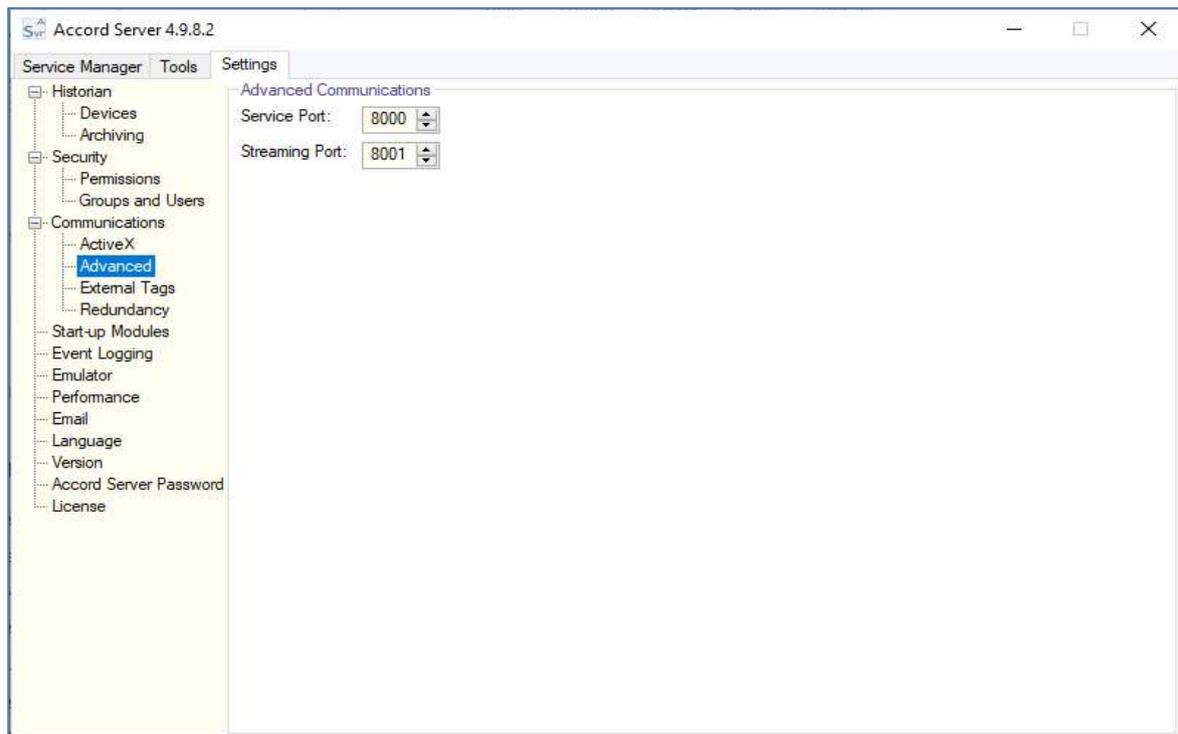
Advanced Communications

5.3.2.1   Changing the Advanced Port

The Advanced Port refers to the TCP Port number the Advanced Communications module binds to when the service starts. It is important that this number is unique and does not conflict with any other services running on the host computer. It is recommended to leave this setting at its default, however should the need arise to modify it:

1. Select '**Advanced**' under the '**Communications**' node from the settings tree.
2. Type the desired Port number into the '**Advanced Port**' field.

5.3.3   External Tags

External Tags allow for the configuration of custom devices that relate to data external to the selected Accord Server project. External Tags are treated much in the same way as standard devices within a project are and thus, are available to the Accord Controls and the Accord Server SDK. There are three supported data types for External Tags, these are as follows:

1. Boolean   Supporting values that are either True or False.
2. Integer   Support values ranging from -2147483648 to 2147483647.
3. Real   Supporting values ranging from -3.40282e+038 to 3.40282e+038.
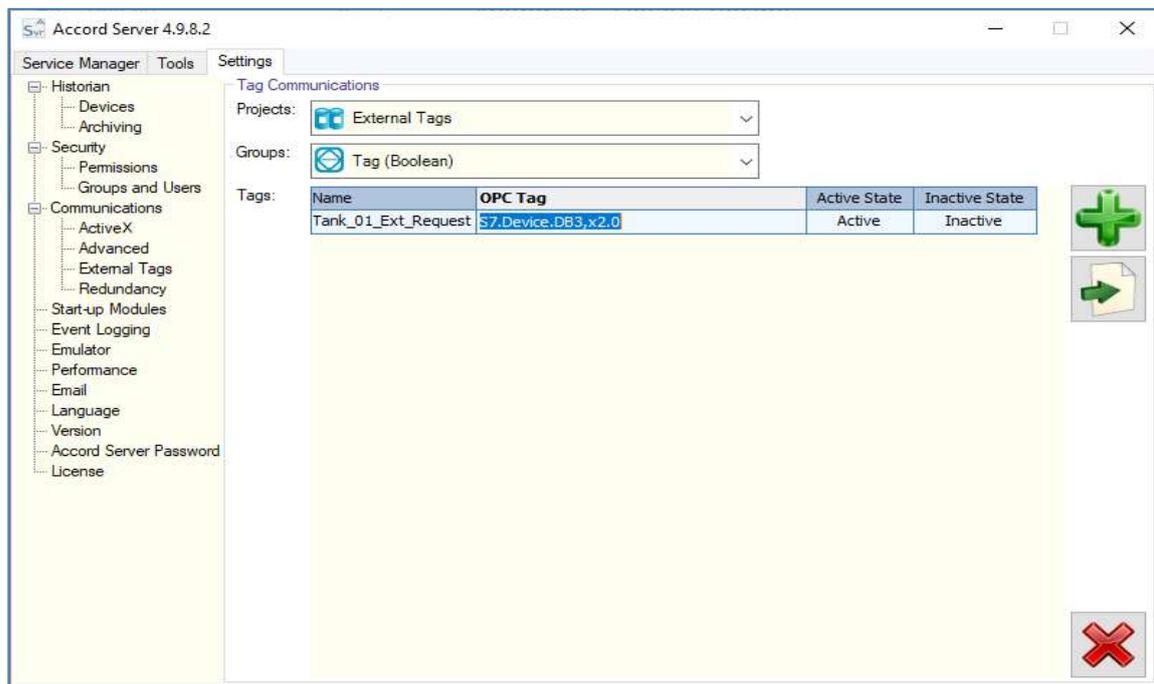
External Tags

External Tags use the same OPC Server that the project uses however, it is not required that they use the same Channel/Device configuration as used by the various groups within the project. This means it is possible to configure an External Tag to read data from an entirely different PLC than that used by the project. When configuring an External Tag, it is important to remember that the absolute tag address must be used. This means that if the tag requires a specific OPC Channel and Device, those must be included in the address.

 For example, to read value the Life Byte value for a Siemens S7 project, located in data block 3 at offset 4, using an OPC Channel called 'S7' and an OPC Device called 'Device', it is necessary to use the following address:

```
S7.Device.DB3,BYTE4
```

In this example, since the data is a whole number, the correct type to configure the External Tag as is Integer. It is important to note that if the wrong address is configured, or the wrong data type is used, the data obtained by Accord Server would be highly unreliable. For more information regarding supported address formats, please consult the help documented for the selected OPC Server.

5.3.3.1 Adding an External Tag

To add a new External Tag:

Select the group from the '**Group**' list and click the '**+**' button and enter a unique name for the new tag.

Adding an External Tag

5.3.3.2 Deleting an External Tag

To delete an external tag:

Select the group from the '**Group**' list and select the desired tag from the '**Tags**' list and click the '**X**' button.

Deleting an External Tag

The 'OPC Tag' and 'Engineering Units' fields may be entered and edited later if required. Active and Inactive states for Boolean tags may be entered and edited later if required.

5.3.3.3 Exporting External Tags to CSV File

Data for external tags (of the same Group) can be exported to a CSV file for reference or to be imported at a later time. The Data comprises of the Name, the OPC address and the appropriate Engineering Unit or Active/Inactive state text. Right click anywhere in the '**Tags**' list and Select the '**Export As**' option and select folder and enter a file name.

5.3.3.4 Importing External Tags from CSV File

Multiple external tags (of the same Group) can be imported from a CSV file. This file can be created from a previous export, can be manually created or a combination of both. An export using this method will import the name, the OPC address and the appropriate Engineering Unit or Active / Inactive state texts. Existing tags with the same name will be replaced with the new address.

When entering the address for an External Tag in the CSV file, it is important to remember that the absolute tag address must be used. This means that if the tag requires a specific OPC Channel and Device, those must be included in the address.

For example, if you wish to read value the Life Byte value for a Siemens S7 project, located in data block 3 at offset 4, using an OPC Channel called 'S7' and an OPC Device called 'Device', you would need to use the following address:

```
S7.Device.DB3,BYTE4
```

Click the arrowed '**Import**' button and Browse to folder and select the file to be imported when importing a file.

5.3.4   Redundancy

Service Redundancy enables an Accord Server installation to act as a backup for another networked Accord Server Service installation.
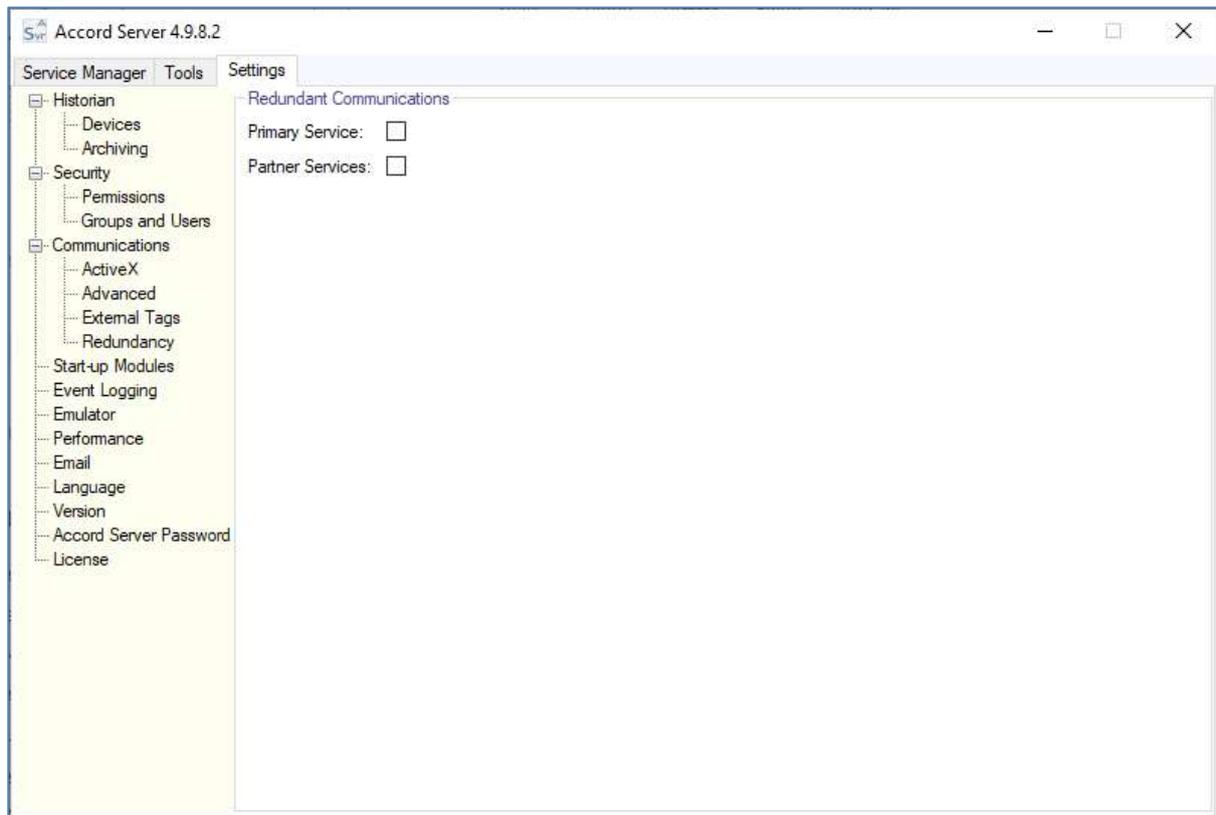
Service Redundancy

5.3.4.1 Primary Service versus Partner Service

A Primary Service is intended to be the first services relating to projects. In a typical network scenario, the Primary Service would be installed on the machine that is of optimal performance and in the best location to provide the required services as efficiently and as affectively as possible. Any Accord Server service that has a project deployed directly through its service is automatically considered a Primary Service, even if the Primary Service option is not enabled for that service.

A Partner Service is a service that is acting as a backup for a Primary Service and is only contacted by clients in the event of a failure in the Primary Service. Partner projects are also only activated on an as needed basis, and historical data is maintained only until the Primary Service indicates that it is ready to receive the data.

5.3.4.2   How does it work?

Once Accord Server Service is started, with the Primary Service option enabled, the service publishes access to project related data via the network. If another service on the network wishes to form a Partnership with this service, it will now be able to do so. If a Partnership is established and the Partner Service is started, the Partner Service will request permission to perform consolidation of data between the two services, ensuring that both are in a consistent state. This means that any projects managed by the Primary Service will be automatically copied to the Partner Service, as long as the Partner Service does not possess existing projects that are considered a higher priority than those managed by the Primary Service.

Once consolidation has completed, the Partner Service will watch the state of the Primary Service, ensuring the service is operating correctly. If the Partner Service detects that the Primary Service is no longer operating, it will trigger the activation of all projects it obtained from that service, performing their roles until such a time as the Primary Service is restored. Upon restoration of the Primary Service, firstly the Partner Service will automatically consolidate all changes that occurred during the downtime with the Primary Service and then the Partner Service will deactivate all projects it obtained from that service to conserve resources. This is to ensure that the Primary Service is up to date before switching operations back to using the Primary Service.

Consolidation of configuration data (i.e., Model, Recipes, Schedules) behaves in a two way manner. This means any changes made on Primary will be copied over to Partner and vice versa. On the other hand, consolidation of historical data (i.e., Audit trails, device history), is only one-way, from Partner to Primary. Historical data will be wiped from secondary once copied to Primary to save resources.

This means that all exchange of data between the services is handled automatically, significantly simplifying the configuration process. Any changes that are performed during the downtime are automatically consolidated on an as needed basis, without any need for external interaction by the user. The distinct advantage of this approach is that the user is not restricted from performing downloads and altering logging or security configurations for the project while the Partner Service is providing the required services. Changes to the Primary Service while it is active are also automatically consolidated with its respective Partners. Configuring a Primary Service

To configure a Primary Service, please ensure to follow these steps:

1. Select '**Redundancy**' under the '**Communications**' node from the settings tree.
2. Tick the '**Primary Service**' box if the intent is to enable Primary Services, otherwise un-tick the box.

3. Type the desired Port number into the '**Communications Port**' field. This is the Port that Partner Services will use to communication with the service.

4. Check that SQL Server on the Primary Service has the '**TCP/IP**' protocol enabled on SQL Configuration Manager.
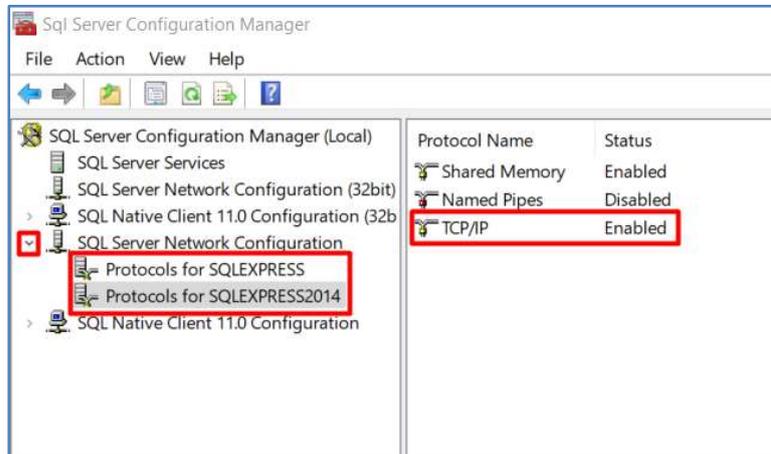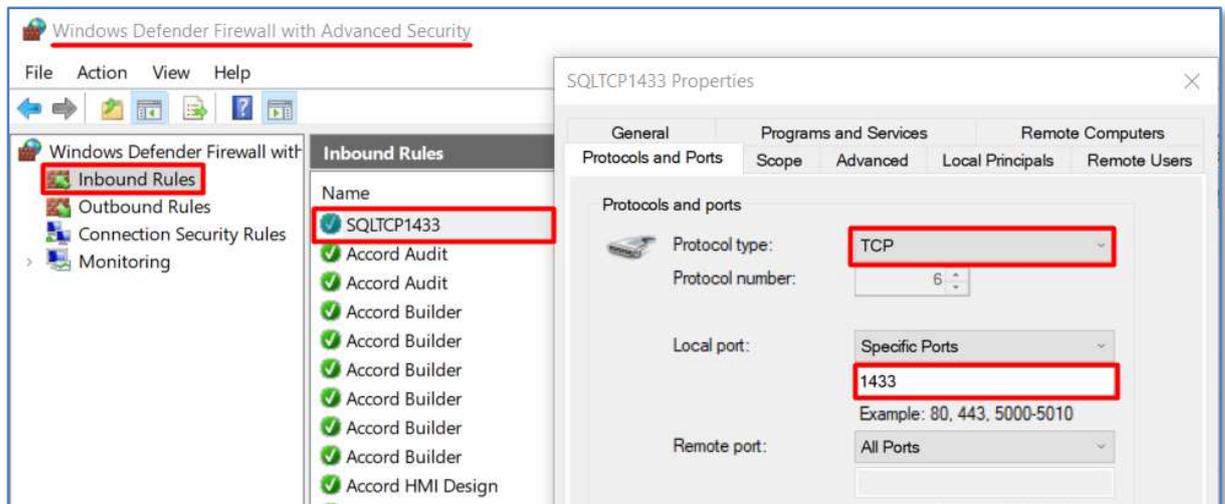

Enable TCP/IP for SQL Server

5. Double click the '**TCP/IP**' protocol and ensure that 1433 is assigned as the port number.
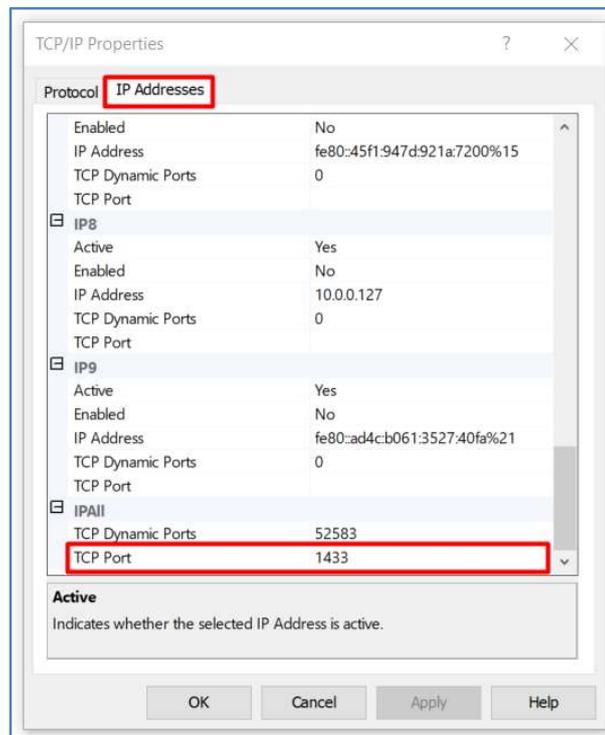
SQL Server TCP/IP Port Configuration

6. Create Windows Firewall rule to allow incoming traffic through this port.

Allow TCP through Port 1433

7. Ensure matching Windows user credentials are used on both the Primary and Partner Service. The Windows account must have a password and is an administrator account or else Partner connection to Primary SQL Server will fail (e.g., **'Partner Service'** machine is logged in as administrator account with name 'Admin' and password '1234'. A local account with the same name, password and type must exist on the **'Primary Service'** machine.).

8. Navigate to SQL Management Server Studio and ensure that **'BUILTIN/Users'** are granted **'sysadmin'** role.
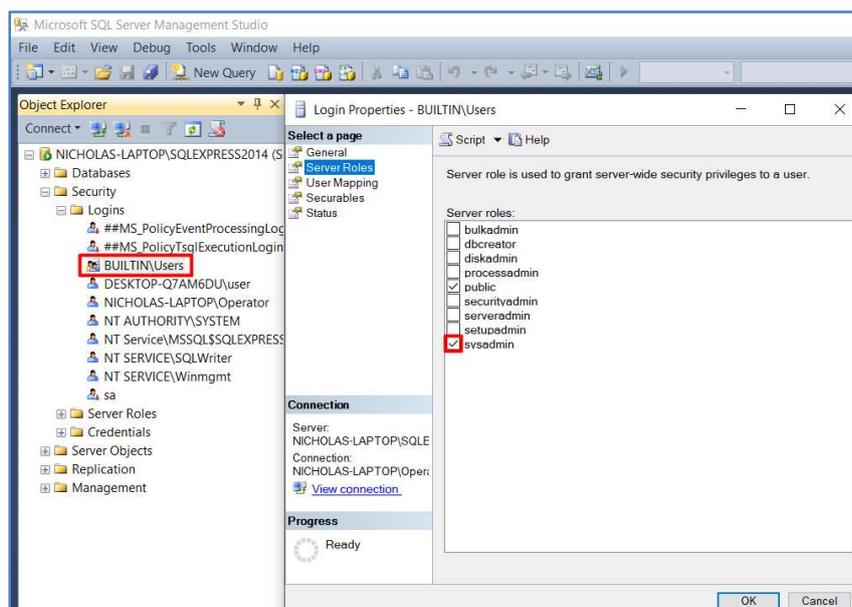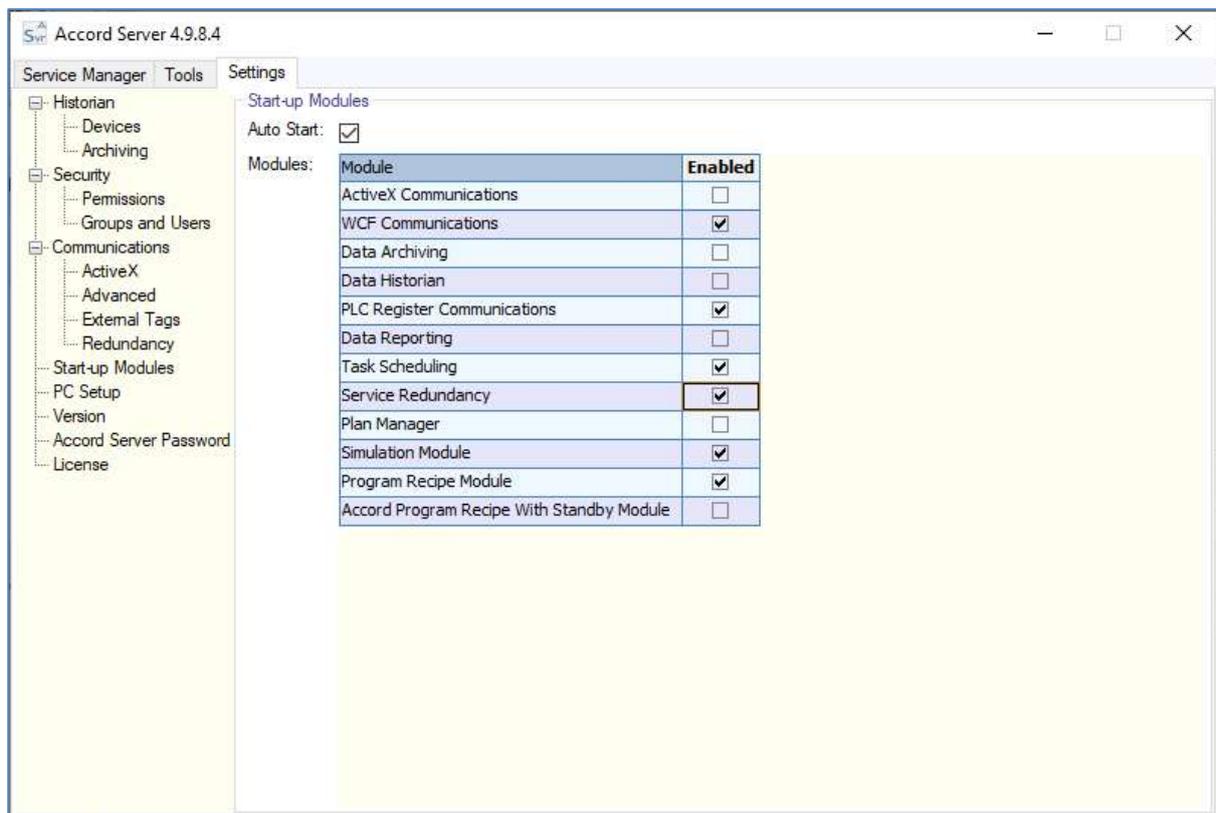

SQL Server Login Setup

11. In Settings, press on ActiveX and check that visibility is set to Network.
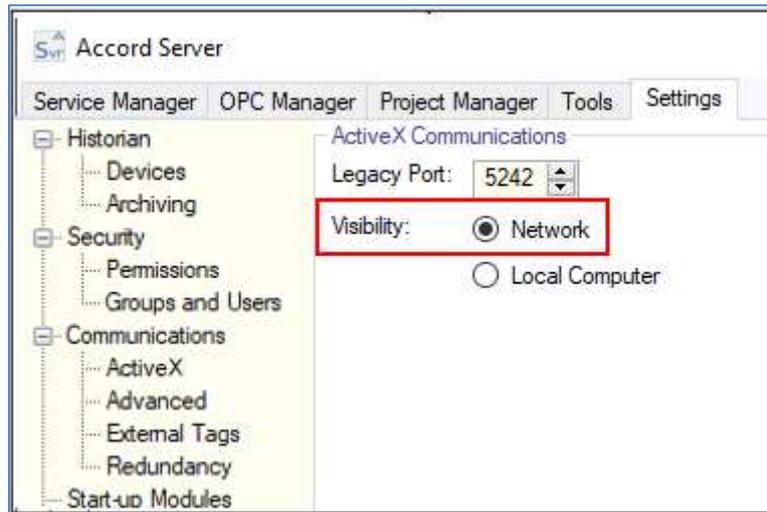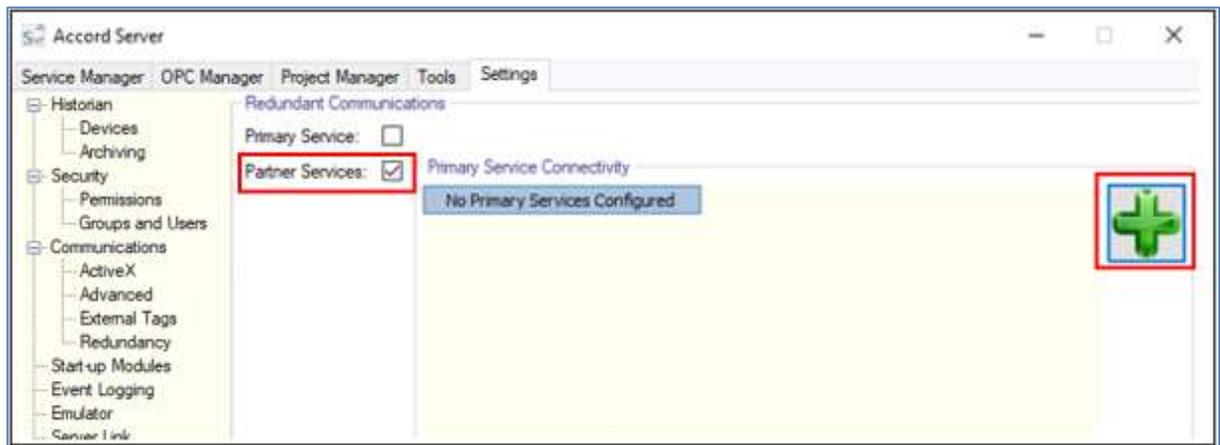

Select ActiveX Network

12. In Settings, select Start-up Modules and ensure that Service Redundancy is Enabled.


Activate Redundancy

5.3.4.3   Configuring a Partner Service

In Accord Server in Partner PC - Select '**Redundancy**' and tick the '**Partner Service**' box and click the '**+**' button on the top right of the Partnerships listing to produce the '**New Redundancy Pairing**' dialog.

Creating a Partner Service

Note: *Redundancy consolidation requires a direct connection between SQL Server instances and is configured to use Windows Authentication. Both computers hosting the database servers must be part of the same domain or have same login credentials.*
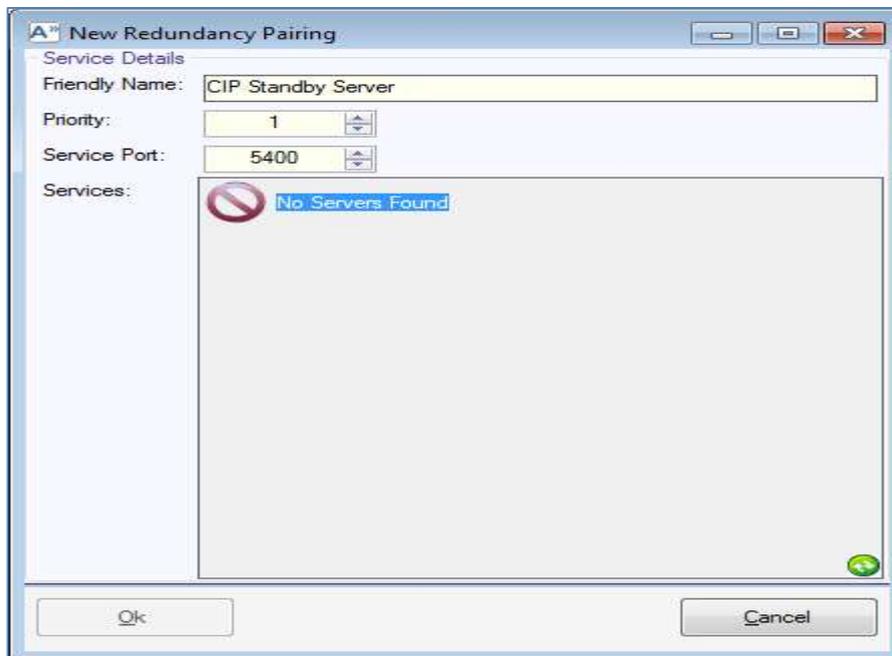

Naming the Partner Service

1. Type a unique '**Friendly Name**' for the Partnership.
2. Assign a '**Priority**' value to the Partnership, indicating how Accord Server should treat this Partnership with regards to conflicts with other potential Partnerships. If you are unsure what value to assign it, use the value Accord Server automatically assigned it.

3. Type the desired Port number into the '**Service Port**' field. This number corresponds with the '**Communications Port**' configured for the Primary Service.
4. Select the desired Service from the '**Services**' list.

Note: If the desired Service is not listed, ensure that the service is running and that the Primary service port matches the one on the search dialog (Not the Advanced Service port). Then, click the green 'Refresh' button that will become visible at the bottom right of the Services list, once it has completed the task of searching for services.

Select the Partner Service and Click the '**X**' button to Delete the Partnership function.
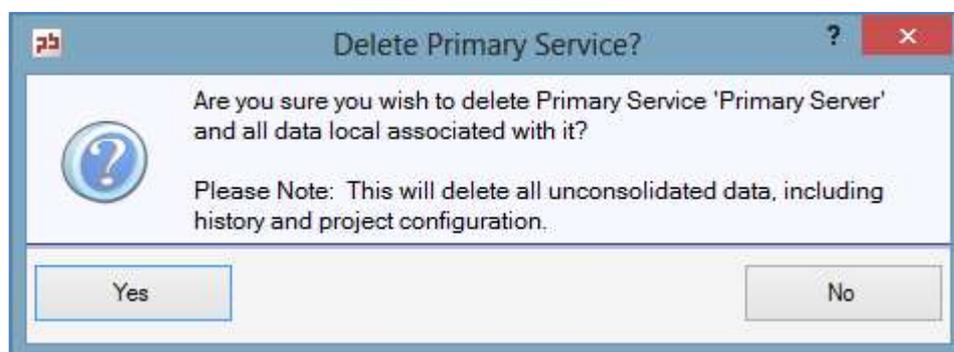
Deleting a Partnership

To change the name for a Partnership:
Select the '**Name**' field for the desired Partnership and type the new unique name value.
Note: If the new name conflicts with an existing name, no change will be made.

To change the target server for a Partnership:
Select the '**Server**' field for the desired Partnership and Enter a new server.

To change the target server for a Partnership:
Select the '**Port**' field for the desired Partnership and enter the new port value.

To change the target server for a Partnership:
Select the '**Priority**' field for the desired Partnership and enter a new priority value.
Note: If an existing Partnership has the same priority value, the existing Partnership will be automatically demoted, along with any other Partnerships beneath it in priority.

5.3.4.4 Firewall Settings

Any firewall setup on computer can impact successful communication between any of the nodes in the system, please follow this guide to disable firewall if disabling is necessary.

1. In computer Search Engine type Firewall.
2. Select Windows Defender Firewall.
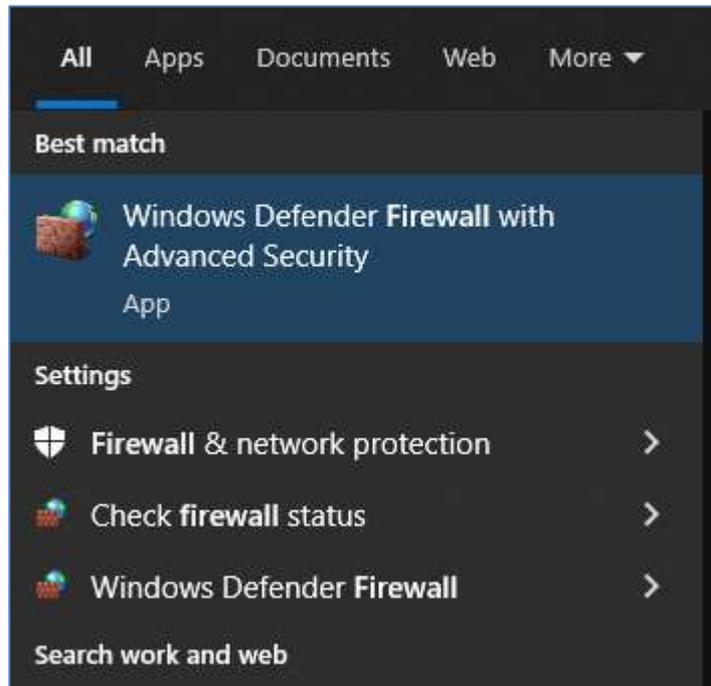
Access Firewall

3. In the form displayed press Turn Windows Defender Firewall on or off.
4. Check that all firewalls disabled, see image below for reference.

Disable Firewall

5. Type Firewall into Search Engine again.
6. Select Firewall & network protection.
7. Check that all Firewall are off. See image below for reference.

5.3.4.5 Summary for Pairing Set-Up

Accord Server is installed on one PC as a Primary PC and on another as Partner.

Both PC's must have the same user and password logged in to Windows. This is required for SQL remote login. TCP/IP protocol must be enabled for SQL Server and configured for port 1433. TCP protocol must be enabled in firewall on port 1433 on the Primary. Sysadmin role must be granted to BUILTIN users on SQL Server Management Studio.

The Partner Server must not have a default OPC Profile, it is to be deleted.

5.4   Start-up Modules

Start-up Modules allows the user to enable/disable optional Service modules. This is useful when dealing with limited system resources. For example, if the system does not have Recipes or Plans then those modules would not be selected.
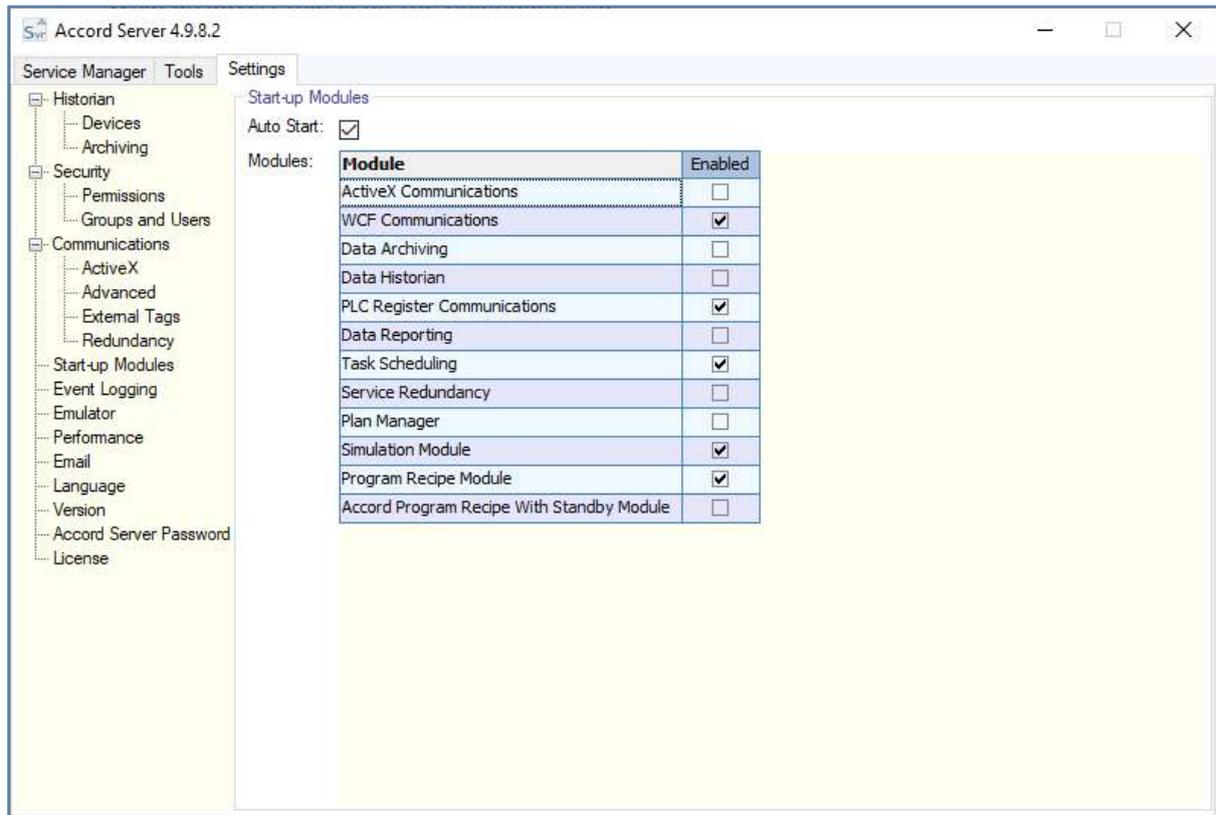
Start-up Modules

To Enable/Disable Auto Start:

Select '**Start-up Modules**' from the settings tree and tick the '**Auto Start'** box.
Un-tick the '**Auto Start**' box to disable Auto Start.
Note: Deactivating Auto Start means that Accord Server will no longer automatically run when Windows starts.

To Activate/Deactivate a module:

Select '**Start-up Modules**' from the settings tree and Tick the '**Enabled**' box for the module.

Note: Permanently deactivating a module means that all functionality that module provides to other dependent modules is no longer available. It is strongly recommended to verify the service operates as intended following the deactivation of a module.

...

5.5 Server PC Setup
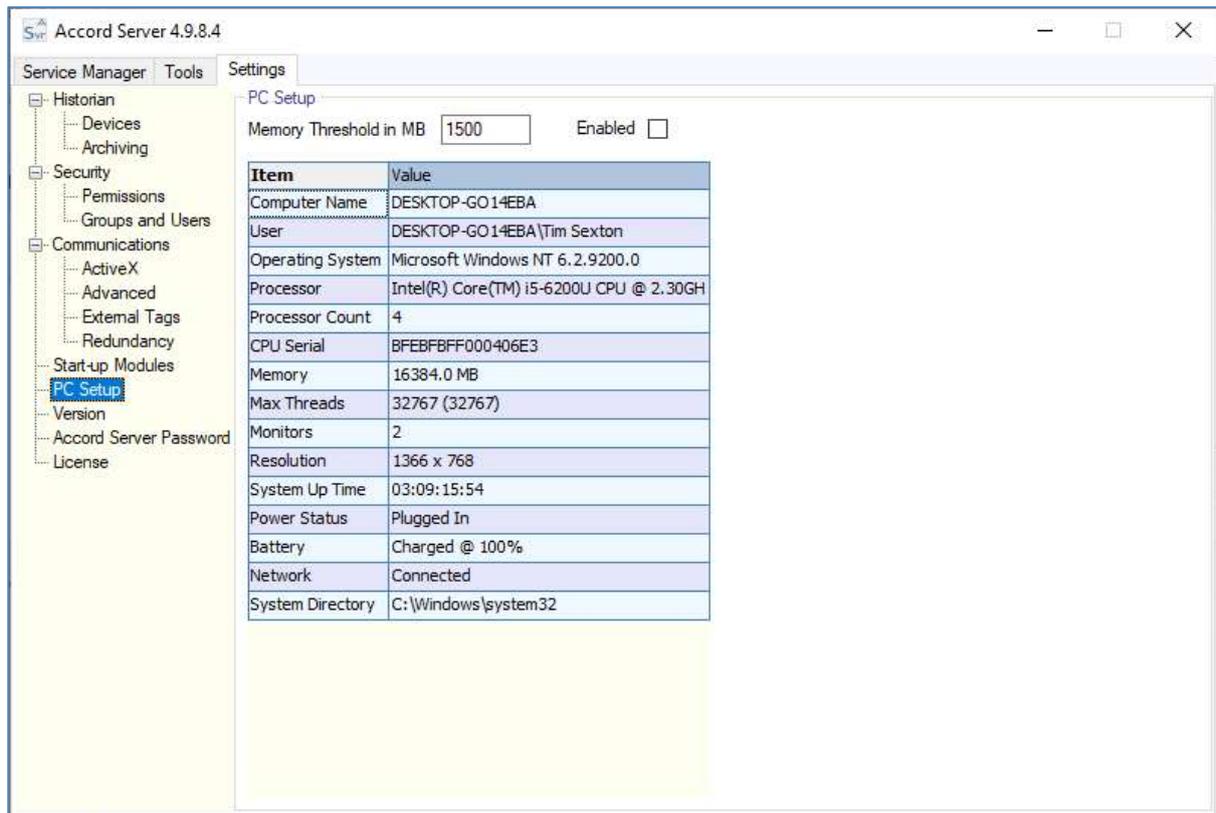
PC Setup

### 5.5.1 Setting the Memory Threshold

The Memory Threshold is a limit for the amount of Memory that Accord server can use. If the limit is exceeded (due to PC being used for another process or communication overload) then the Server module will restart. This is to avoid prolonged outages, if possible.

To change the desired Threshold setting:

Select '**Server PC Setup**' from the settings tree and Enable the Memory Threshold by clicking on the tickbox and adjust the threshold figure as required. Accord should normally use less than 500mB of memory, so 1500 Mb is a large threshold.

5.6   Version

The Version section provides a summary of all assembles Accord Server is dependent on, along with their version numbers. It is not possible to configure any settings from this area.
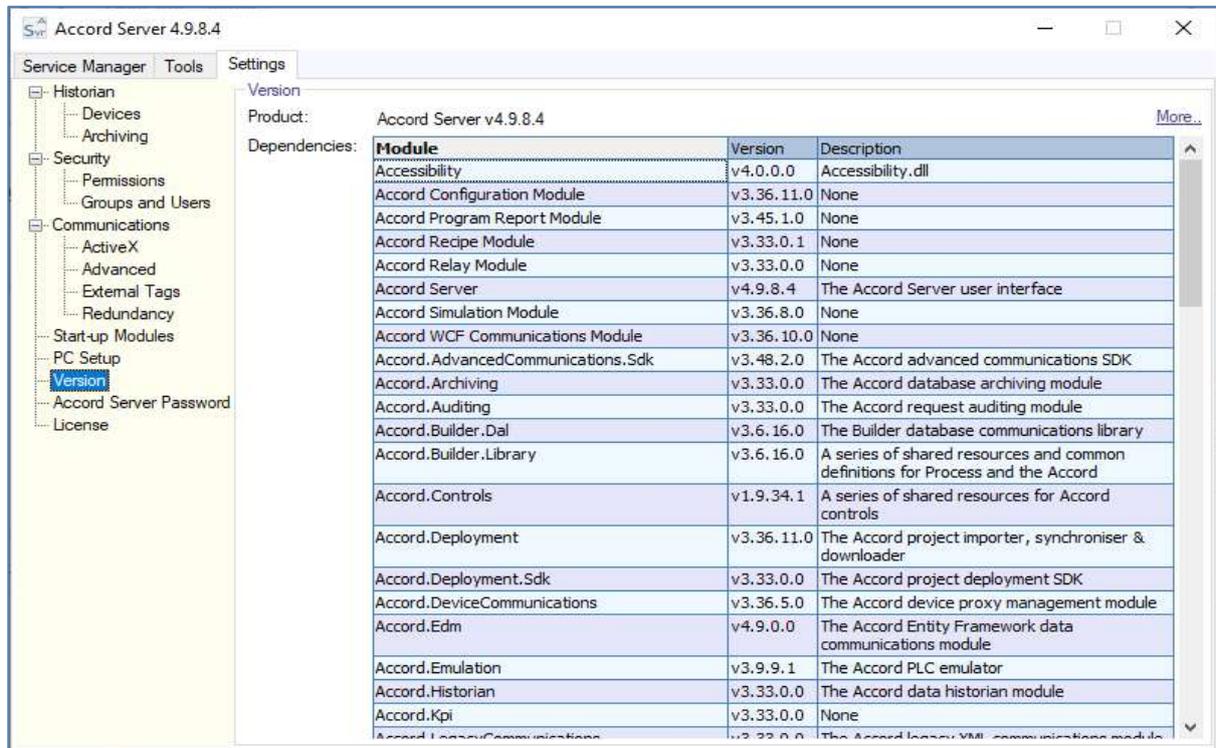
Accord Server Version Information

5.7   Accord Server Password

Accord Server has a log in, for settings and use of Tools, and this is password protected. The default password may be changed here. Note: It will not be possible for Accord technical support to retrieve the password if it is lost once it is changed.
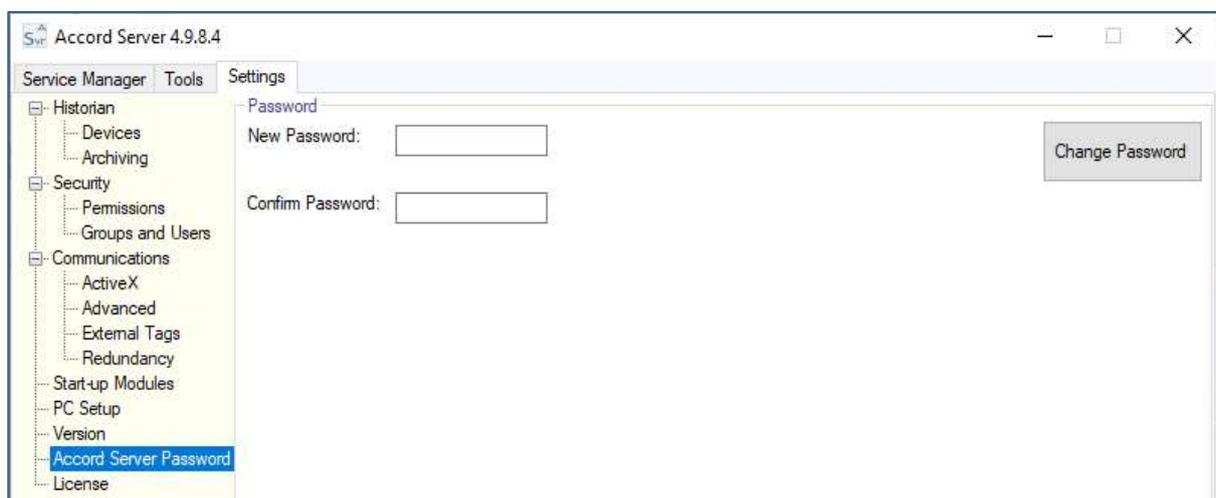
Accord Server Password Panel

5.8 Licensing

The License section provides a summary of all features currently licensed to Accord Server. A new license may be applied by clicking the "Change License" button.
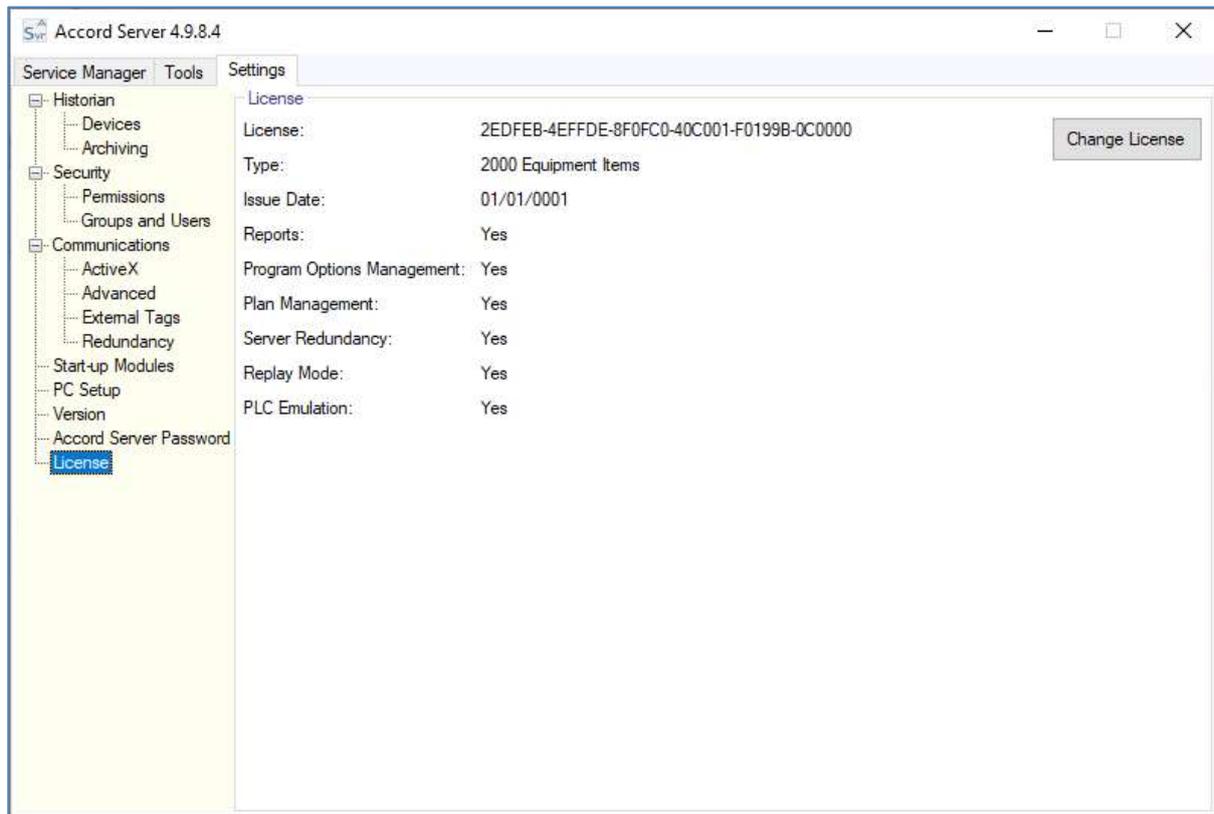
Accord License Information

5.8.1 Configuring a License

To configure a license for Accord Server:

1. Click '**Change License**'.

2. On the '**Voucher Activation**' dialog:
Ensure an internet connection is established.

Contact a supplier to obtain a license code if internet connection is not available.

Type the '**Voucher Code**' provided by your supplier into the '**Voucher Number**' field and click '**Activate**'. Accord Server will contact the licensing service and licence the Services.
Or
Type a license code directly into the '**License Code**' field.

Voucher Activation

3. Verify that the required module and project sizes are licenced.

5.9 Service Redundancy

5.9.1 Primary Service Not Found

When configuring a Partner Service, it is required to select an active Primary Service. If the '**New Redundancy Pairing**' dialog is unable to connect to the service, verify the following:

- Verify the Primary Service is running.
- Verify the Service Redundancy module has been selected as a start-up module on the Primary Service.
- Verify there is no error on the Service Redundancy module for the Primary Service.
- Verify the Primary Service has been configured to publish as a Primary Service.
- Verify the '**Service Port**' configured on the Partner Service matches the '**Communications Port**' configured on the Primary Service.
- Verify there is no firewall blocking connections between the two Accord Server services. The blockage is usually on the side of the Primary Service.
- Verify the version of each Accord Server Service matches.

5.9.2 Consolidation Failures

Accord Server has a robust consolidation mechanism that ensures changes between the Primary and Partner Services are synchronised on a regular basis. Much of the work is processed by the Partner Service, reducing the strain on the Primary Service. This approach is logical since consolidation never happens while the Primary Service is down, meaning that once the Primary Service is operational, the Partner Service usually is idle and has resources to perform the complex consolidation process. In the event of consolidation failure, issues usually arise as a result of SQL Server communication issues, since the consolidation process requires a reliable connection between the Primary Service database and the Partner Service database be maintained throughout the procedure. If consolidation failures, verify the following:

- Verify the SQL Server Installation for the Primary Service is configured to permit connections over TCP/IP.
- Verify that both Services are logged in to Windows with matching user credentials.
- Verify that the credentials are given administrative roles on SQL Server Management.
- Verify there is no firewall blocking SQL Server connections. This problem is more likely to be as a result of poor firewall configuration on the computer hosting the Primary Service.
- Verify a stable network connection exists between both the Primary Service and the Partner Service.

The Partner Service will automatically activate/deactivate any project obtained from the Primary Service whenever the state of the Primary Service is detected to have changed. If the Primary Service and Partner Services are in states that contradict this model, the likely cause is related to a communications failure. The end result in this situation is that both the Primary and Partner Services will both be active at the same time. The Partner Service will not deactivate until such as time as communications with the Primary Service is restored, and that the Primary Service confirms services are operating as expected.

Multiple Accord Servers actively managing the same PLC results in a significant communications overhead and may result in a degradation of performance.