

Diamond Light Source Machine Protection

MDT Autosave

PLC Application Management
Software

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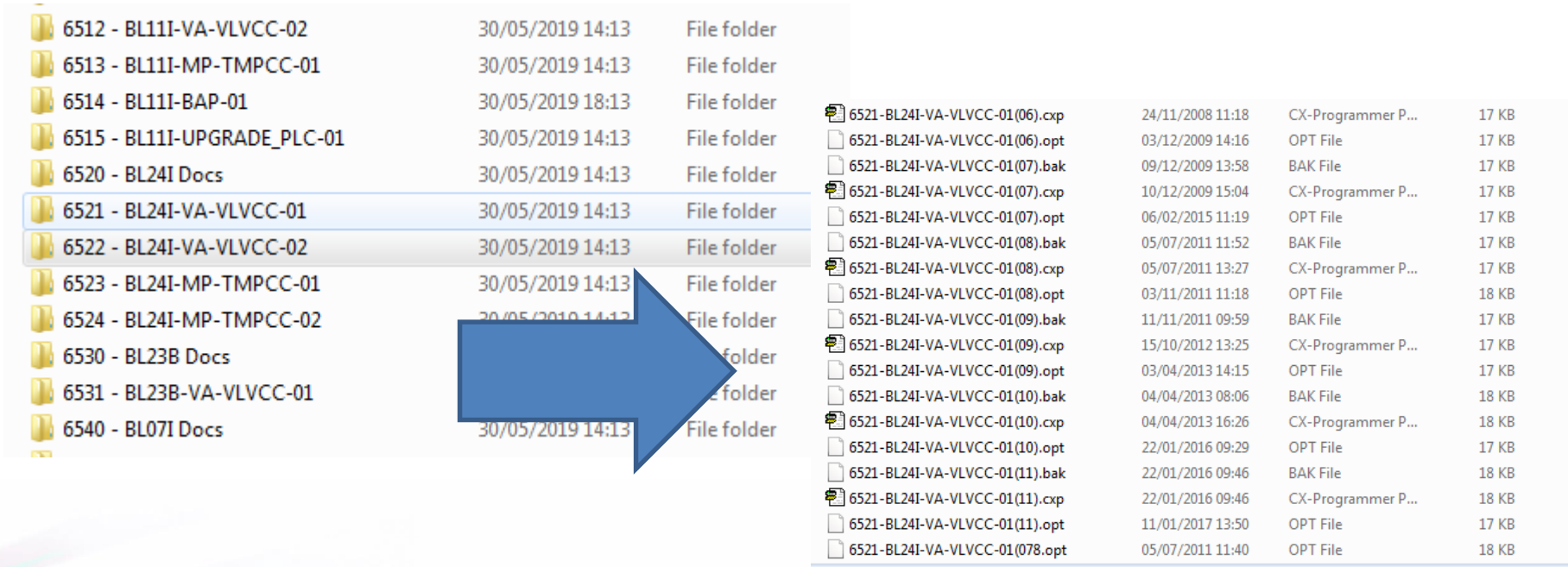
www.diamond.ac.uk



Small team of 3 involved with all applications on site from the beginning of Diamond

Everyone knew where everything was and what it did...

No need for a management tool...



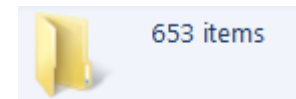
6512 - BL11I-VA-VLVCC-02	30/05/2019 14:13	File folder			
6513 - BL11I-MP-TMPCC-01	30/05/2019 14:13	File folder			
6514 - BL11I-BAP-01	30/05/2019 18:13	File folder			
6515 - BL11I-UPGRADE_PLCC-01	30/05/2019 14:13	File folder			
6520 - BL24I Docs	30/05/2019 14:13	File folder			
6521 - BL24I-VA-VLVCC-01	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(06).cpx	24/11/2008 11:18	CX-Programmer P... 17 KB
6522 - BL24I-VA-VLVCC-02	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(06).opt	03/12/2009 14:16	OPT File 17 KB
6523 - BL24I-MP-TMPCC-01	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(07).bak	09/12/2009 13:58	BAK File 17 KB
6524 - BL24I-MP-TMPCC-02	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(07).cpx	10/12/2009 15:04	CX-Programmer P... 17 KB
6530 - BL23B Docs	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(07).opt	06/02/2015 11:19	OPT File 17 KB
6531 - BL23B-VA-VLVCC-01	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(08).bak	05/07/2011 11:52	BAK File 17 KB
6540 - BL07I Docs	30/05/2019 14:13	File folder	6521-BL24I-VA-VLVCC-01(08).cpx	05/07/2011 13:27	CX-Programmer P... 17 KB
			6521-BL24I-VA-VLVCC-01(08).opt	03/11/2011 11:18	OPT File 18 KB
			6521-BL24I-VA-VLVCC-01(09).bak	11/11/2011 09:59	BAK File 17 KB
			6521-BL24I-VA-VLVCC-01(09).cpx	15/10/2012 13:25	CX-Programmer P... 17 KB
			6521-BL24I-VA-VLVCC-01(09).opt	03/04/2013 14:15	OPT File 17 KB
			6521-BL24I-VA-VLVCC-01(10).bak	04/04/2013 08:06	BAK File 18 KB
			6521-BL24I-VA-VLVCC-01(10).cpx	04/04/2013 16:26	CX-Programmer P... 18 KB
			6521-BL24I-VA-VLVCC-01(10).opt	22/01/2016 09:29	OPT File 17 KB
			6521-BL24I-VA-VLVCC-01(11).bak	22/01/2016 09:46	BAK File 18 KB
			6521-BL24I-VA-VLVCC-01(11).cpx	22/01/2016 09:46	CX-Programmer P... 18 KB
			6521-BL24I-VA-VLVCC-01(11).opt	11/01/2017 13:50	OPT File 17 KB
			6521-BL24I-VA-VLVCC-01(078).opt	05/07/2011 11:40	OPT File 18 KB

Every change had to be manually saved with a new filename and revision number.

- Programs were stored in a “system” which was only understood by the original staff

6103 - FE03I-VA-VLVCC-01
6104 - FE04I-VA-VLVCC-01
6105 - FE05I-VA-VLVCC-01
6106 - FE06I-VA-VLVCC-01
6107 - FE07I-CS-VLVCC-01
6108 - FE08I-VA-VLVCC-01
6110 - FE10I-VA-VLVCC-01
6111 - FE11I-VA-VLVCC-01
6112 - FE12I-VA-VLVCC-01
6113 - FE13I-VA-VLVCC-01
6114 - FE14I-VA-VLVCC-01
6115 - FE15I-VA-VLVCC-01
6116 - FE16I-VA-VLVCC-01
6118 - FE18I-VA-VLVCC-01
6119 - FE19I-VA-VLVCC-01
6120 - FE20I-VA-VLVCC-01
6121 - FE21I-VA-VLVCC-01
6122 - FE22I-VA-VLVCC-01
6123 - FE23I-VA-VLVCC-01
6124 - FE24I-VA-VLVCC-01
6125 - FE09I-VA-VLVCC-01

..not here?



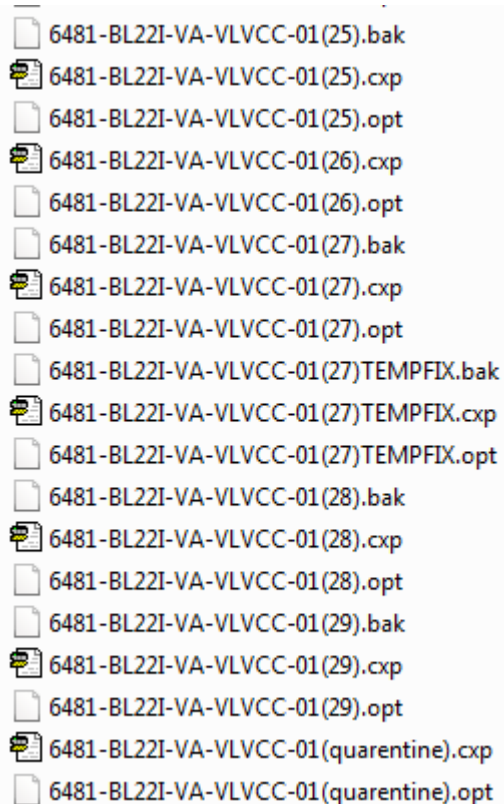
‘Only’ 653 items to choose from, in a single folder, each containing multiple copies or revisions of an application

Why is this...

- Naming convention wasn't always used and naming system would break down



- Programs would be stored in incorrect locations or would have wrong name/revision number applied



6481-BL22I-VA-VLVCC-01(25).bak
6481-BL22I-VA-VLVCC-01(25).cxp
6481-BL22I-VA-VLVCC-01(25).opt
6481-BL22I-VA-VLVCC-01(26).cxp
6481-BL22I-VA-VLVCC-01(26).opt
6481-BL22I-VA-VLVCC-01(27).bak
6481-BL22I-VA-VLVCC-01(27).cxp
6481-BL22I-VA-VLVCC-01(27).opt
6481-BL22I-VA-VLVCC-01(27)TEMPFIX.bak
6481-BL22I-VA-VLVCC-01(27)TEMPFIX.cxp
6481-BL22I-VA-VLVCC-01(27)TEMPFIX.opt
6481-BL22I-VA-VLVCC-01(28).bak
6481-BL22I-VA-VLVCC-01(28).cxp
6481-BL22I-VA-VLVCC-01(28).opt
6481-BL22I-VA-VLVCC-01(29).bak
6481-BL22I-VA-VLVCC-01(29).cxp
6481-BL22I-VA-VLVCC-01(29).opt
6481-BL22I-VA-VLVCC-01(quarentine).cxp
6481-BL22I-VA-VLVCC-01(quarentine).opt

A manual task to rename or save files in a specific format which isn't enforced leads to mistakes, especially when the programmer is under pressure!

- The date it was stored in the folder wasn't always the date the code was changed



- Anyone with access to the folder could change it and no record kept of who opened/edited files



Until... *Disaster!*

A system still under development was left running, an untested part of the code was executed and caused damage to equipment....

The code that was running was previously used successfully, but had been modified and there was no trail of changes to check as to *what* or *when* it had been changed, or indeed *why*?

Investigation revealed that one of the things we lacked was a way to control our application software, we had some requirements such as:

- Ease of use
- Program Tracking
- Minimal user interaction
- Able to use compiled binary files
- Flexibility of file types (HMI, Remote I/O Configs)

In the end a solution “Autosave” from “MDT Software” was selected to manage our software.

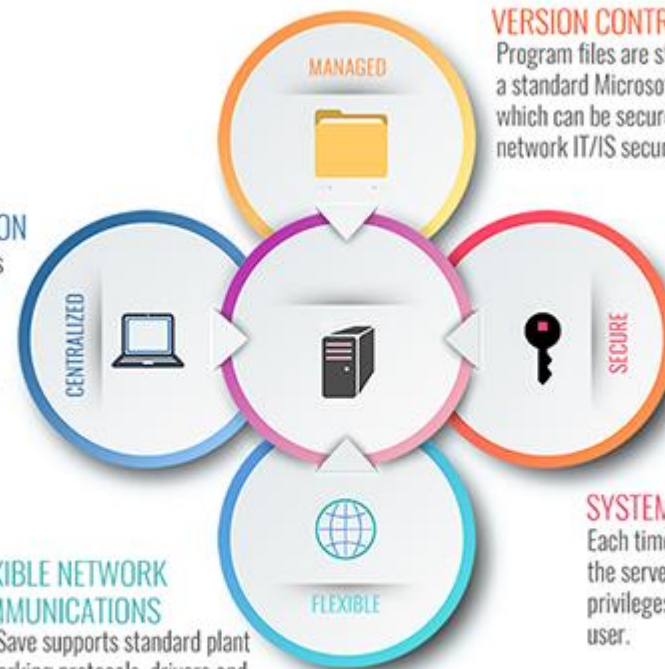


CENTRAL COORDINATION

All scheduled events such as scheduled comparison, automation backup and recovery, and change notification are managed by the server.

FLEXIBLE NETWORK COMMUNICATIONS

AutoSave supports standard plant networking protocols, drivers and devices. AutoSave uses the same communications you enjoy with your programming editor.

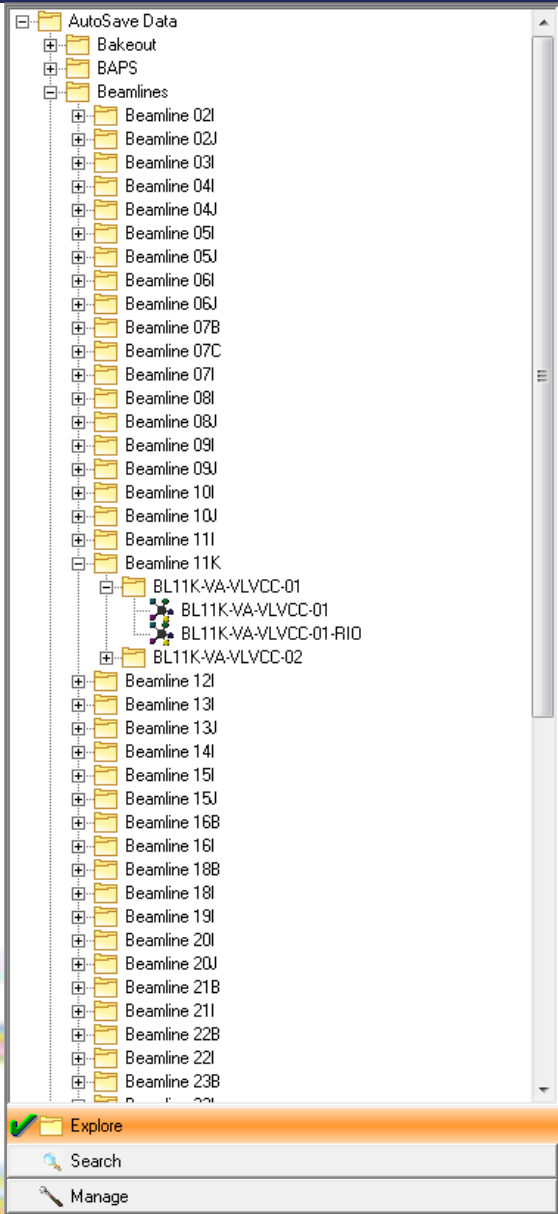


VERSION CONTROL LIBRARY

Program files are stored and managed in a standard Microsoft Windows folder which can be secured using appropriate network IT/IS security methods.

SYSTEM SECURITY




Each time an AutoSave client logs in, the server determines the level of privileges and authorization for the user.



- Applications are shown to the user in a logical format, easily searchable
- Each folder and program can be given permissions

Opening a program shows its revision history, including User, the computer they used, how they stored the code after making changes and some comments. All previous versions of the code are available to open.

Summary | Parameters | Scheduled Commands

Description


Location

Select Device





This Current has never been confirmed to match the Device.

Version	Revision	Store Date	Full Name	Client	Method	Comments
Current	00034	23/09/2019 08:54:17	Simon Lay	DIAMRL5399	Launch	Corrected initial indication on FE absorber permit.
	00033	23/08/2019 08:46:25	Simon Lay	DIAMRL5399	Launch	Added in chiller flow to D98.12 for C.C to shut absorber if flow fails.
	00032	15/08/2019 17:35:26	Nickie Griffin	DIAMRL5662	Launch	Fixes for Module 7 - 10 EPICS and DDs
	00031	03/06/2019 09:53:28	Ken Jones	DIAMRL5333	Launch	modified interlock chain for mps non critical to include default set of temperature inte
	00030	15/05/2019 13:04:10	Shoalb Khaja	DIAMRD2831	Launch	Cleared all Duplicate Interlocks on Module 11
	00029	14/05/2019 09:15:30	Shoalb Khaja	DIAMRD2831	Local to Current	Mods For Motor Temps and Interlocks for epics
	00028	13/05/2019 15:44:45	Ken Jones	DIAMRD2981	Launch	Few more additions for new temperature interlocks
	00027	13/05/2019 15:17:28	Shoalb Khaja	DIAMRD2831	Launch	Modification for Device Drivers - Motion Step 1.2.3.4
	00026	13/05/2019 14:26:04	Shoalb Khaja	DIAMRD2831	Launch	Modification for temperature INTERLOCKS
	00025	13/05/2019 10:56:37	Ken Jones	DIAMRD2981	Launch	modified prev/next and non critical interlocks for vlvcc-02 changes
	00024	09/04/2019 11:46:58	Nickie Griffin	DIAMRL5662	Launch	Added RGA reboots
	00023	12/02/2019 15:49:56	Simon Lay	DIAMRL5399	Launch	Checked MPC enables and corrected one.
	00022	08/02/2019 13:46:11	Simon Lay	DIAMRL5399	Launch	D1 In beam stop position Wired wrongly (NC) so corrected and commented.
	00021	28/01/2019 16:43:24	Simon Lay	DIAMRL5399	Launch	Added in water interlocks, corrected GRIO validation and stopped the valve close c
	00020	21/01/2019 15:54:05	Simon Lay	DIAMRL5399	Launch	Added in RGA enables for 3, 4 & 5.
	00019	18/01/2019 14:46:51	Simon Lay	DIAMRL5399	Launch	IMG interlocks for valves anded with aborber open and valve open.
	00018	17/01/2019 15:09:12	Nickie Griffin	DIAMRL5662	Launch	Forwarding of ABS-01 to VLVCC-02
	00017	17/01/2019 13:53:20	Nickie Griffin	DIAMRL5662	Launch	First Pass Interlocks Added
	00016	10/12/2018 17:05:23	Simon Lay	DIAMRL5399	Launch	Added in space for D1 closed limit
	00015	10/12/2018 14:52:17	Simon Lay	DIAMRL5399	Launch	Swapped IMG 2 / 3 and PIRG 2 / 3 Gauge controllers to match hardware changes.
	00014	04/12/2018 11:25:32	Nickie Griffin	DIAMRL5662	Launch	Interlocks added for 1st Light
	00013	26/11/2018 13:46:56	Nick Dawkins	DIAMRL5676	Launch	Updated non crit intlk. P_On'd temps not used for first light and added PHDGN temp
	00012	23/11/2018 11:05:00	Nick Dawkins	DIAMRL5676	Launch	Labelled and added FE permits and prelim MPC enables
	00011	22/11/2018 15:28:24	Nick Dawkins	DIAMRL5676	Launch	Put RIO healthy signals into beamline order
	00010	15/11/2018 13:44:47	Nick Dawkins	DIAMRL5676	Launch	Added P_Off's to valve interlocks to prevent accidental use.
	00009	14/11/2018 10:19:40	Nickie Griffin	DIAMRD4393	Launch	Update
	00008	13/11/2018 18:59:29	Nickie Griffin	DIAMRD4393	Launch	Interlocks Update, Smart Slice Monitoring and Tidy Up
	00007	12/11/2018 18:25:09	Nickie Griffin	DIAMRD4393	Launch	Update of IO to "As Built" drawing (Rev D). Water Interlocks added.
	00006	12/11/2018 10:55:55	Nickie Griffin	DIAMRL5662	Launch	Commissioning Update
	00005	10/09/2018 11:37:13	Nickie Griffin	DIAMRL5662	Local to Current	Updated IP Address

My Computer



AutoSave Universal
v5.02.16.85

Save Close Messages

Revision Detailed Information ✕

Revision Details | Revision Relationship

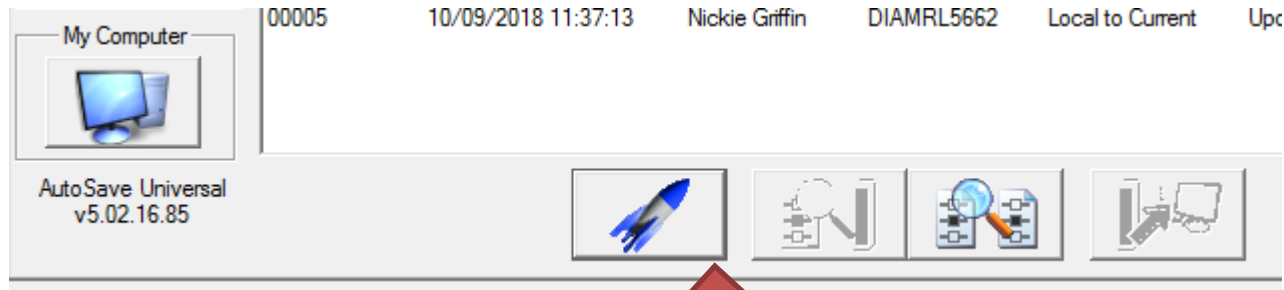
Information about this revision

Attribute	Value
Name	anc00034
Is Current	Yes
Method	Launch
Store Date	23/08/2019 08:54:17
User	scl73
User Full Name	Simon Lay
Client	DIAMRL5399
Control Number	
File Name	anc00034.zip
Physical File Name	r0002914.zip

Comment

Corrected initial indication on FE absorber permit.

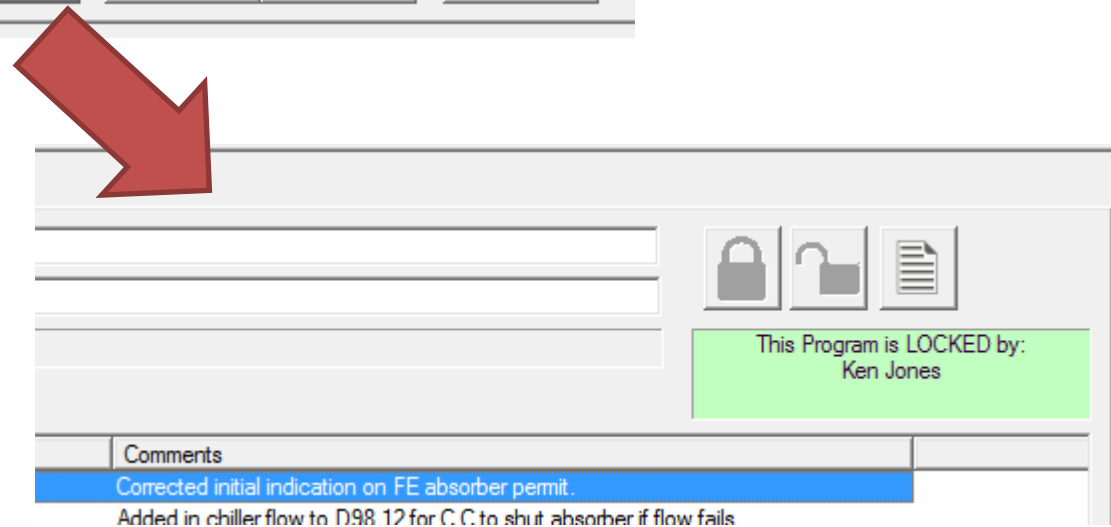
OK Cancel Apply



Clicking the rocket to launch your application, will lock the code for other users, they can view but can't make changes to the server without unlocking it first.

The code is unzipped to your local machine

The launch command is only available to the latest version, older versions of your application require more user interaction

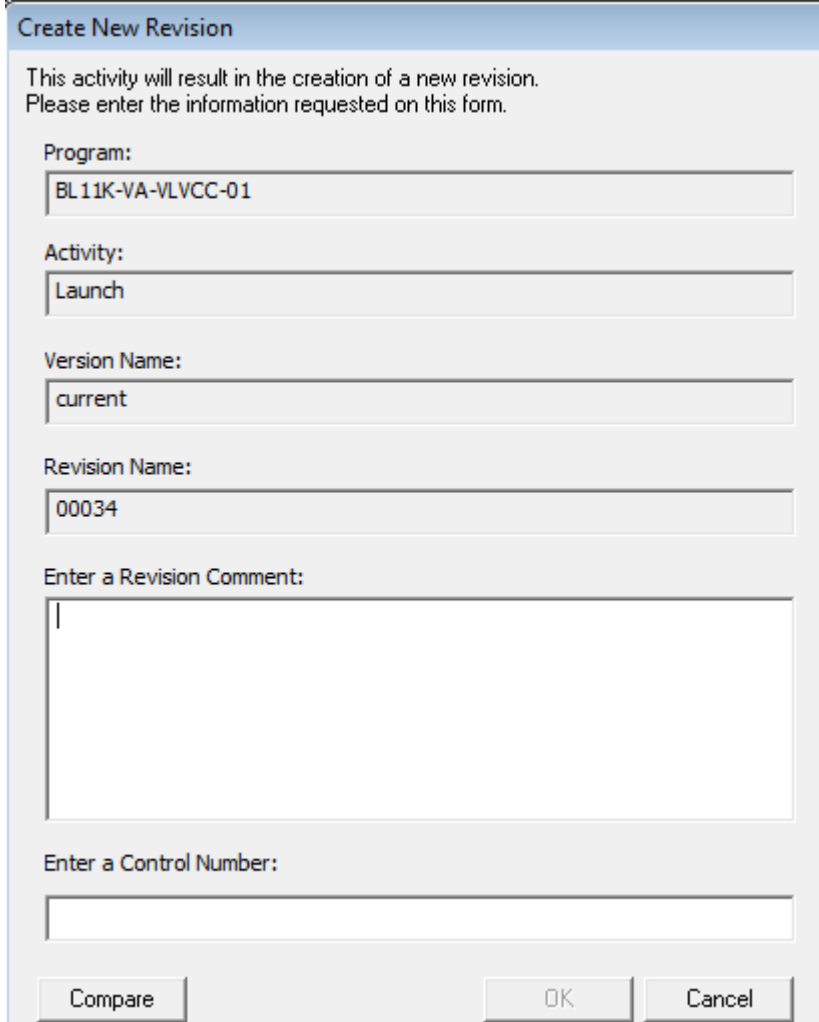


The lock stays enabled whilst your programming software is open. Or until someone requests an unlock.

When you have closed your programming software, a prompt appears asking for details of the new revision.

If any changes were made and the comment is complete, the code is then zipped and stored on the server.

A new revision number is applied and is immediately available for all authorized users to access.



Create New Revision

This activity will result in the creation of a new revision. Please enter the information requested on this form.

Program:
BL11K-VA-VLCC-01

Activity:
Launch

Version Name:
current

Revision Name:
00034

Enter a Revision Comment:

Enter a Control Number:

Compare OK Cancel

- Back-end runs on SQL server, data can be extracted and used on other systems
- Applications to access software can be installed from portal website on the server
- Since adding all of our applications from our old folder structure to Autosave, we discovered many programs did not match what was running on the PLC and had to be re-uploaded.

MDT Autosave

Pros:

- Very flexible, supports most major PLC/automation products through 'modules', which are added to bring manufacturer specific functionality
- Can be configured to compare programs over network or local copies (using plug-ins)
- New staff/other users can access PLC code without overwriting or making changes.
- Intuitive interface

Cons:

- Price, licencing is on a per program basis
- Initial setup and adding new programs very clunky
- Requires network connection to open programs

Other options

- Git: Was trialled some time ago, wasn't usable due to binary files, requires a lot of user interaction
- Sysmac Studio: For new projects Omron supplies a built in Git repository, appears to be very cumbersome, but less than plain Git

