

# SRS

## XMPS-1000

### (GUI for programming software of PLC)

**Version<1.0>**

1. Graphical UI of programming software  
Ladder, Predefined FB, user defined FB etc.
2. Interpreter

|   |             |                      |          |                  |
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| SRS XMPS-1000   | Author      | Sagar Gupta          | Date     | 22 December 2021 |
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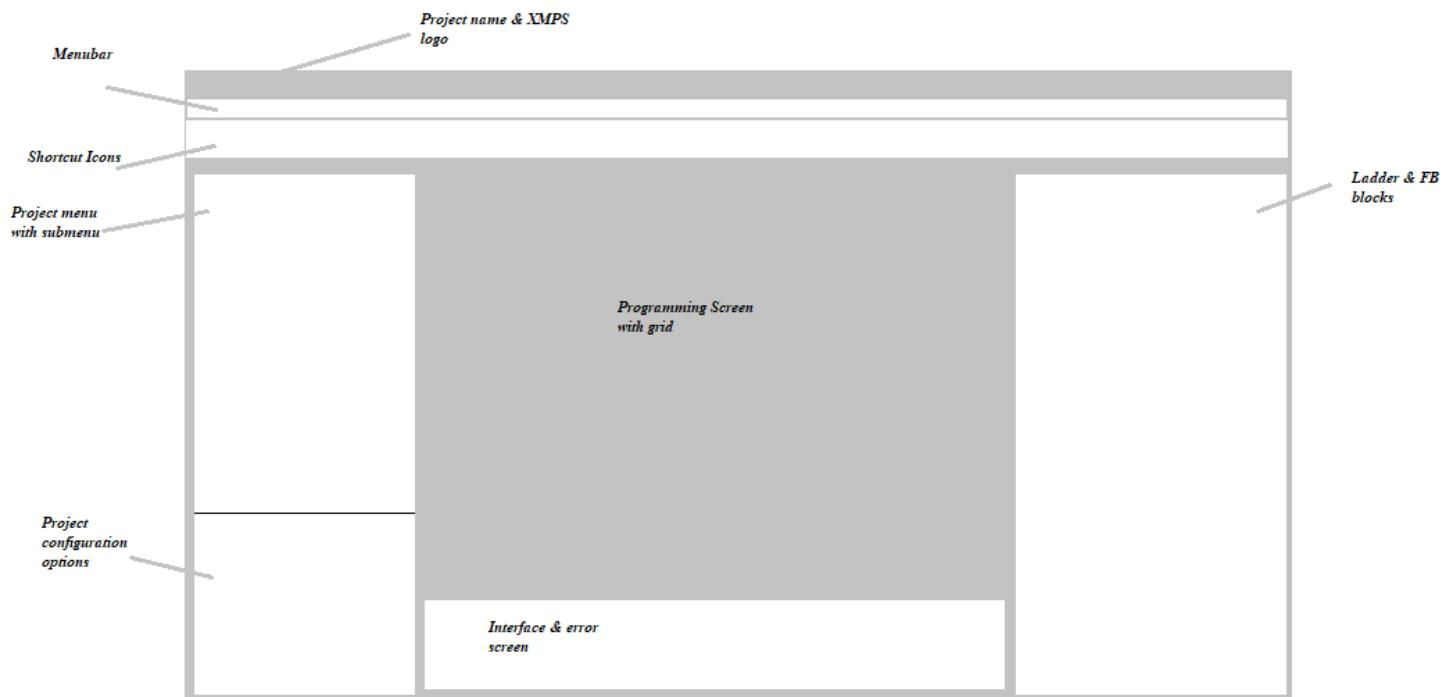
## 1. Introduction :

This is the Software Requirements Specification (SRS) document which provides an overview of the entire XMPS-1000 requirements.

## 2. Purpose:

In short, the purpose of this SRS document is to provide a detailed overview of our XMPS- 1000 software product, its parameters and goals. This document describes the project's user interface requirements. It will explain the purpose and features of the system, the interfaces of the system, Interpreter (code generation).

## Provisional Proposed UI :



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#### 4. Menu Bar :

4.1. Project : In “Project” menu following options should be added.

##### 4.1.1 New Project

Frontend-New Project

- Backend –
- a. New path for project
  - b. Select CPU option
  - c. If existing path choosed popup of warning.

##### 4.1.2 Open Project

Frontend- Open Project

- Backend-
- a. Open project popup
  - b. If exixsting project not saved then popup for saving the project

##### 4.1.3 - Save project

Frontend- Save project

- Backend-
- a.Save project latest changes

##### 4.1.4 Save As..

Frontend-Save As..

- Backend-
- a.Ask for saving project path

##### 4.1.5 Close Project

Frontend- Close Project

- Backend-
- a. Save the latest changes and close the project
  - b. only project should close not programming software

##### 4.1.6 Print

Frontend- Print

- Backend-
- a. Same as what we have done in XMPS-100

Print the ladder main program & configuration settings.

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#### 4.1.7 Exit

Frontend-Exit

Backend- a.Save and close the software.

### 4.2 Edit : In “Edit” menu following options should be added.

#### 4.2.1 Undo

Frontend-Undo

Backend- a. Undo the latest change (atleast last 15 changes)

#### 4.2.2 Redo

Frontend- Redo

Backend- a. Redo the changes (atleast 15 changes)

#### 4.2.3 Copy

Frontend-Copy

Backend- a. Copy the selected rung/instruction

b. Copy the selected project folder

c. Copy the selected program logic file

#### 4.2.4 Paste

Frontend-Paste

Backend- a.Paste the copied /cutted rung, instruction

b. Paste the copied/cutted folder

c. Paste the copied program logic file

#### 4.2.5 Cut

Frontend-Cut

Backend- a.Cut the selected rung/ instruction

b. Cut the folder

c. Cut the Program logic file

#### 4.2.6 Delete

Frontend-Delete

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- Backend-
- a. Delete the selected rung/ instruction
  - b. Delete the selected folder
  - c. Delete the selected program logic file

#### 4.2.7 Find & Replace

Frontend-Find & Replace

- Backend-
- a. Find the text
  - b. Find & replace the text

4.3 View : In "View" menu following options should be added.

##### 4.3.1 Device info

Frontend-Device info

After Click- It will show the XMPro CPU parameters

##### 4.3.2 Zoom

Frontend-Zoom

Backend-Should able to zoom the programming grid window

##### 4.3.3 Project Window

Frontend-Project Window

Backend-After click project window should Enable or Disable

##### 4.3.4 Compiler error screen

Frontend-Compiler error screen

Backend-After click compiler screen should Enable or Disable

4.4 Mode : In "Mode" menu following options should be added.

##### 4.4.1 Login

Frontend- Login

Backend-Sotware should connect with PLC via ethernet port & all editable functions should be disable, no program will edit in this mode only start & stop plc command should accept.

Online Monitoring option should enable.

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#### 4.4.2 Logout

Frontend-Logout

Backend- Logout the Login mode and Normal mode activate.

#### 4.4.3 Download Project

Frontend- Download Project

Backend-Save - Compile - Download the compiled file into the PLC via ethernet port

#### 4.4.4 Upload Project

Frontend- Upload project

Backend- Upload the project from PLC & display the project

#### 4.4.5 Offline Simulation

Frontend-Offline simulation

Backend- TBD

#### 4.4.6 PLC Start

Frontend- PLC start

Backend-PLC start command shoud go to PLC & this mode should active only if the user is Login to PLC

#### 4.4.7 PLC Stop

Frontend- PLC stop

Backend-PLC stop command shoud go to PLC & this mode should active only if the user is Login to PLC

#### 4.4.8 Compile

Frontend- Compile

Backend- Generate code as per requirement.

### 4.5 Help : In "Help" menu following options should be added.

#### 4.5.1 Index

Frontend Index

After click the Index of XMPS-1000 intruction help window should be open. And after clicking each of index point it will show the detail information of perticuler point.

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#### 4.5.2 Contents

Frontend-Contents

After click the Contents all help related to XMPS-1000 software should open.

#### 4.5.3 Search

Frontend-Search

Should open the search bar for the user.

#### 4.5.4 User annual

User manual PDf open.

### 5. Shortcut Bar :

In shortcut bar following symbols should be present:

5.1 New

5.2 Open

5.3 Save

5.4 Project close

5.5 Upload

5.6 Download

5.7 Zoom IN

5.8 Zoom out

5.9 Zoom % selection

5.10 Compile

5.11 Login

5.12 Logout

5.13 Run Online Monitering

5.14 Help

5.15 Cut

5.16 Copy

5.17 Paste

5.18 Select

5.19 Undo

5.20 Redo

5.21 Delete

5.22 Previous screen

5.23 Next screen

5.24 Find

|   |             |                      |          |                  |
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5.25 Ladder components (Contact, Coil, Parallel contact, Parallel coil, Variable, New rung, New comment)

After click on particular shortcut related action should be taken.

## 6. Project Menu

In Left side of screen there should be the Project Menu with the Submenus as follows:

- All files

### 6.1 Project List

- 6.1.1 Project name XXXXXX

- 6.1.1.1 Powerup routine (Init)

- 6.1.1.1.1 Logic 1

- 6.1.1.1.2 Logic 2

- 6.1.1.1.3 xxxxxx

- 6.1.1.2 Main

- 6.1.1.2.1 Main program (should call the Logic blocks as per sequence)

- 6.1.1.3 Library

- 6.1.1.3.1 Logic blocks

- 6.1.1.3.1.1 Logic 1

- 6.1.1.3.1.2 Logic 2

- 6.1.1.3.1.3 Logic 3

- 6.1.1.3.1.4 Logic 4

- 6.1.1.3.1.5 xxxxxx

- 6.1.1.3.2 Hardware Interrupt

- 6.1.1.3.2.1 Logic 1

- 6.1.1.3.2.2 Logic 2

- 6.1.1.3.3 UDDB

- 6.1.1.3.3.1 FB 1 xxxxx

- 6.1.1.3.3.2 FB 2 xxxxx

- 6.1.1.3.3.3 FB 3 xxxxx

- 6.1.1.4 IO configuration

- 6.1.1.4.1 Base (XMPRO-10)

- 6.1.1.4.2 Local IO 1 (xxxx)

- 6.1.1.4.3 Local IO 2 (xxxx)

- 6.1.1.4.4 Local IO 3 (xxxx)

- 6.1.1.4.5 Local IO 4 (xxxx)

- 6.1.1.4.6 Local IO 5 (xxxx)

- 6.1.1.5 Tags

- 6.1.1.6 Error diagnostic tags

- 6.1.1.7 System Configuration

- 6.1.1.7.1 Ethernet

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- 6.1.1.7.1.1 Modbus TCP Server
  - 6.1.1.7.1.2 Modbus TCP Client
    - 6.1.1.7.1.2.1 Slave 1
    - 6.1.1.7.1.2.2 Slave 2
    - 6.1.1.7.1.2.3 Slave 3
    - 6.1.1.7.1.2.4 xxxxxx
  - 6.1.1.7.2 RS485
    - 6.1.1.7.2.1 Modbus RTU Master
      - 6.1.1.7.2.1.1 Slave 1 (MOD-DI-8)
      - 6.1.1.7.2.1.2 Slave 2 (xxxxx)
      - 6.1.1.7.2.1.3 Slave 3 (xxxxx)
      - 6.1.1.7.2.1.4 Xxxxx
  - 6.1.1.7.3 CAN
    - 6.1.1.7.3.1 CANOpen Master
      - 6.1.1.7.3.1.1 CANOpen Slave 1 (CAN -DI16)
      - 6.1.1.7.3.1.2 CANOpen Slave 2
      - 6.1.1.7.3.1.3 CANOpen Slave 3
      - 6.1.1.7.3.1.4 xxxxxxx
- 6.1.2 Project name XXXXXX

Same as project 1 .....

All tabs should include the dedicated screen as defined below.

**Project name Screen-** After click it should display the overall program information  
 (No.of Power up blocks, No of Logic blocks, Total IO used, Total tags defined etc)

**Powerup routine (Init) Screen-** Under this tab Logic blocks should be added as per requirement of user.

**Main-** Under this tab one “Main Program” block should add. Here user can call the Logic blocks as per their sequence. (It will be the programming grid screen)

**Library-** In this tab user should able to select the which following library he wants to use for his application.

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**Logic blocks**-Under this tab user should add the Logic blocks as per their requirement and should rename that block as per their requirement.

**Hardware interrupt**- In this tab user should configure the Interrupt Input and Under that Input tab user should add the Logic blocks which should run when Interrupt occurs.

**UDFB**- User defined function block. Under this tab user can create his own programmed function block.

Function block has Inputs & outputs, so user will be able to add the Inputs & can create his own logic as per received input and gives the Output.

**IO configuration**- Under this tab user should be able to configure the Onboard and Local IO modules.

**Tags**- In this tab all pregenerated CPU & Local IO tags should be automatically assigned as per predefined address.

User can be able to add the memory tags as per their requirement in Logic block screen only and same tag should be added in Tags screen automatically.

User should be able to rename the tag name only.

User should be able to add the memory address tags as per their requirement.

All memory tags which will generate in all logic blocks during the program should be added here automatically.

**Error Diagnostic tags**- In this tab all predefined error tags will be added as per added configuration.

**System Configuration**- Under this tab all settings and requests of Ethernet, Modbus TCP Server, Modbus TCP Client, RS485, Modbus RTU masterSlave 1, Slave 2, Slave xxx, CAN, CANOpen master, CANOpen slave 1, CANOpen slave xx should be added.

## 7. Ladder & FB Blocks screen

This screen should be activate when user will click on any Logic block screen.

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Under this screen all below instructions predefined FB should be present.

All Ladder components should be present here.

All UDFB blocks also should be added here automatically when user creates any UDFB.

**A. Ladder components:**

- 7.1 Contact
- 7.2 Coil
- 7.3 Insert after contact
- 7.4 Parallel Contact
- 7.5 Insert FB
- 7.6 Variable
- 7.7 Set Coil
- 7.8 Reset Coil
- 7.9 Negate Contact
- 7.10 Negate Parallel contact
- 7.11 Comment
- 7.12 Insert branch

**B. Predefined Function blocks:**

- 7.13 Logical
  - 7.13.1 AND
  - 7.13.2 OR
  - 7.13.3 XOR
  - 7.13.4 NOT
- 7.14 Arithmatic
  - 7.14.1 ADD
  - 7.14.2 SUB
  - 7.14.3 MUL
  - 7.14.4 DIV
  - 7.14.5 MOD
  - 7.14.6 MOV
- 7.15 Bitshift
  - 7.15.1 SHL
  - 7.15.2 SHR
  - 7.15.3 ROR
  - 7.15.4 ROL
- 7.16 Limit
- 7.17 Compare
  - 7.17.1 GT
  - 7.17.2 GE

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- 7.17.3 LT
- 7.17.4 LE
- 7.17.5 EQ
- 7.17.6 NE
- 7.18 Edge detector
  - 7.18.1 Rising edge
  - 7.18.2 Falling edge
- 7.19 Counter
  - 7.19.1 CTU
  - 7.19.2 CTD
- 7.20 Timer
  - 7.20.1 0.01S TON
  - 7.20.2 0.1S TON
  - 7.20.3 1S TON
  - 7.20.4 0.01S TOFF
  - 7.20.5 0.1S TOFF
  - 7.20.6 1S TOFF
  - 7.20.7 0.01S TP
  - 7.20.8 0.1S TP
  - 7.20.9 1S TP
- 7.21 Flipflop
  - 7.21.1 RS
  - 7.21.2 SR

## 8. Interface & Error screen

8.1 This screen will appear when user will build or compile the project and shows the status of compilation. If any error is present then it should show the error.

(Next version of this document will explain the details about this screen).

**Note- Next version of this document will include the requirements of the Interpreter.**

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