INDUSTRIAL AUTOMATION

Interactive Graphical SCADA System

INSIGHT AND OVERVIEW

IGSS

GETTING STARTED

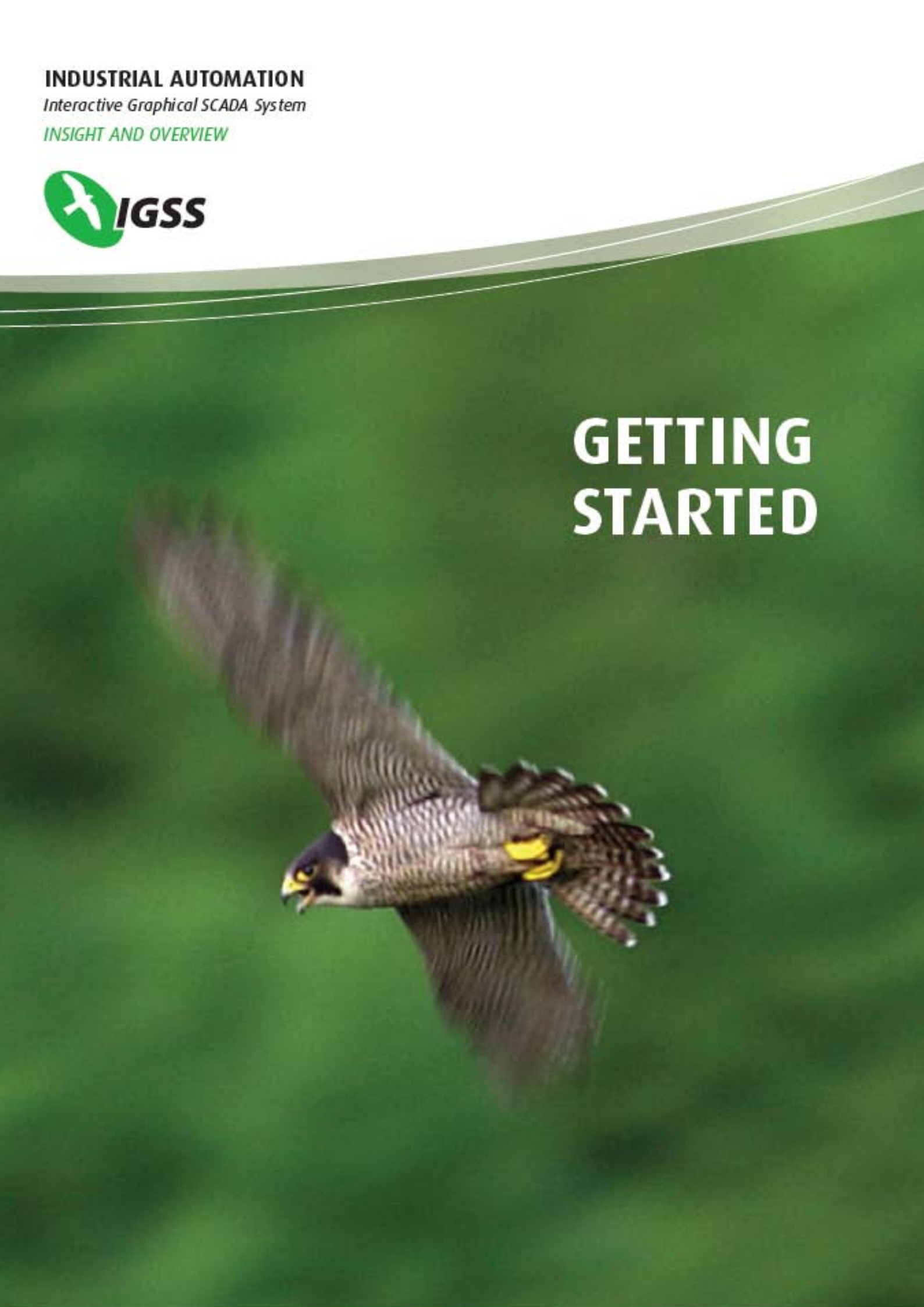


Table of Contents

About This Manual

Intended use

This manual is intended as a help for the system designer to get started with the creation of a project. It contains the following information:

- An introduction to the IGSS system and its components (Chapter 1)
- Step-by-step procedures for creating a new project from scratch (Chapter 2)
- Descriptions of the key object types and terminology used in IGSS (Chapter 3)

The manual deals almost exclusively with the **Definition** module. For information about the other modules in the IGSS system, refer to the Help function.

The manual is NOT a reference manual. The built-in Help function should be used for finding further details about the topics covered in this manual. References to the Help function are given throughout the manual.

Structure of this manual

This manual contains the following chapters:

This chapter …	contains the following:
1: Welcome to IGSS	an introduction to IGSS and an overview of its components.
2: Creating a project	step-by-step procedures for creating a project. The sample project is very small and simple but all the important system types are represented.
3: Types and Templates	definition and use of each of the IGSS types: area, diagram, graph, analog, table, counter, digital, string and scaling, including an explanation of the physical counterpart of each type. The chapter gives you a thorough understanding of the different object types and provides you with the terminology required for reading Chapter 3.

Conventions

The following typographical conventions are used:

Item	Convention	Example
User interface element	Bold typeface	The **Edit Mapping** tab.
Menu structure	Arrow between menu items	To access Help, select **Help** → **Help Topics**.
User input	Monospace typeface	We have now inserted the following text: `The level in the basin is too low. Pour faster …`
IGSS module	Red bold typeface	Open the **Definition** module.
Reference to Help	Italic typeface	For further details about addressing, search for "*PLC addresses*" in the **Definition** Help file.

IGSS User Documentation

Documentation overview

With the IGSS system you receive the following documentation items:

This documentation item …	includes the following …
Getting Started	See the “About This Manual” section.
Igssmaster.chm	Generel help on how to use the IGSS Master module and how to perform the fundamental tasks with IGSS.
Igss module Help	Step-by-step procedures, reference information and context-sensitive help for the specific module you are currently working with.

IGSS Help

The figure below shows a typical window from the IGSS Help system:

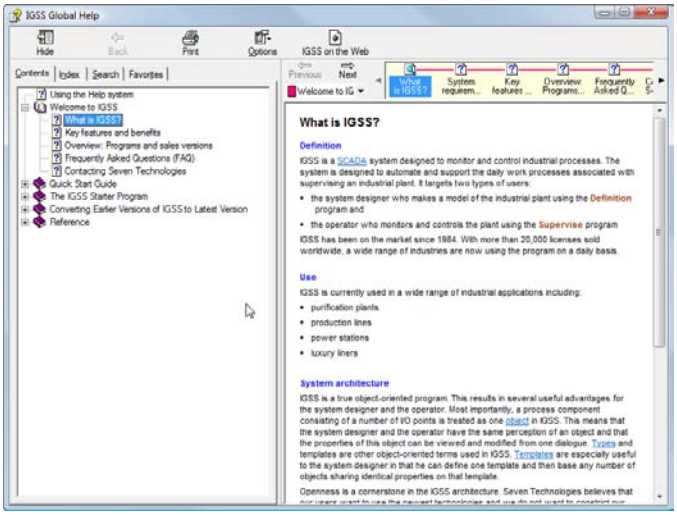


Figure 1 A typical window from the IGSS Help system.

Types of Help topics

We have tried to design our Help so that you can easily distinguish the different types of information being presented. The most important types are:

Topic Type	Description
Step-by-step procedure	Includes numbered steps for performing a specific task. This type of topic is presented in a small card-like window in the upper right corner of the screen so that you can read the procedure and perform the task at hand at the same time.
Reference information	Describes user interface details or conceptual information. For example, there are topics describing the different object types.
What’s This? Help	Describes an individual item in a dialog,that is a button or a field.

Accessing Help

There are several ways to access Help dependent on what type of Help you want:

To access this type of Help …	do the following…
Step-by-step procedure or reference information	Select **Help** → **Help Topics** and find the requested topic on the **Contents** tab or search for it from the **Index** or **Find** tabs (see *"Searching in Help"* below).
What's This? Help	In a dialog, do one of the following: • Click the ? in the upper right corner, then click the item you want information about. • Move the focus to the desired item by pressing **TAB**, then press **F1**.

Searching in Help

Most often you will search for a specific piece of information in Help. The easiest way to do this is by using the built-in search facilities:

Use the …	when you are searching for …
Index	Step-by-step procedures, reference or conceptual information or user interface details.
Search	Specific words or phrases that you cannot find in the **Index**.

The Help function also contains a **Contents** tab which provides a hierarchical view of the Help topics.

Help on Help

If you are in doubt as to how to use the Help function, just press **F1** to get Help.

Updated Help files

New updated Help files will be available for download on our Web site on www.igss.com. To get the help files the easy way use the IGSS Update module. In each Help file you will find a **Version Information** topic in the **Reference Information** book on the **Contents** tab. That topic tells you when the Help file was created and which software version it describes.

Webhelp

IGSS now offer its users to access entire online help documentation with just a few clicks.

You can find a **help file** for each IGSS module plus some additional **thematic help-files**. All help files are available on: www.igss.com/support/help-and-manuals.

IGSS also provides **training videos** which helps you to get started with a project and gives you a basic knowledge about the program. IGSS training videos are available at: www.igss.com/training/scada-training-videos.

For a fast guide to IGSS, you can also download the **IGSS Quick Start Guide** as a pdf on the Web site.

Chapter 1: Welcome to IGSS

Overview

About this chapter

This chapter gives you an introduction to the IGSS system.

Contents

This chapter contains the following topics.

What is IGSS?

Introduction

IGSS is a SCADA system used for monitoring and controlling industrial processes. Used in a wide range of industries, IGSS has sold more than 25,000 licenses since first coming on the market in 1984.

IGSS reference list

IGSS is currently in operation in many different industries, including:

- Food and Beverage
- Oil and Gas
- Education
- Pharmaceutical & Health
- Energy
- Marine
- Traffic
- Wastewater Treatment
- Water Supply

Please visit our website to view the full reference list and application notes about running IGSS installations.

Operating systems supported

IGSS V9.0 runs under Windows 7, Windows Vista and Windows XP.

User types

The system targets two types of users:

- **system designers** who construct a model of the industrial plant and
- **operators** who monitor and control the plant via PCs

Object-orientation

IGSS is a true object-oriented program. This results in several useful advantages for the system designer and the operator. Most importantly, a process component consisting of a number of I/O points is treated as one object in IGSS. This means that the system designer and the operator have the same perception of an object and that the properties of this object can be viewed and modified from one dialog box. Object types and templates are other object-oriented terms used in IGSS. Templates are especially useful to the system designer because he can define one template and then base any number of objects sharing identical properties on that template.

Data exchange interfaces

Openness is a cornerstone in the IGSS architecture. 7-Technologies believe that our users want the freedom to use the newest technologies. Therefore IGSS supports a variety of standards and interfaces including ODBC, SQL, OPC, OLE, VBA/Automation and ActiveX. These interfaces allow you to exchange IGSS data with 3rd party programs. If you are about to create a huge project, you may want to define the process components in an external database and then import the data into IGSS.

Scalability

Scalability is another key feature of IGSS. Based on true client/server architecture, you can easily expand the number of operator stations or the number of objects in your project. If you have a distributed plant, you can even connect remote operator stations, if required.

Sales versions

When you buy IGSS, you only purchase the number of objects, operator stations and communication drivers that you need. The system can be expanded at any time as your needs grow.

Several redundancy solutions are also available to minimize system downtime. Please contact the IGSS Sales Department for further information.

Further details

For a more detailed overview of system features, search for *"key features and benefits"* in the Igssmaster.chm file.

What's new in this version

For an overview of the new features in this version, search for *"what's new in this version?"* in the Igssmaster.chm file.

Overview of modules

Introduction

IGSS consists of a number of modules each with its own specific purpose. The following list of modules is divided into the two main user types: System designers and operators.

System designer modules

Some modules are not part of the standard version. In that case, it is noted against the module name.

For further details about any of the modules, use its associated Help function.

Module name	Summary of use	Module type
 **Master**	Access all the IGSS modules and system tools. Change the system to **Design** mode or **Runtime** mode.	Main module
 **Definition**	Build a model of the physical process being monitored and connect to the PLC addresses of the physical process components. Prepare process diagrams for the operators.	Setup module
 **System Configuration**	Specify global settings for the system and set up the appropriate communication drivers to enable communication with the PLCs.	Setup module
 **Job Scheduler**	Schedule jobs for automatic execution at regular intervals or based on events.	Utility
 **Maintenance**	Create maintenance jobs which define a maintenance interval for specific process components. When the interval is exceeded, the operator gets a maintenance reminder.	Utility
 **User Administration**	Define user names and passwords, user groups and user privileges.	Setup module

 **Notifier**	Set up duty periods and calendars during which critical alarms will be sent to the mobile phones of the duty personnel. Specify commands which can be activated from operators mobile phones.	Utility

Operator modules

Module name	Summary of use	Module type
 Alarm	Easily view alarms either directly on process diagrams, in the Alarm List (active alarms) or the Alarm Log (historical alarms). Handle alarms based on recommended operator action and document irregularities using operator notes.	Main module
 Audit Trail	Record all actions done by system operators. For a quick look at the **Audit Trail** help file click here.	Utility
 Dashboard	Create your own customized overview of process data from multiple processes - all in one view. For more information click here.	Utility
 Maintenance	Get maintenance reminders in the maintenance or alarm list and perform the related maintenance jobs.	Utility
 Reports	View or print reports. Two main types of reports are available: • standard reports (daily, weekly etc.) • custom reports (use MS Excel to create flexible report contents and layouts)	Report module
 Supervise	Monitor and control the plant. Alarm handling is an integrated part of **Supervise**.	Main module

Chapter 2: How to Create a Project

Overview

About this chapter

This chapter contains the following information:

- A presentation of the sample project we are going to build
- Step-by-step procedures for setting up and preconfiguring the project
- Step-by-step procedures for building the project and installing it
- Step-by-step procedures for refining the project with some of the more advanced features in the system

About the project

The sample project shows how you create objects of the different object types. The procedures describe the most basic and typical ways of defining these objects.

If you are interested in more advanced ways of creating objects, refer to *"Section D: Optional Design Procedures"* in this chapter.

Contents

This chapter contains the following sections.

Section A: The Sample Project

Overview

About this section

This section contains the following information:

- A detailed presentation of the project we are going to build
- A project checklist which will help us ensure that all the necessary steps are performed

Contents

This section contains the following topics.

The Project We Will Build

Introduction

In this chapter we will create a small IGSS project step by step. The project consists of a tank into which water is filled and let out. The project we aim to create looks like this:

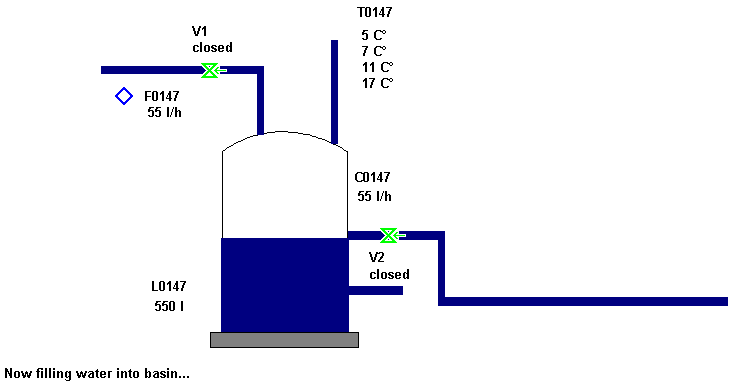


Figure 3.1 The sample project we are going to build.

Single-user system

In order not to introduce too much complexity, the sample project is run on a single-user system. Once you are familiar with the basic project techniques, you can read more about setting up multi-user systems in the "Multi-User Systems" Help file in the “IGSS” program group.

The project components

The project consists of the following components (or objects in IGSS terminology):

Object name	IGSS type	Description
Overview	Diagram	The diagram showing the project. We will use the built-in area called **Global**.
F0147	Analog	Measures the hourly flow of the water intake.
L0147	Analog	Displays the water level in the tank.
C0147	Counter	Counts the number of liters let into the tank per hour.
T0147	Table	Monitors the temperatures at different levels in the tank.
V1	Digital	Controls the water intake.
V2	Digital	Controls the water outlet.
Fahren.toCel	Scaling	Converts temperature values from Celsius (°C) to Fahrenheit (°F).
Message	String	Describes the current state of the process. In this example, the text “**Now filling water into basin ...**” is shown.

The Project Checklist

Introduction

Before we start setting up and building the project, let's take a look at the checklist which is divided into two phases: "Setting up and preconfiguring" and "Mandatory design procedures".

Setting up and preconfiguring

We will go through the following procedures:

Procedure	Mark when completed
Create the new project	
Define IGSS station type	
Set up the station parameters	
Set up the driver parameters	
Make background drawings	
Plan alarm texts	
Draw new symbols	

Building the project

We will go through the following procedures:

Procedure	Mark when completed
Define areas and diagrams (**Overview**)	
Define scaling objects (**Fahren.toCel**) and templates (**Valve**)	
Define digital objects (**V1** and **V2**)	
Define analog objects (**F0147** and **L0147**)	
Define table objects (**T0147**)	
Define counter objects (**C0147**)	
Define string objects (**Message**)	
Define alarm texts	
Define graph windows (**G0147**)	
Simulate process values	
Install the project and troubleshoot	
Define operator reports	

Recommended order

Note that the sequence of the project process given above is merely a recommended order and is by no means compulsory. You can always go back to the previous procedure and make any modification you like. Also, some of the procedures may or can be repeated several times - this particularly goes for "Install the project and troubleshoot", a procedure that you will typically repeat after each step in the "Building the project" phase.

Section B: Setting Up and Preconfiguring

Overview

About this section

This section takes you through the key properties in **System Configuration**. For information about the remaining functions and properties, refer to the **System Configuration** Help file.

About System Configuration

The **System Configuration** module is where you define the global settings for the IGSS system.

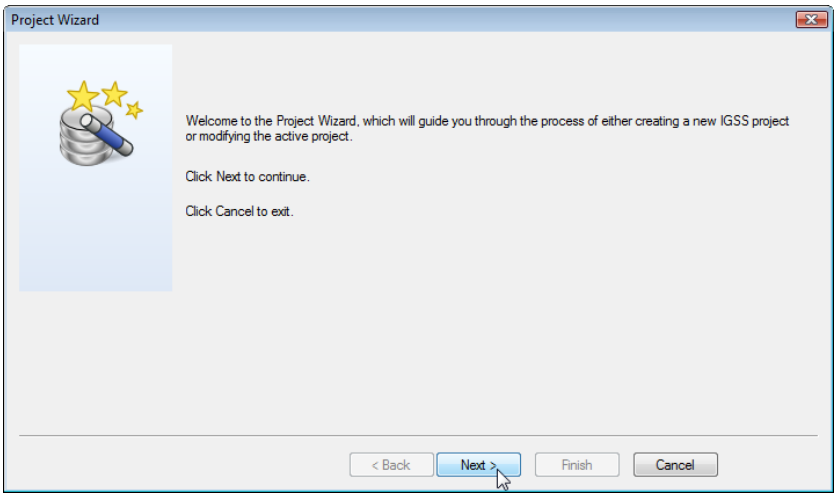
Contents

Create the New Project Using the New Project Wizard and Set It Active

Purpose

The very first thing you must do is to create a new project and give it a descriptive name. We will name our sample project, **Getting Started**.

To create a new project

Step	Action
1.	Start **IGSS Master**. Select **Start** → **Programs** → **IGSS 9.0** → **IGSS**.
2.	Switch to **Design Mode** Click on the drop down menu (bird) and choose **Design Mode**.
3.	Start the **Project Wizard** In **IGSS Master** select the **Design and Setup** tab. Then choose **Project Wizard**. The Project Wizard dialog appears. 
4.	Select **Create a new IGSS project** and click **Next**.
5.	Choose a project name and select a project folder
6.	Select a **Single User (Standalone)** station type There are three main station types: Single User, Server and Operator. When running as Single User, the project is only available on the station from which it is run, the station is both server and operator. When running as Server, the project is available for all defined operators. When running as Operator station the project can be downloaded from the server by any of the defined operators.
7.	Select the station name: **IGSSStation1** and add the three following components: • Driver: **Siemens S7 TCP/IP** • Interface: **IP Network** • Node: **Node 0** For a more detailed description of the driver setup refer to the “Set up the Driver Parameters” in this section.
8.	Click **Finish**, to end the Project Wizard.

Data folders

IGSS uses two key data folders:

- one for the project data (**Project root folder**), for example, project file (<*MyConfig*.elm), project database (<*MyConfig* >.mdb), etc.

- one for the data files (**Report folder**), for example, base class files (.bcl), log files (.log), alarm files (.alm), etc.

For details about project folders and files, search for "*configurations; folders and files*" in the **Definition** Help file.

Define the IGSS Station Type

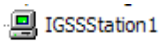
Purpose

If you haven't done this in the project wizard, you can manually add a new station in the **System Configuration** module To open this module, open **IGSS Master** and select **Design and Setup → System Configuration.**

Before you start using an IGSS station, you must specify the station type (single-user, operator or server) and assign a unique station name to it.

To define IGSS station type

Perform the following steps:

Step	Action
1.	Select **Edit → New Station**, a new station is added.
2.	Click the station icon,  , in the tree view.
3.	Click the **Station** tab.

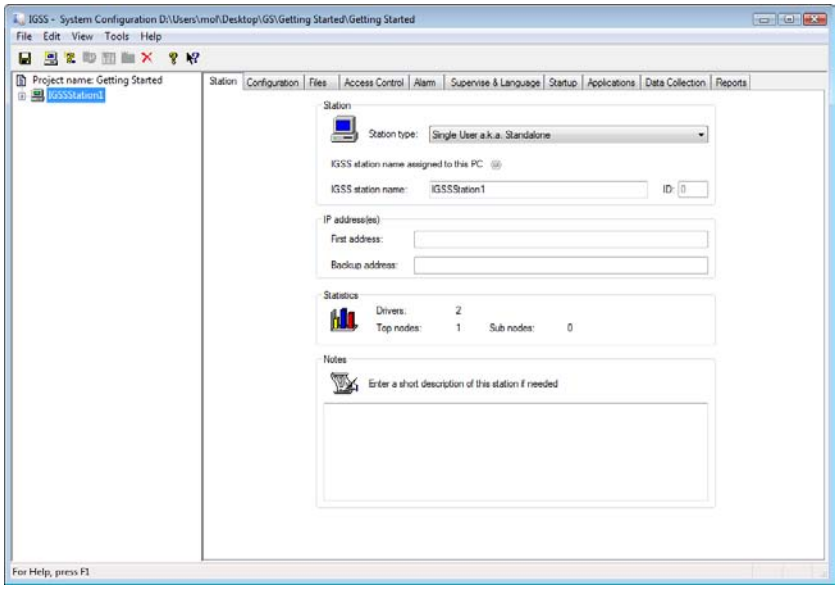


Figure 3.2 On this tab you select the Station type and assign a unique name to it.

4.	In the **Station type** group, select the appropriate station type. In this case, we select **Single User a.k.a Standalone**.
5.	Type IgssStation1 in the **IGSS Station name** box.

Selecting the active project

When you choose a project in IGSS Master, it automatically becomes the active project.

Set Up the Station Configuration Parameters

Purpose

We will now go through a further setup of the station. We will go through the following tabs:

- Configuration
- Data Collection
- Alarm
- Access Control
- Supervise

Review the project parameters to verify that they are set as described in this section

To set up configuration parameters

Perform the following steps:

Step	Action
1.	Click the **Configuration** tab.

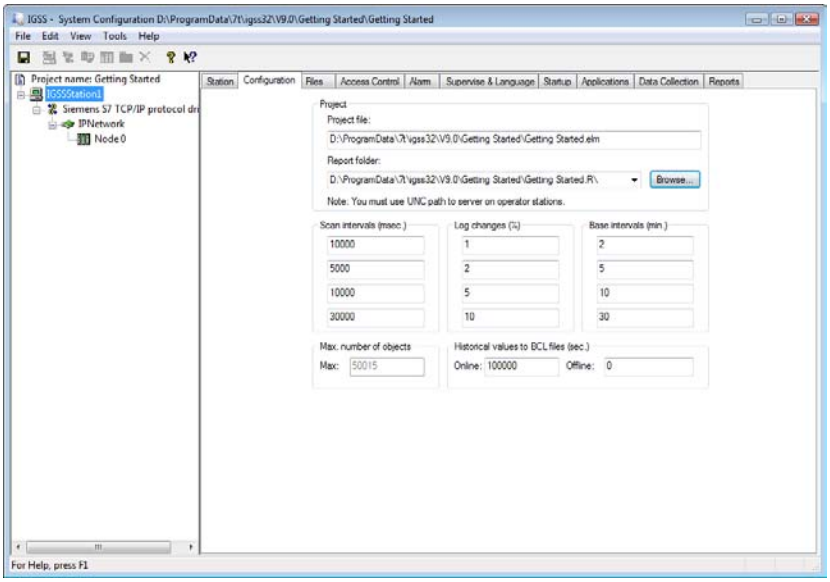


Figure 3.3 On this tab you specify the key data management settings.

2.	Modify the settings as shown above.

Configuration parameters tab

Even though you may change these parameters, remember that:

- the system has a default setting for each parameter so you do not have to make any changes and
- each parameter may be changed at any time later in the configuration process - BUT you should be aware, that alterations will affect the entire project as well as the data collection.

The following important global parameters can be modified on the **Configuration** tab:

Parameter	Description
Max. number of objects	Shows the number of objects allowed in your project. The figure is read from the license file, Options.txt.
Scan intervals	Type the four scan intervals that you want to be able to apply to the IGSS objects in the project. The four scan intervals will be shown on the **Data Management Definitions** tab and you will choose one of them for each IGSS object.

Parameter	Description
Base intervals	Type the four base intervals that you want to be able to apply to the IGSS objects in the project. The base interval determines how often the scanned values are reduced to a reduced value. The data reduction method is selected in the **Data reduction** group. The four base intervals will be shown on the **Data Management Definitions** tab and you will choose one of them for each IGSS object.
Log changes	Type the four percentages with which you want to filter value changes. Generally, IGSS logs values only when a value has changed since the previous scan, but you may define that a change must be greater than, for example, 5 % to be registered as a change from the **Data Management Definitions** tab when you define a process component. Use this setting to prevent unnecessary logging of minor, insignificant changes to the object values.

Set Up the Data Collection Parameters

Purpose

When you start an IGSS project, the data collection engine (DC) is started. DC handles many different tasks including updating of alarm, log and base class files, printing of alarm and log data. On this tab, you determine how you want DC to operate.

To set up data collection parameters

Step	Action
1.	Click the **Data Collection** tab.

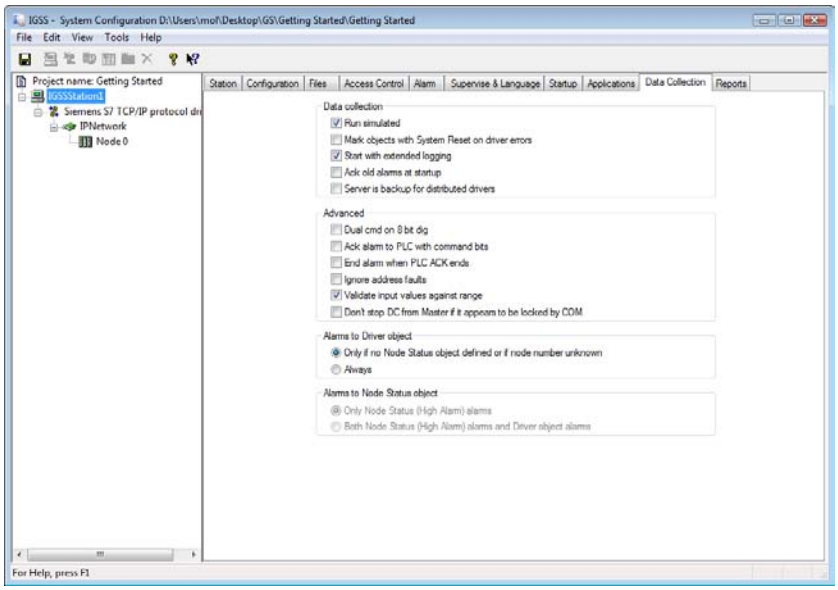


Figure 3.4 On this tab you specify the data collection parameters.

2.	Modify the settings as shown above.

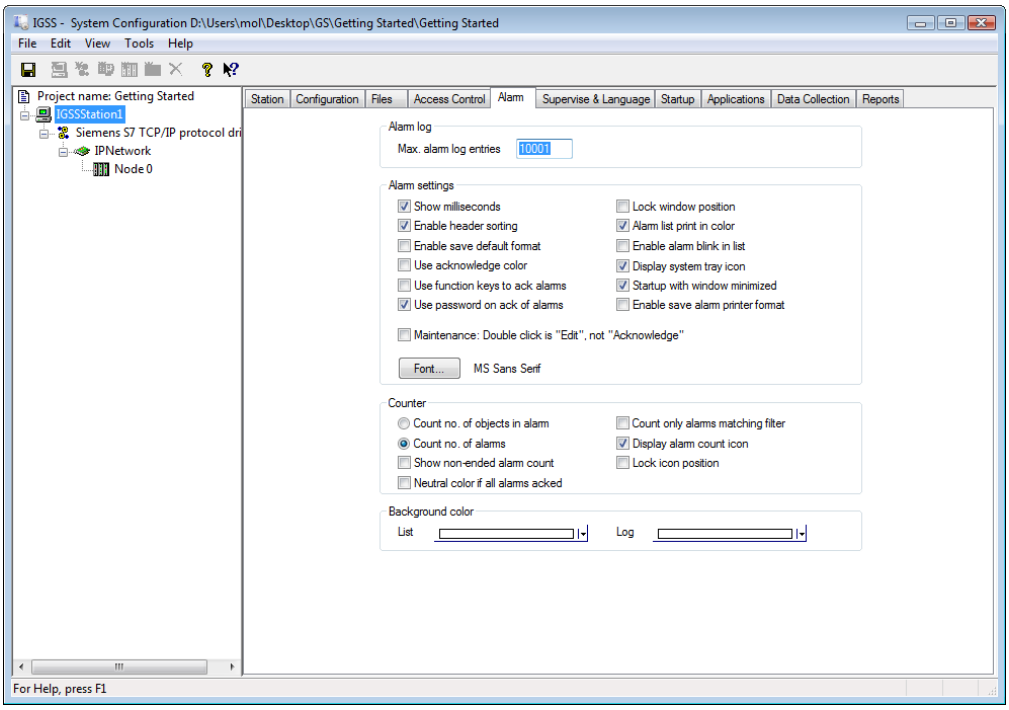
The most important data collection parameters are:

Parameter	Description
Start with extended logging	Check this box if you want to log all values from the PLC driver. This may be useful for troubleshooting purposes. *NOTE:* The values are saved in the <*MyConfig* >.scn file in the report folder. By default, only alarm data packets are written to the file.

Run simulated	Check this box if you want to use simulated data contained in the *<MyConfig>*.sim file. See *"Simulate Process Values"* in this section.

To set up alarm parameters

Use the default settings in the project.



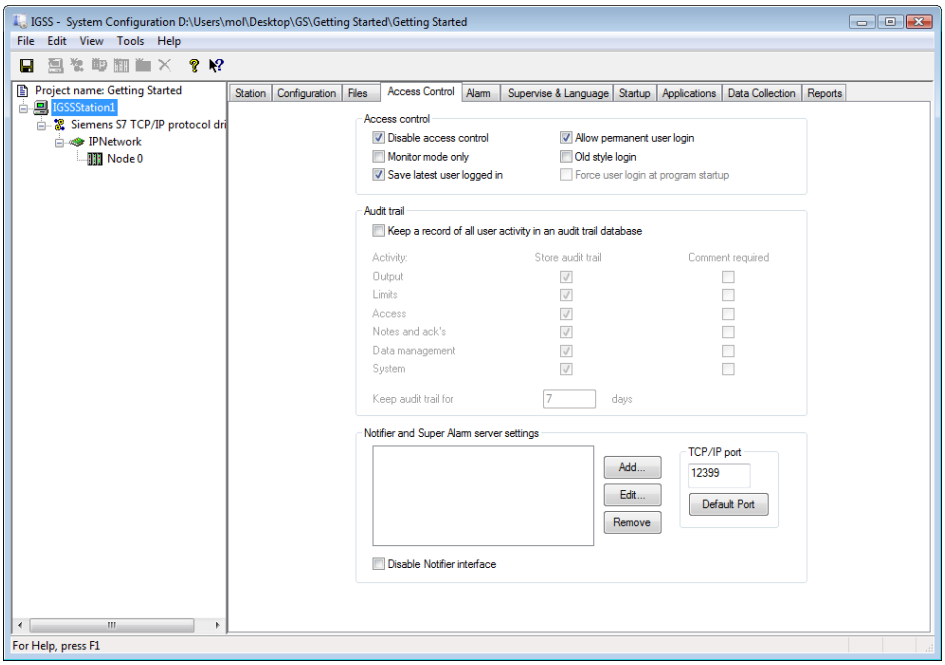
Alarm tab

On this tab you define the settings for the **Alarm** module, for the selected station.
The most important alarm parameters are:

Parameter	Description
Full alarm count	Check this box if you want to count all alarms, this includes acknowledged alarms in the alarm count.
Use function keys to ack. alarms	*NOTE:* Check this box if you want to use function keys to acknowledge alarms. In the alarm list you simply press the function key corresponding to the number of the alarm to acknowledge it.
Lock icon position	Check this box if you want to lock the icon position. This is mainly intended for multiuser systems.
Lock window position	Check this box if you want to lock the window position. This is mainly intended for multiuser systems.

To set up access control parameters

Use the default settings in the project.



Access Control tab

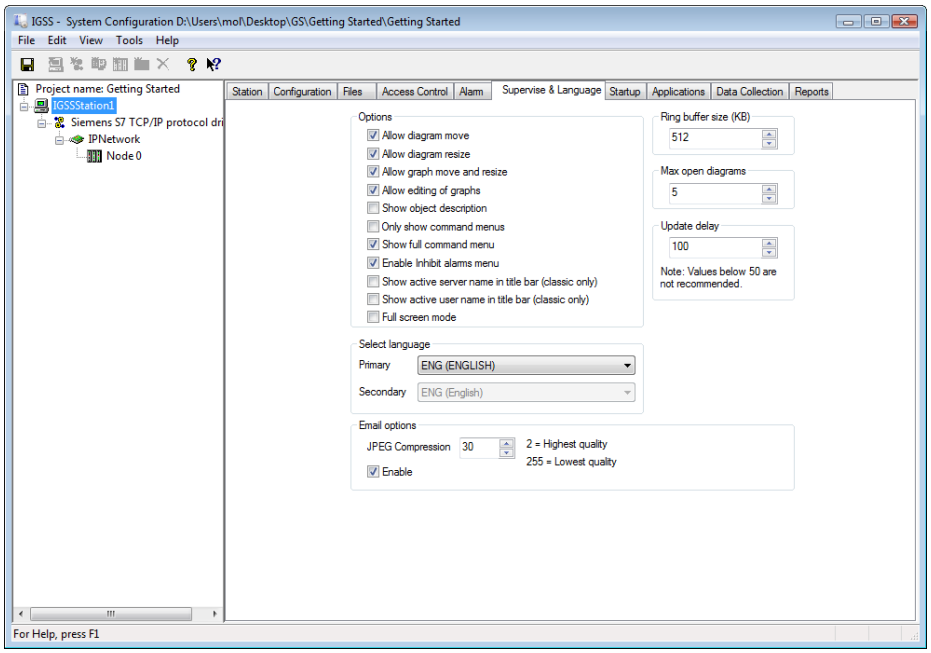
On this tab you define the settings concerning access control. Access control is a security mechanism used to prevent unauthorized access to certain functions in the system. When a user is logged in, all activities such as sending of commands, acknowledging of alarms, etc. are registered with user name.

The most important access control parameters are:

Parameter	Description
Disable access control	Check this box if you want to disable access control.
Force user login at program startup	*NOTE:* Check this box if you want to force the user to login at program startup.

To set up Supervise & Language parameters

Use the default settings in the project. If you select another language, you should be aware that this manual is based on the English language.



Supervise & Language tab

On this tab you define the settings for the **Supervise** module and choose language.

The most important parameters are:

Parameter	Description
Allow diagram move	Check this box if you want the operator to be able to move the diagrams in **Supervise**.
Allow diagram resize	*NOTE:* Check this box if you want the operator to be able to resize the diagrams in **Supervise**.
Allow graph move and resize	Check this box if you want the operator to be able to move and resize graphs in **Supervise**.
Allow editing of graph	Check this box if you want the operator to be able to edit graphs in **Supervise**.
Select Language	Here you select which language you want to display in IGSS. Available languages are English, Danish, German, Czech, Spanish, French, Icelandic, Norwegian, Polish, Russian and Swedish.

Set Up the Alarm and Log Printers

Purpose

Before you can start printing alarm and log data from the system, you must set up the alarm and log printers. Note that you do not define a graphics printer as in the older versions of IGSS. When you print from **Definition** and **Supervise**, you simply select the Windows printers defined on the IGSS station.

Perform the following steps:

1. Click the **Reports** tab.

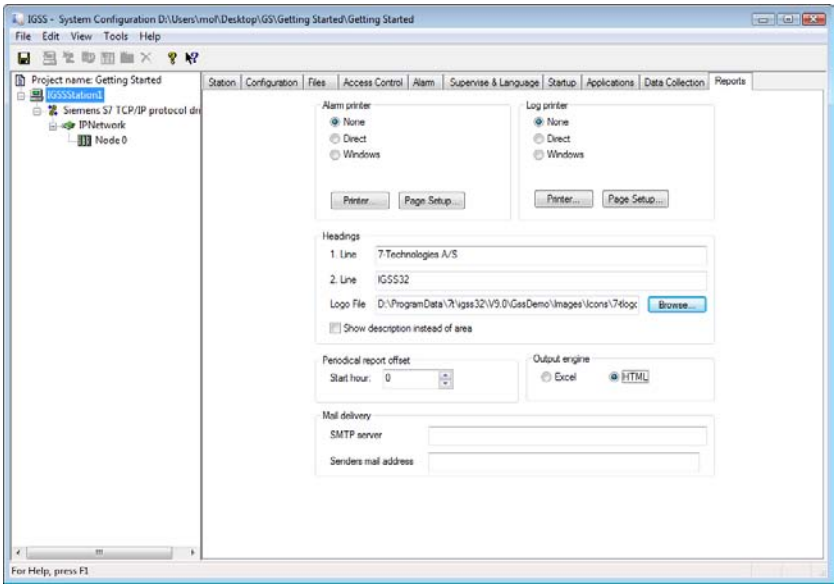


Figure 3.5 On this tab you set up the alarm and log printers.

2. In the **Alarm printer** group, select the printer type (**Direct** or **Windows**).
3. Click the **Printer** button and select the printer you want to use for alarm printouts.
4. In the **Log printer** group, select the printer type (**Direct** or **Windows**).
5. Click the **Printer** button and select the printer you want to use for log printouts.
6. In the **Headings** group, you can type the information you want to show on all printouts from the system. This would typically be the plant name.
7. In **Output engine**, you choose the output format for the report as **HTML** or **Excel**.

   Mail delivery allows you to send a report per mail. You must enter an SMTP server and mail address from which it will be sent.

To set up alarm and log printers

NOTE: If you are using the Direct option, only 1 line will be printed at a time, typically on a matrix printer. If you are using the Windows option, you will be using the Windows printer driver which will print one page at a time.

TIP: Use the **Page Setup** button to specify paper size, paper orientation, margins, etc.

The remaining tabs

For our sample project, we will keep the default settings for the remaining tabs in **System Configuration**.

Set up the Driver Parameters

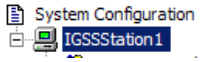
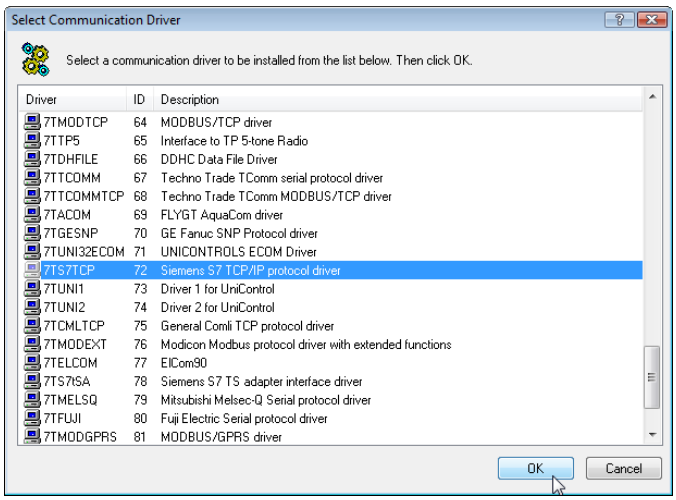
Purpose

This is a more detailed description of defining the driver. Before we start defining the process components in **Definition**, we must set up the PLC driver(s) we want to use.

This example

For our small project, we use the **Siemens S7 TCP/IP driver**. We define one node (PLC) to which all the process components are connected.

To define the driver

Step	Action
1.	Make sure that you are on the station level  . Select **Edit → New driver** or click and double-click the **Siemens S7 TCP/IP driver**.  *Figure 3.6 Double-click the driver you want to include in the driver profile.*
2.	Make sure that you are on the driver level Select **Edit → New Interface** or click  . An IP Network interface is automatically added in the tree view. *NOTE:*

3. Click the **+** sign beside **IP Network** and notice that IGSS has automatically added the first node (PLC). Select the node icon to view the node properties. As you can see, node number **0** is suggested and we will keep this setting.

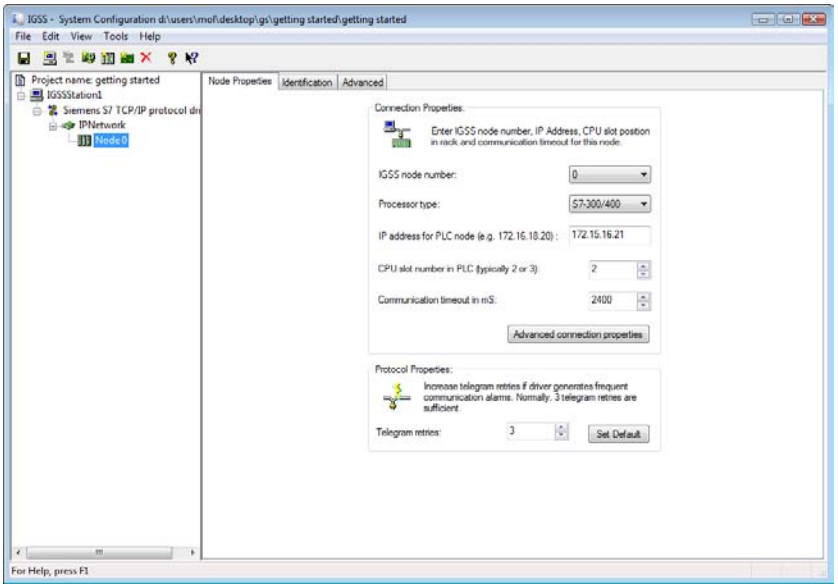


Figure 3.7 The tree view shows all the components of the driver profile. You can expand or collapse the view using the **+** and **-** signs.

Subnodes

If you need to communicate with PLCs that do not have a direct connection to an IGSS server or operator station, you can communicate with those PLCs (called subnodes in IGSS) through a manager node (gateway PLC). This may be the case if you have two separate networks in a plant, a LAN network and a dedicated PLC network. The gateway PLC would then be accessible through the LAN network and would handle all communication to the subnode(s) on the PLC network.

For further details on subnodes, search for "subnodes" in the **System Configuration** Help file.

Special types of telegrams

In **System Configuration**, you can exchange different kinds of telegrams between IGSS and the PLCs (nodes). These telegrams include system events, time synchronization and keep alive telegrams. They are defined on the **Advanced** tab at the node level.

For further details, search for "telegrams; using extended services" in the **System Configuration** Help file.

Make the Background Drawings

Purpose

The background drawing for the project of a process diagram holds all that is static in the process. The dynamic process components are subsequently defined in **Definition**.

NOTE: You can also use a background color for your diagrams and build the process picture from scratch.

Background color or background picture?

In IGSS, you have two alternatives for the diagram background:

1: Background color

You choose a background color and draw the static elements of the diagram using the built-in IGSS drawing tools found in the **Drawing** toolbar. This allows you to take individual graphics and resize and position them freely on the diagram and to use shapes like lines, polygons, rectangles, etc.

To avoid scaling/resizing problems, it is recommended to use the built-in IGSS drawing functions.

2: Background picture

In order to use a background drawing in IGSS, it must be saved in one of the supported formats. To view the list of supported formats, open the **Diagram Properties** dialog box, select the **Picture** option, click

Browse and open the **Files of type** drop-down list. The supported file formats include the well-known formats used on the Internet (*.jpg and *.gif).

7T recommends using file formats generally supported by Microsoft Windows. For background pictures, it is recommended to use vector-based file formats to avoid resizing problems. For example, the Enhanced Metafiles (.emf) format is very well-suited for IGSS applications.

To create a background drawingpicture

Perform the following steps:

Step	Action
1.	Open the drawing program you have chosen to use
2.	Draw the background picture. Include all parts that are static in the process. *TIP:* You do not need to include static text on the picture. This can be done directly in **Definition** where the text can be freely formatted.

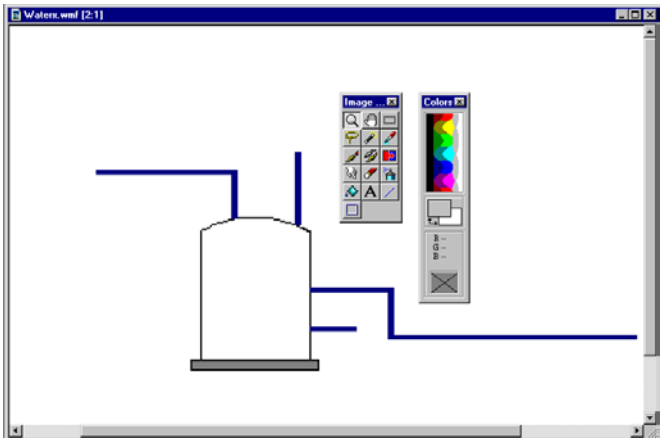


Figure 3.8 The background picture is made in an external drawing application.

3.	Save or convert the picture to one of the supported formats considering the above recommendations about file formats.

Plan the Alarm Texts

Purpose

We recommend that you plan and structure alarm texts, priorities and alarm colors at an early stage in the configuration process to obtain consistency. Planning decisions include determining the number of alarm priorities to be used, associating a color with each alarm priority, planning reuse of alarm texts (the same alarm text can be associated with as many objects as you like).

What is an alarm text?

An alarm text is a general description of an error situation, for example, “Motor overheated”. Each alarm text consists of the following properties:

Component	Description
Alarm No.	Identifies the alarm text with a unique alarm number. If you are creating a new alarm text, the next available number is automatically suggested, but you can change it, if required.
Priority	Type a priority from 255 (highest priority) to 1 (lowest priority). *TIP:* Carefully plan alarm priorities and their associated colors. To help the operator immediately understand the alarm priority, be consistent and use only a limited number of alarm priorities.

Alarm and acknowledge colors	Specify the colors for alarm and acknowledged states and enable or disable blinking of object symbols on process diagrams. *TIP:* To help the operator easily distinguish between an object in alarm and an object where the alarm is acknowledged, check **Blinking** for the alarm color and uncheck it for the acknowledge color.
Alarm Text	Write a brief description of the alarm situation. This is the text that the operator will see in the Alarm List when the alarm occurs.
Sound	Specify whether you want to play a sound when this alarm occurs. The sound can be either a beep or a sound file (*.wav).
Event on alarm	Specify the event(s) you want to trigger when this alarm occurs. The following events are available: • **To Notifier** sends the alarm number via **Notifier** to mobile phones. Use this function to ensure that alarms are handled during periods where the operator stations are unmanned. **Notifier** is a separate sales module. • **To PLC** sends an alarm change telegram to the selected PLC, provided that this telegram type is enabled in **System Configuration**. • **To Print** prints the alarm text on the alarm printer. • **Auto Acknowledge** automatically acknowledges the alarm when it occurs. Use this setting for intermittent alarms.
Instructions	Gives recommended operator action should this alarm situation arise. The operator can access the instructions from the process diagram and from the alarm list.
Copy	Select an existing alarm text in the drop-down list, and then click **Copy** to copy its properties to the current alarm text. The properties can then be freely changed.

Draw the New Symbols

Purpose

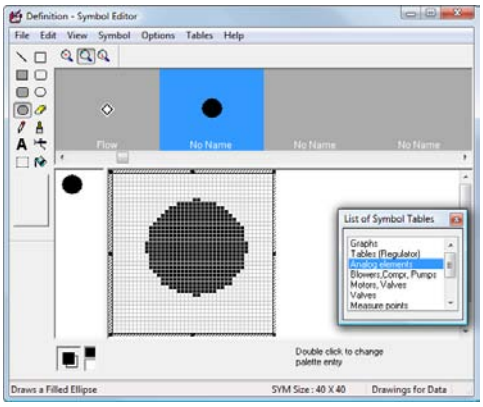
IGSS comes with a large library of symbols (about 150). If these symbols are sufficient for your needs, you can skip this procedure. However, you can easily modify the existing symbols or draw new symbols.

Symbol tables

The above-mentioned library of symbols is contained in the symbol file, **Symbols.v20**. The file consists of a number of subtables, each containing symbols for a specific type of component, for example, valves. The names of the subtables of Symbols.v20 are the ones you see in lower part of the **Objects** menu and on the **Symbol Definition** tab when you define process components. You can change the names of the subtables in Symbol Editor.

To draw new symbols

Perform the following steps:

Step	Action
1.	In Definition go to **Edit → Symbols...**
2.	Open the **Symbols.v20** file located in the **[Installation path]\Gssdemo\Eng** folder. In Windows Vista the folder Gssdemo\ is located in C:\ProgramData\[IGSS installation path] 
3.	In the **List of Symbol Tables**, click the subtable to which you want to append a new symbol.
4.	Use the scroll bar to find an empty symbol position marked **No Name** and select it.
5.	*REFERENCE:* Draw the new symbol.
6.	Click  to save the **Symbols.v20** file. *RESULT:* You can now select the new symbol, when you define a new process component in **Definition**.

Checklist Review - Setting Up and Preconfiguring

Review

The Setting Up and Preconfiguring phase is now completed. To sum up, we have now done the following:

Procedure	Mark when completed
Created the new project	√
Define IGSS station type	√
Set up the station parameters	√
Set up the driver parameters	√
Made background drawings	√
Planed alarm texts	√
Draw new symbols	√

Section C: Mandatory Design Procedures

Overview

About this section

This section contains the following information:

- A short introduction to the **Definition** module
- Step-by-step procedures for creating the sample project

Contents

This section contains the following topics:

Checklist Review - Mandatory Design Procedures

What we need to do

Let us take a look at the checklist again and see what we need to do to complete the project:

Procedure	Mark when completed
Define areas and diagrams (**Overview**)	
Define scaling objects (**Fahren.toCel**) and templates (**VALVE**)	
Define digital objects (**V1** and **V2**)	
Define analog objects (**F0147** and **L0147**)	
Define table objects (**T0147**)	
Define counter objects (**C0147**)	
Define string objects (**Message**)	
Define alarm texts	
Define graph windows (**G0147**)	
Simulate process values	
Install the project and troubleshoot	
Define operator reports	

The Definition Module

Introduction

Most of the remaining procedures in this section are performed in **Definition**. This topic tells you how to access **Definition** and gives a brief introduction to the menus.

To start

Click **Start** → **Programs** → **IGSS 9.0** → **IGSS Master** →**Switch to Design Mode** →**Definition**

Menus in Definition

The table below summarizes the pull-down menus in **Definition**:

This menu …	allows you to …
File	check and install projects, import/export Groups revert to the previous version and print diagrams or screen pictures. *NOTE:* It is recommended that you save your work regularly using the **Save** command (the keyboard shortcut is **CTRL + S**).
Edit	cut, copy, paste and delete objects or just their references on a diagram, select and find objects, edit alarm texts, manage Groups, create measurement units and report formats. *TIP:* You can also view the properties of an IGSS object by right-clicking the object and selecting **Properties** in the popup menu.
View	show or hide the toolbars and the status bar, change the date/time display, and show all states of digital objects.
Format	format text, set colors, set up multiple screens, set grid size and enable snap to grid, set initial display for each area, align objects and stack objects on the diagram.
Area	create and delete areas, edit area properties and select any of the existing areas in the current projevt provided that the **Name to Menu** option is selected for each area.
Diagram	create and delete diagrams, edit diagram properties and select any of the existing diagrams within the current area provided that the **Name to Menu** option is selected for each diagram.

This menu …	allows you to …
Graph	create and delete graphs and select any of the existing graphs within the current area provided that the **Name to Menu** option is selected for each graph.
Template	edit, create and delete templates.
Objects	define any type of object. The first section of the menu allows you to create, edit and delete objects. The second section allows you to choose between the standard display types and descriptors. The third section allows you to choose between the symbol tables in the current symbol file. *NOTE:* This menu is only available when a diagram is open.
User Programs	add links to external programs to be shown either in the **Definition** or the **Supervise** module.
Tools	configure the menus and toolbars of **Definition** and **Supervise**, delete all objects or delete all objects except templates and create VBA macros or open the Visual Basic Editor.
Views	create different views for different scenarios. It allows to show/hide selected object values/states that might be useful to a view exclusively.
Window	close the current window and select any of the currently open diagram or graph windows.
Help	open the **Definition** Help file and view the version number.

For details about the individual menu items, search for "*menus*" in the **Definition** Help file.

Right-click menus

Apart from the pull-down menus, a number of right-click menus (or context menus) are available.

For further details, search for "*right-click menus*" in the **Definition** Help file.

Toolbars

To provide easy access to the most frequently used commands, a number of toolbars are available. Some of them are predefined; others can be customized by you.

For further details, search for "*toolbars*" in the **Definition** Help file.

Define Measurement Units

Purpose

Some of the process components have a measurement unit. We will now define all the units we need for the project and these units are then selected as part of the object definition procedure.

Units in IGSS

To ensure consistency in the use of measurement units, IGSS features a number of unit-related functions. You start by creating a units set into which the individual base units are put.

By default, a set of units called SI is included. You can define your own sets of units, if required. If you convert a project from an older version, the units are imported into the SI units set.

For further details about units sets and unit conversion, search for *"units"* in the **Definition** Help file.

Units in the project

For the sample project we need the following measurement units:

Object name	Unit
F0147	l/h
L0147	l
C0147	l/h
T0147	°C

You can write the ° sign by typing `ALT+0176`.

To define measurement units

We need three different measurement units which are defined as follows:

Step	Action
1.	Select **Edit → Measurement Units**. The **Base Units** dialog box appears.
2.	Click **New** to add a new base unit. • In the **Unit text** field, type `l` for litre. • Click **OK** to save and return to the **Base Units** dialog box.
3.	Repeat step 2 for the `l/h` and `°C` base units.
4.	Click **Close**.

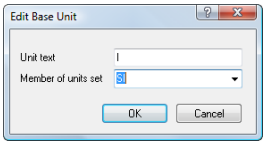


Figure 3.9 In this dialog box you define new base units. If you have several units sets, you select the relevant one in the drop-down list.

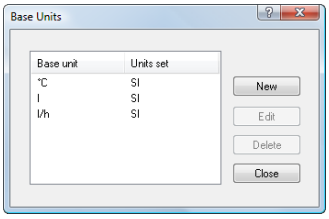


Figure 3.10 The three base units are now created and can be chosen when we later create the process components.

TIP: You can write the ° sign by typing `ALT+0176`.

Define Areas and Diagrams

Purpose

Before we start defining the process components, we need an area and the process diagram on which we want to show the process.

For details about areas and diagrams, refer to *"The Area Object Type" and "The Diagram Object Type" in Chapter 2*.

To define the area (Global)

For our small process we only need one area. We will use the built-in area called **Global**.

To define the diagram (Overview)

We will define the diagram for our process which we will call **Overview**. Perform the following steps:

Step	Action

1. Select **Diagram → Create**. The **Diagram Properties** dialog box appears.

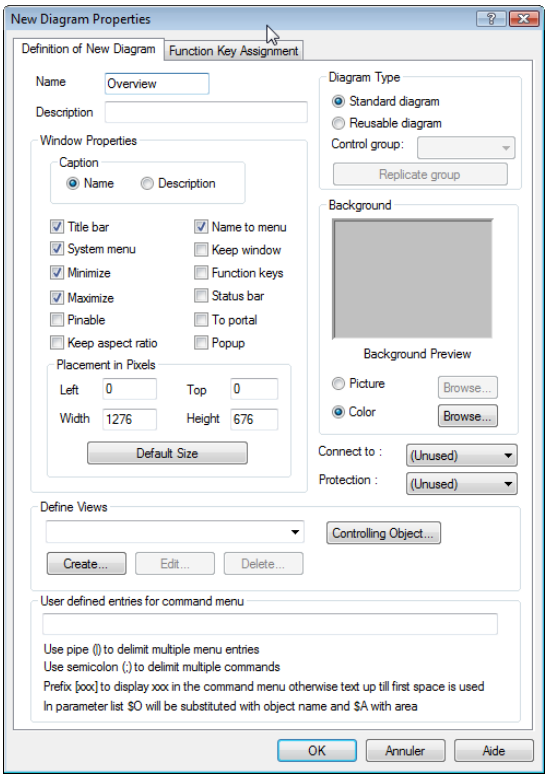


*Figure 3.11 In this dialog box you define the properties of the **Overview** diagram.*

2. In the **Name** field, type `Overview` and leave the **Description** field blank.

3. Check the **Name to Menu** option to allow operators to open it from the **Diagram** menu during supervision.

4. Leave the **Keep Window** option unchecked.

NOTE: During supervision four diagrams may be open simultaneously. When diagram number five is opened, the system automatically closes the first one. However, if you check the **Keep Window** option, the diagram is never closed automatically. In this case we only have one diagram, so there is no need to use the option.

5. Define which window elements you want to show on the diagram, for example, **Status Bar** (the information line at the bottom of the diagram).

Step	Action

6. In the **Background** group, select **Picture** and click **Browse** to find the picture which is located in the [Install Path]**\Samples** folder. The **Open a Background Picture** dialog box appears.

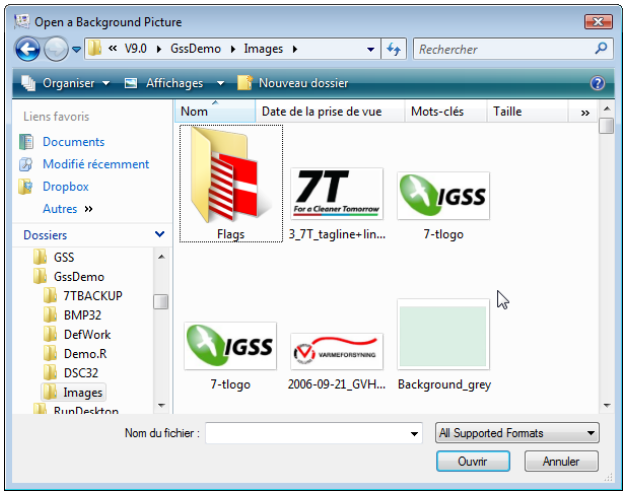


Figure 3.12 In this dialog box you choose the background picture for the diagram.

7. Double-click the image you want to have as background.

8. Click OK.

RESULT: The new **Overview** diagram appears. Here is an example of a diagram with a background:

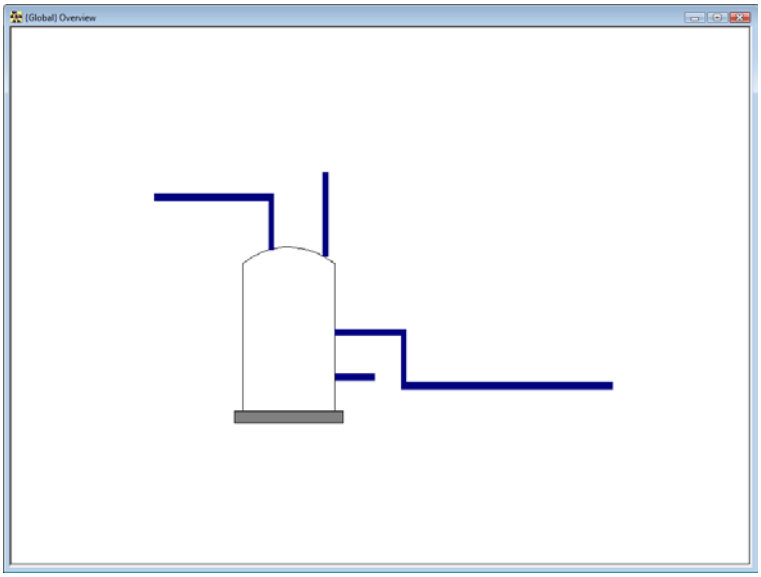


*Figure 3.13 The **Overview** diagram is ready.*

Define Alarm Texts

Introduction

Before we start defining the individual components, we will create the alarm texts to be used in the project. We recommend that you plan the alarm texts at an early stage to ensure consistent use of alarm priorities and colors. Careful planning will also maximize the reuse of alarm texts.

How the operator views alarms

One of the things that happen when a component enters a state of alarm during supervision is that a text describing the alarm situation is shown in the **Alarm List**. The alarm texts in the **Alarm List** are displayed in

different colors depending on how critical the alarm situation is. In the figure below the column **Alarm Text** shows the user-defined alarm texts, below the alarm list the event list is placed.

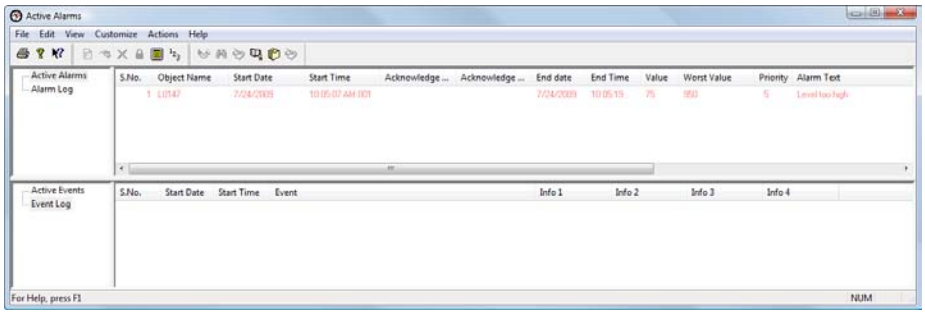


Figure 3.14 The Alarm List provides the operator with an overview of all active alarms and gives access to historical alarms in the Alarm Log. The event list shows all the defined events.

Alarm texts for this project

For our project we need the following alarm texts:

For these components …	we need alarm texts if …
Valves	they are defective.
Flow	the flow is too high, much too high, too low or much too low, that is, we need four alarm texts.
Level	the level is too high or too low.

Alarm text properties

We need to create the following alarm texts:

TIP: We recommend that you associate each alarm priority with one color. A consistent use of colors will ensure that the operator immediately recognizes the importance of an alarm.

Alarm no.	Priority	Alarm color	Alarm text	Instructions
101	5	Light red	Valve defective	
102	6	Red	Flow exceeds high alarm	
103	5	Light red	Flow exceeds high limit	
104	5	Light red	Flow below low limit	
105	6	Red	Flow below low alarm	
106	5	Light red	Level too high	The level in the basin is too high. Open safety valve ...
107	5	Light red	Level too low	The level in the basin is too low. Pour faster...

NOTE: Fill in the remaining properties as you like. It is recommended to enable **Blinking** for alarm color and disable it for acknowledgement color. In that case, the component in alarm will blink on the process diagram and will stop blinking when the operator acknowledges the alarm.

Two ways of defining alarm texts

In IGSS you can create and edit alarm texts as follows:

- from the **Alarm Details** dialog box accessed from the **Edit → Alarm Texts** menu

- from the **Edit Alarm Description** dialog box accessed from the **Edit Mapping** tab of the object properties dialog box

To define alarm texts

The following procedure describes how you define all the above alarm texts from the **Alarm Details** dialog box. The alternative is to create the alarm texts as part of the object definition procedure.

Step	Action

1. Select **Edit → Alarm Texts**. The **Alarm Details** dialog box appears.

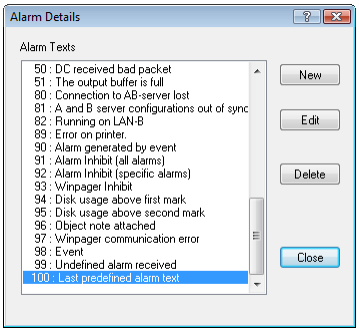


Figure 3.15 From the Alarm Details dialog box you can create, edit and delete alarm texts for the current project.

2. Click **New** to add the first alarm text. The **Edit Alarm Description** dialog box appears.

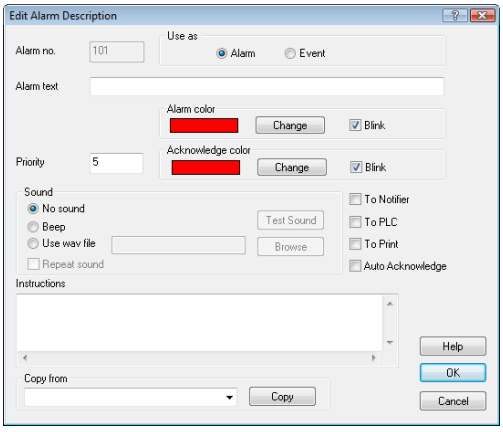


Figure 3.16 In this dialog box you create new alarm texts or edit existing ones.

3. Specify the alarm properties from the table above and fill in the remaining properties, as you like.

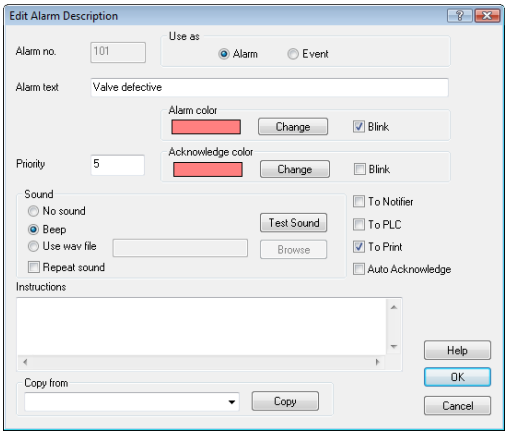


Figure 3.17 The first alarm text is ready for use..

4. Click **OK** to save the alarm text and return to the **Alarm Details** dialog box.

5. Repeat steps 2 to 4 for the remaining alarm texts.

   RESULT: The alarm texts are now ready for use. We will merely have to associate them with the relevant alarm atoms when we later define the process components.

6. Click **Close** to close the **Alarm Details** dialog box.

For further details, search for "*alarm texts*" in the **Definition** Help file.

Define Digital Templates

Purpose

In the project we have two valves. Instead of defining them one by one we will define a valve template to ensure that both valves share the same properties.

To define the digital template (VALVE)

Perform the following steps:

Step	Action

1. Select **Template** → **Create**. The **Create Template** dialog box appears.
   Select **Digital** and type VALVE in the **Name** field and `2-state valve` in the **Description** field.

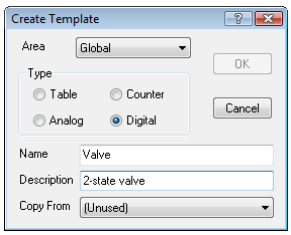


Figure 3.18 In this dialog box you select the template type and type a unique template name and an optional description.

2. Click **OK**. The digital template properties dialog box appears.
   On the **Bit Map I/O** tab, define a state bit in the **To PC** field and a command bit in the **From PC** field. See the **LEGEND** for an explanation of the symbols used.

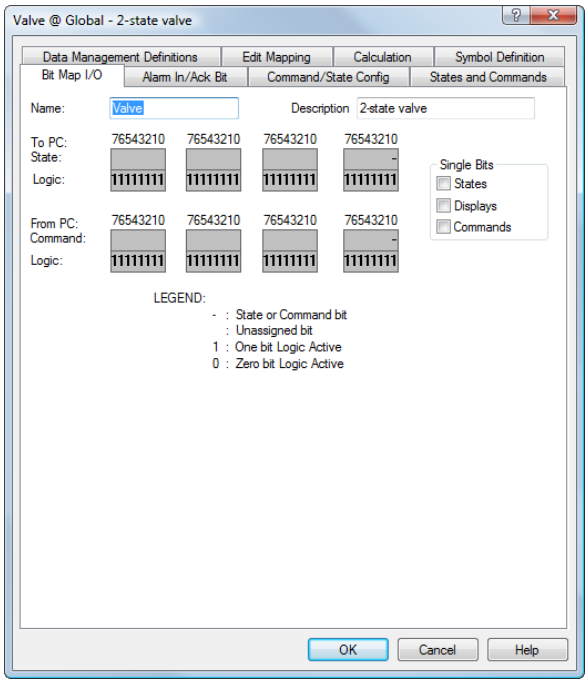


*Figure 3.19 On the **Bit Map I/O** tab you define the individual bits sent to and from IGSS*

Step	Action

3. Click the **Alarm In/Ack bit** tab and define an alarm indication bit **To PC** (bit 0) and alarm acknowledgement bits (bit 1 to PC and bit 0 from PC).

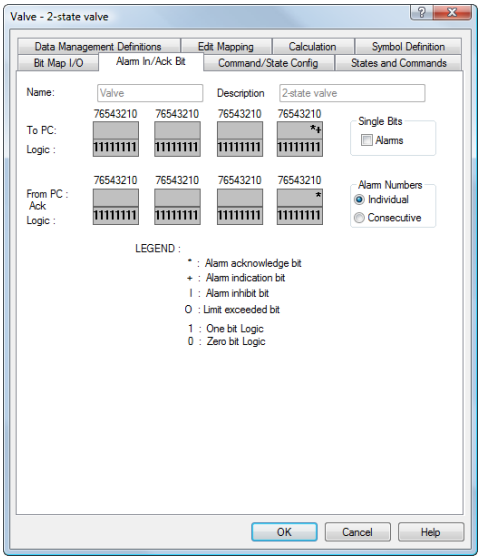


Figure 3.20 On this tab you define the alarm indication and acknowledgement bits.

4. Click on the **States and Commands** tab. Do the following:

- Select the default states **< - 0** and type **closed** in the box.
- Repeat for state **< - 1** but type **open**.
- Select the default command **0 - >** and type **close** in the box and click **Add command**.
- Repeat for command **1 - >** but type **open**.

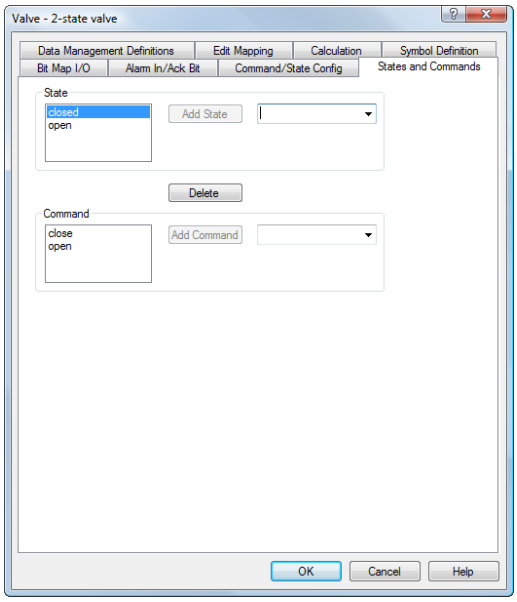


*Figure 3.21 On the **States and Commands** tab you define the names of the individual states and commands.*

Step	Action
5.	Click the **Command/State Config** tab and do the following: • In the **States** list, select **Closed** • In the **Commands** list, clear the **close** check box. • In the **Default Command** drop-down list, select **open**. Repeat for the **open** state, but choose **close** as the default command.

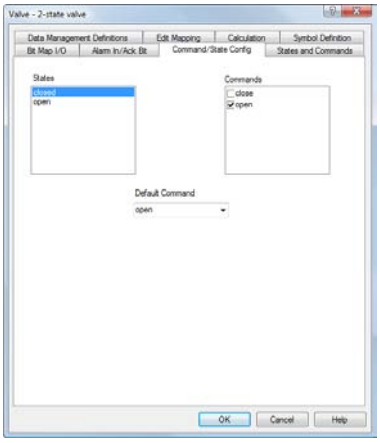


Figure 3.22 On this tab you specify the valid and default commands for each state.

6.	Click the **Data Management Definitions** tab and set the **Scan interval**, **Base interval** and **Data reduction** to the settings shown in Figure 3.23.

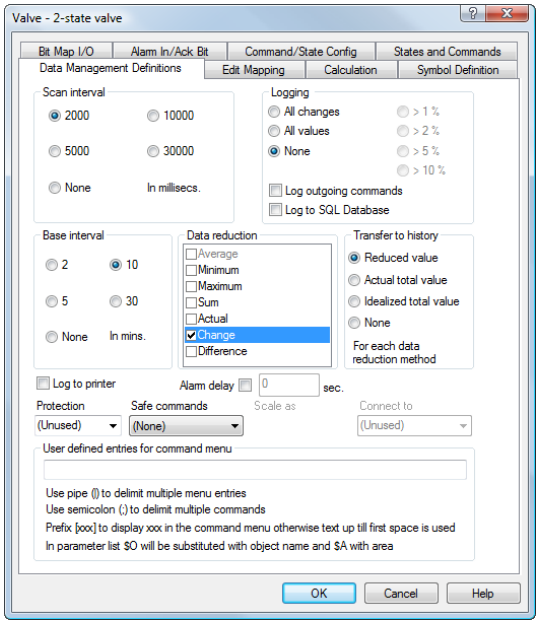


*Figure 3.23 On the **Data Management Definitions** tab you define the data collection properties.*

Step	Action

7. Click the **Edit Mapping** tab.

NOTE: The more information you can type into a template, the less work you will have when using the template to define objects. So we can type all address information which will be common to the valves.

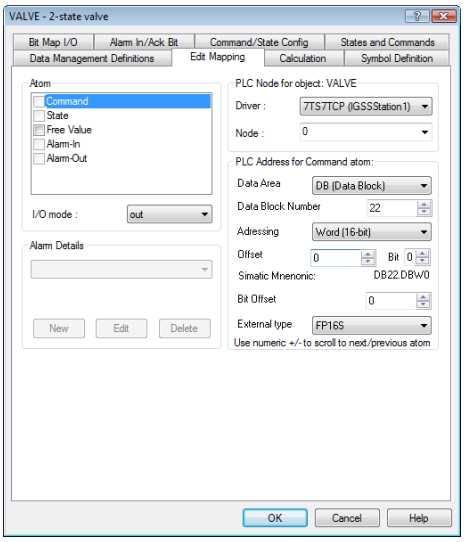


*Figure 3.24 On the **Edit Mapping** tab you define the parts of the PLC address which are common to the objects you will base on this template.*

8. Type the following information:

- Select **Command** or **State** in the **Atom** box.
- In the **I/O mode** field, select **out** for command and **in** for state.
- Select **Alarm-In** and in the **Alarm Details** field, select alarm number 101 as described in *"Define Alarm Texts"* in Chapter 3.
- In the **Driver** field, select the appropriate driver, **7TS7TCP (IgssStation1)**.
- In the **Node** field, type 0 (the node number we defined in **System Configuration**).
- In the **Data Block Number** field, type 22 for command and 23 for state.

NOTE: To make the communication as efficient as possible, we will use one block for commands and another one for states. That way the driver will not scan any unnecessary data (i.e. commands) that will merely be discarded when collecting changes of state.

- Leave the Offset field unchanged.
- Leave the Bit Offset field open, as each object will have its own specific address.
- In the External Type drop-down list, select the FP16S data type.

Step	Action
9.	Click the **Symbol Definition** tab. Do the following: • Check the **Copy symbols to template** box to save the color and symbol selections that you are about to make as a part of the template. • In the **Digital state for symbol** field, select **Closed**. • In the **Symbol color** drop-down list, select a yellow color to represent the state. • In the **Choose symbol** group, select the symbol that you want to represent the state.

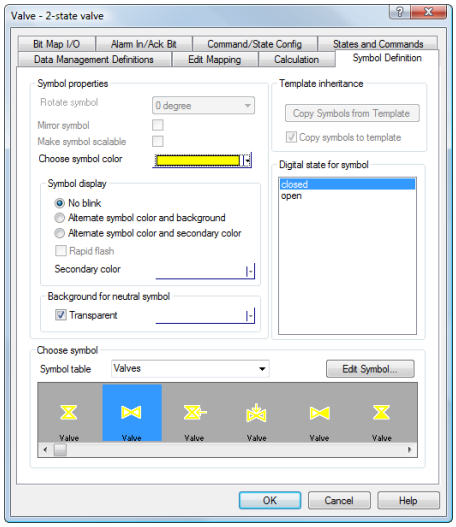


*Figure 3.25 On the **Symbol Definition** tab, you select the colors and the symbols for the various states.*

10.	Repeat step 9 for the **Open** state, but select a green color instead.
11.	Click **OK**, and the digital template is complete.

Define Digital Objects

Purpose

At this point we have a diagram without any objects, a scaling object and a digital template - in other words we have all the basic building blocks for our project.

We will begin by defining the two valves, V1 and V2, which use the digital template, VALVE.

To define the two valves (V1 and V2)

TIP: The only properties we need to define for the two valves are their specific PLC addresses and their symbols.

Perform the following steps:

Step	Action
1.	*Select **Objects → Valves**. The **Object Browser** dialog box appears.*
2.	Click the + sign beside **Global**, then **Digital** and select **VALVE** in the **Tree view** and type V1 in the **Name** field. Click Create.

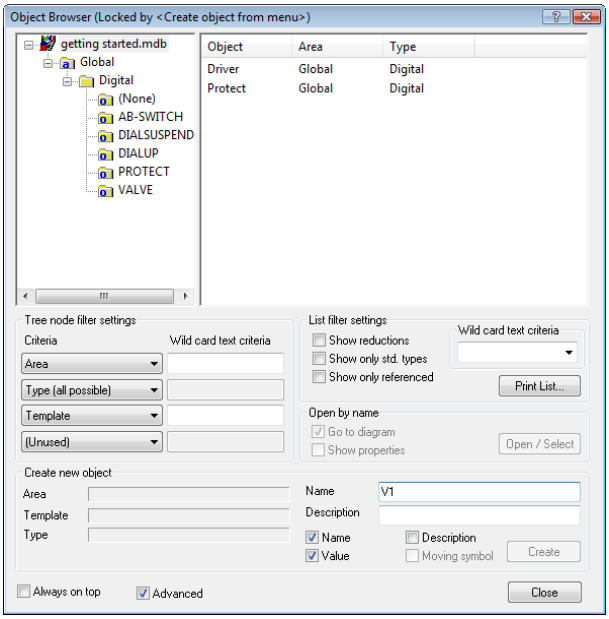


Figure 3.26 In this dialog box, you select the appropriate template and type the unique name of the new object.

Step	Action

3. On the **Edit Mapping** tab, type the precise PLC addresses. We will use the same word offset for state and command - this will help us create consistency in the PLC programming.

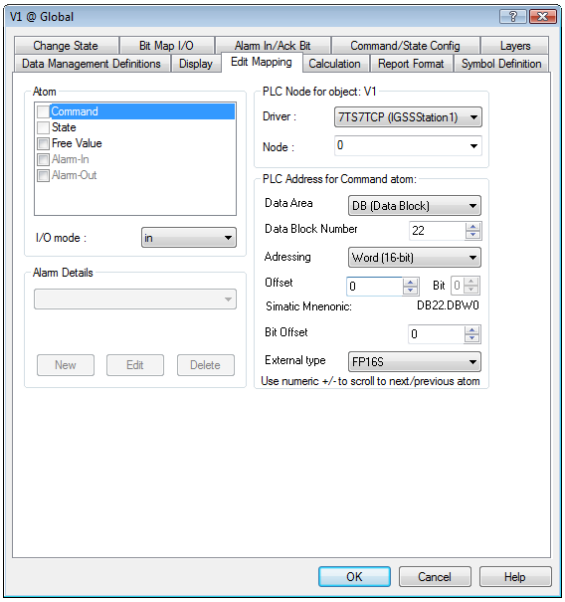


*Figure 3.27 On the **Edit Mapping** tab you type the precise PLC address and the alarm numbers.*

4. Click on the **Symbol Definition** tab. Do the following:

- Click the **Copy Symbols from Template button** to use the color and symbol selections you defined as part of the template.

TIP: If you want to turn the symbol by, for example, 90° to represent the state **open**, simply select that percentage in the **Symbol Angle** drop-down list.

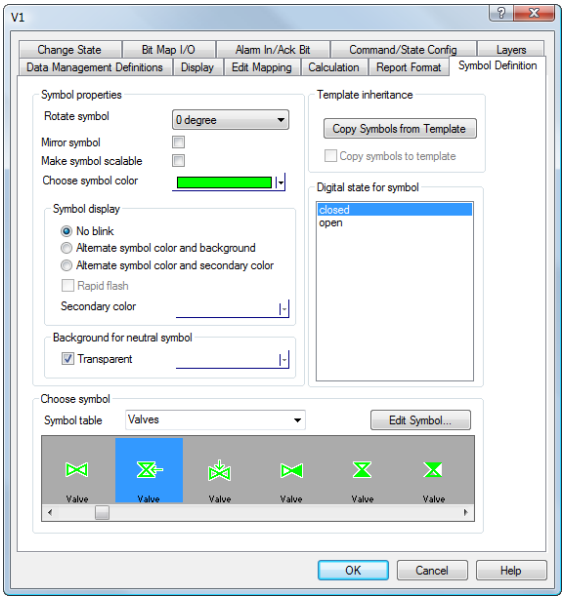


*Figure 3.28 On the **Symbol Definition** tab, you select colors and symbols or you use the selections from the template.*

5. Click **OK**. The two state symbols appear on the diagram. By default, they are placed on top of each other, but you may move them individually, if required (select **View → Show All States**).
Position the symbol, then the name and the state.

Step	Action
6.	Repeat steps 1 - 4 for V2, but use a **Offset** of 1 for both state and command. *NOTE:* As both V1 and V2 use only one state bit, we could have used 0.1 as the bit offset for state. However, in our example it is not necessary to pack the states (it is only a very small project). Also, it is pleasantly symmetrical to use the same bit offset for state and command. Note that command bits cannot be packed. The system always writes (at least) one word (16 bits) at a time.
7.	Click on the **Symbol Definition** tab and click **Copy Symbols from Template** to select the same colors and symbols as for V1.
8.	Position the symbol, name and state for V2.

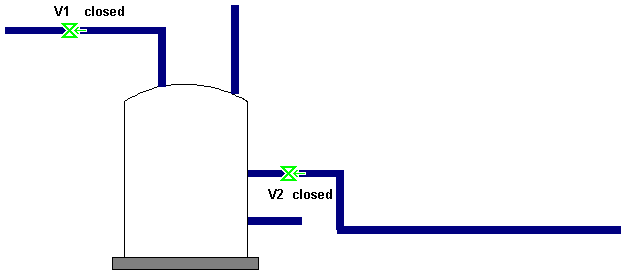


*Figure 3.29 The **Overview** diagram with the two valves in position.*

Define Analog Objects

Purpose

In our project we need two analog objects:

- the flow meter measuring the flow into the tank, **F0147**
- the water level in the tank, **L0147**

To define the flow meter (F0147)

Perform the following steps:

Step	Action
1.	Select **Objects → Analog Elements**. The **Object Browser** appears.

Step	Action

2. Click the + sign beside the **Global** and **Analogue** in the **Name** field, type `F0147` and in the **Description** field, type `Flow into tank T0147`.

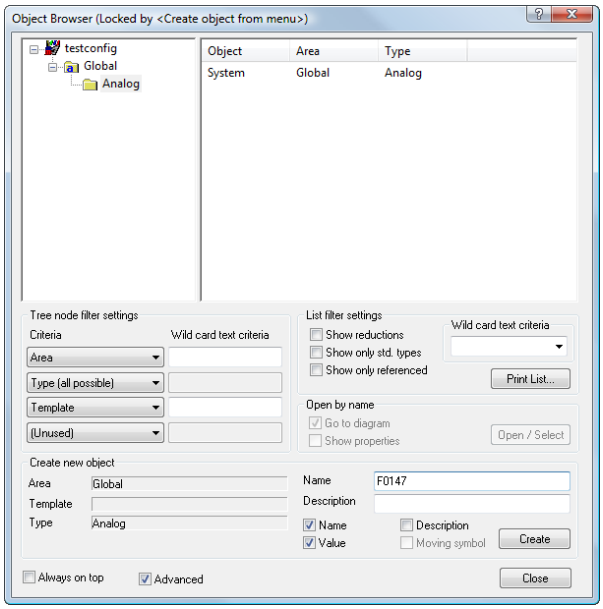


*Figure 3.30 In the **Definition of Object** dialog box you type the unique name of the object and an optional description.*

3. Click **Create**. The analog object properties dialog box appears. Do the following:

- Adjust all the values as shown in Figure 3.31 using the keyboard or by moving the appropriate horizontal line in the bar to the desired value. The flow meter measures in the range 0 - 100 liters an hour (l/h).
- In the **Units** box, select the measuring unit `l/h`.
- Check the four limit and alarm boxes, **High Alarm, High Limit, Low Limit** and **Low Alarm**.

NOTE: The **Actual Value** is, of course, updated as soon as the data collection starts.

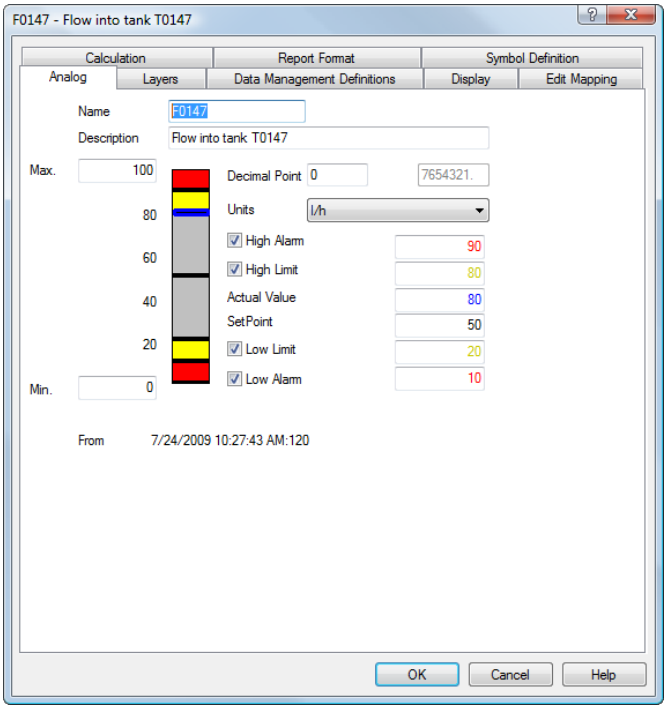


*Figure 3.31 On the **Analog** tab you specify the measuring range, the measuring unit and the alarm limits.*

Step	Action

4. Click the **Data Management Definitions** tab and make the selections shown in Figure 3.32.

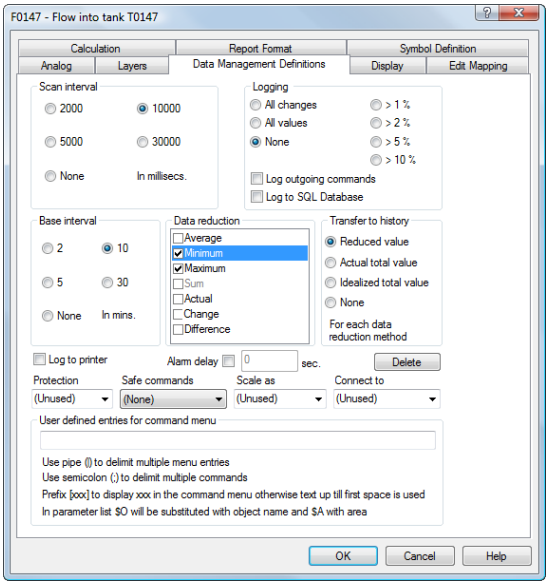


*Figure 3.32 On the **Data Management Definitions** tab you define the data collection properties.*

5. Click the **Edit Mapping** tab and do the following:

- In the **Configure atom** box, select **Actual Value**.
- In the **Data Block Number** field, type `20`. We choose a different data block for our analog measurements than for the digital ones.
- In the **Atom** box, select **Set Point**, and set the data block number to **18**.

NOTE: The other five values are local to the PC and thus have no PLC address.

- In the **Atom** box, select **High Alarm** and select the associated alarm text (number 102) as described in "*Define Alarm Texts*" in Chapter 3.
- Repeat for **High Limit (alarm no. 103)**, **Low Limit (alarm no. 104)** and **Low Alarm (alarm no. 105)**.

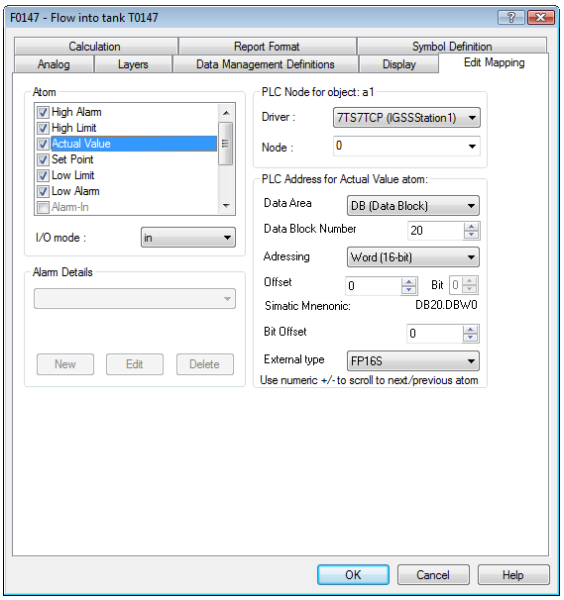


*Figure 3.33 On the **Edit Mapping** tab you type the specific PLC address and attach the appropriate alarm texts.*

6. Click the **Symbol Definition** tab and select a color and a symbol.

Step	Action
7.	Click **OK**. The symbol appears on the diagram. Position the symbol, then the name and the value. See Figure 3.39.

To define a bar display of the water level (L0147)

Perform the following steps:

Step	Action
1.	Select **Objects → Bar Display**. The **Object Browser** dialog box appears.
2.	Click the + sign beside **Global** and select **Analog** and type `L0147` in the **Name** field, then type `Water level in tank T0147` in the **Description** field.

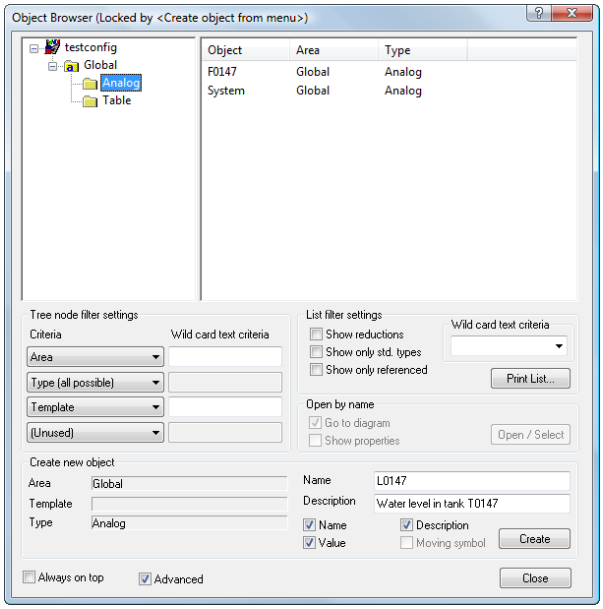


*Figure 3.34 In the **Object Browser** dialog box you type the unique name of the object and an optional description.*

Step	Action

3. Click **Create**. The bar display object properties dialog box appears. Do the following:

- Adjust the maximum value to `1000`.
- Remove all values except **High Alarm**, **Actual Value** and **Low Alarm** by moving the corresponding horizontal line above the top or below the bottom of the bar. Use the color-coding to determine which line to move. A quicker alternative is to clear the check boxes for the atoms you do not want to use on the **Edit Mapping** tab.
- In the **Units** drop-down list, select `l` for liters.

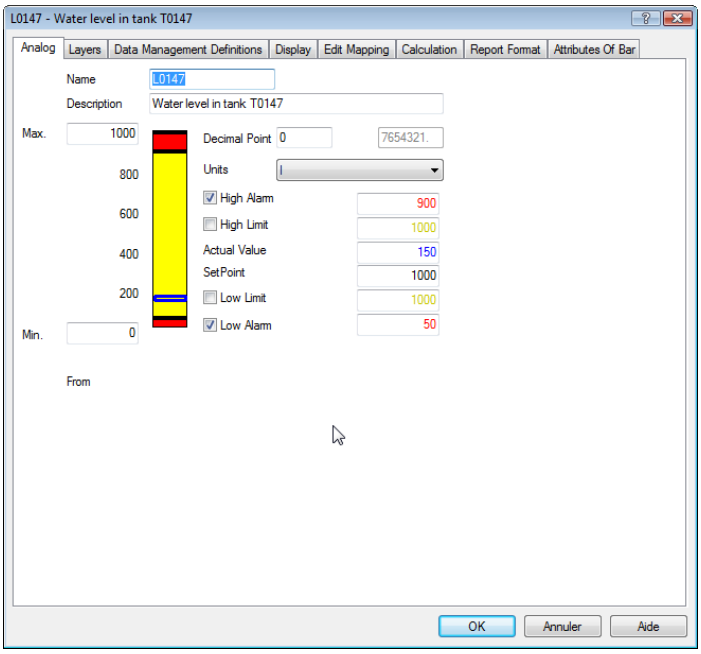


*Figure 3.35 On the **Analog** tab you specify the measuring range, the measuring unit and the alarm limits.*

4. Click the **Data Management Definitions** tab and make the selections shown in Figure 3.36.

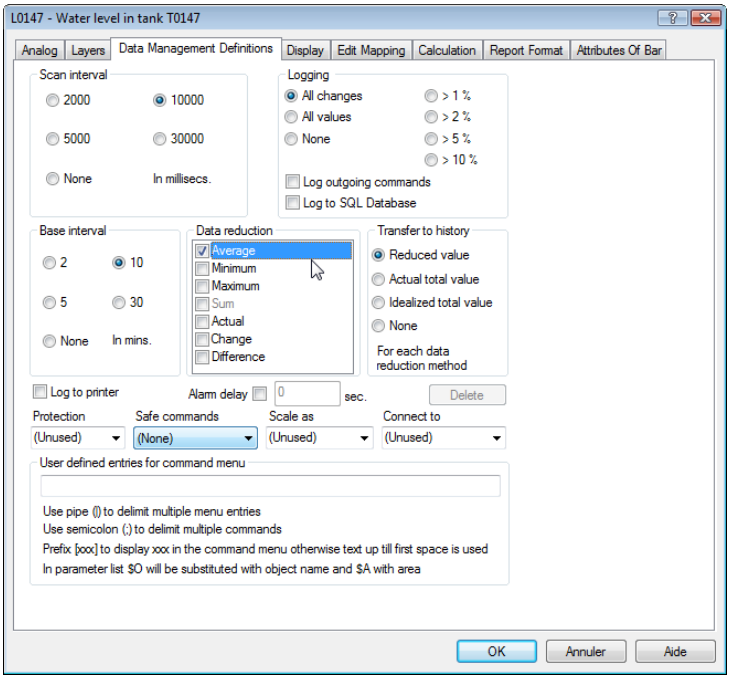


*Figure 3.36 On the **Data Management Definitions** tab you define the data collection properties.*

Step	Action

5. Click the **Edit Mapping** tab. Do the following:

- In the **Atom** box, select **Actual Value** and type the PLC address shown in Figure 3.37.
- Select **High Alarm** and associate the relevant alarm text (alarm no. 106), then select **Low Alarm** and associate alarm no. 107.

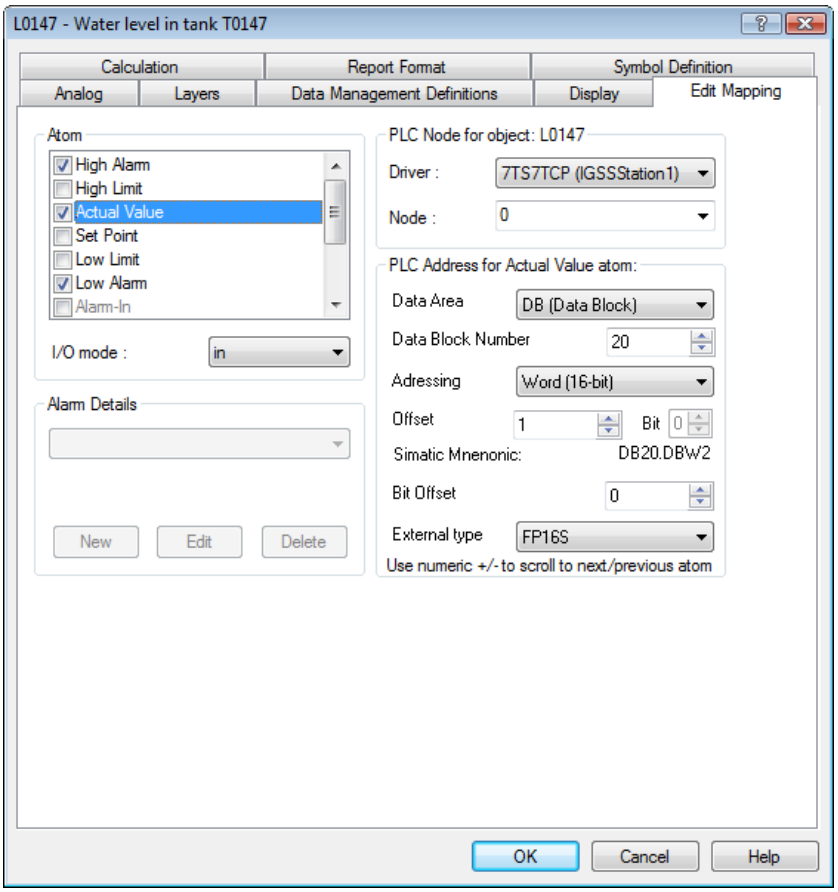


*Figure 3.37 On the **Edit Mapping** tab you type the specific PLC address and the appropriate alarm numbers.*

6. Click the **Attributes of Bar** tab. When you make new selections, the bar preview to the left changes accordingly. Make the selections as shown in Figure 3.38.

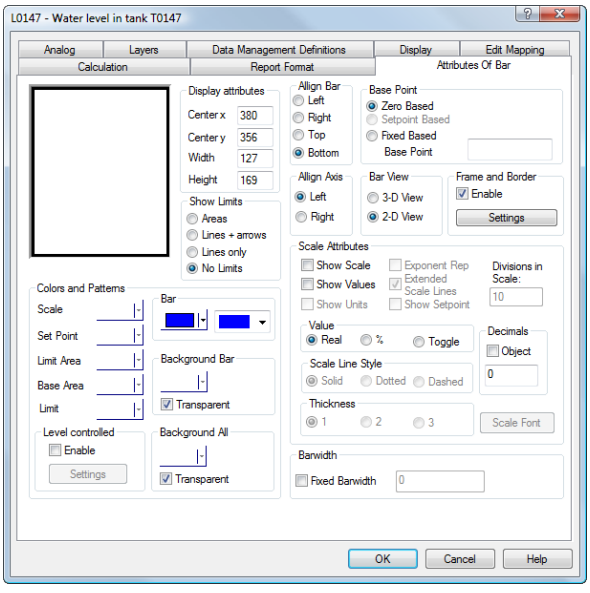


*Figure 3.38 On the **Attributes of Bar** tab you define the layout of the bar.*

Step	Action
7.	Click **OK**. A small rectangle representing the bar display appears. Position the bar display inside the water tank and resize it so that it fits within the tank as shown in Figure 3.39, then position the name and the value.

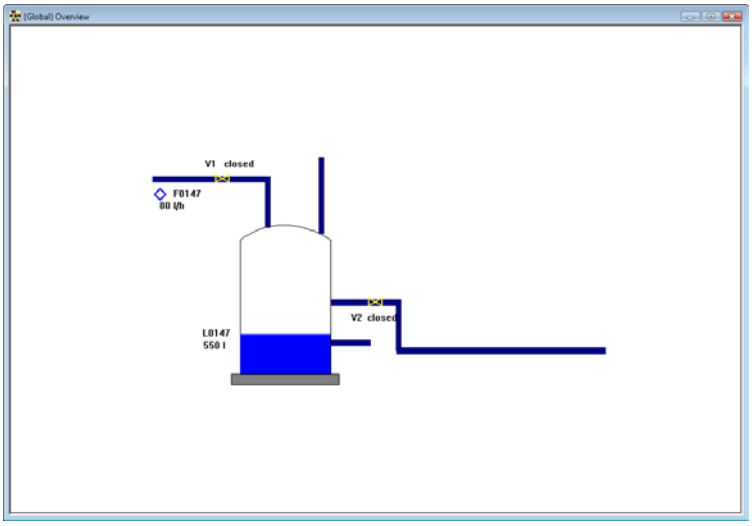


*Figure 3.39 The **Overview** diagram with the bar display in the right position.*

Define Table Objects

Purpose

In our project we need to show the four temperature gauges, which measure temperatures at different levels in the tank. We integrate the four temperature gauges in one table object, **T0147**.

To define the table object (T0147)

Perform the following steps:

Step	Action
1.	Select **Objects → Rectangular Field**. The **Object Browser** appears. Select **Table** and type the name and description as shown in Figure 3.40.

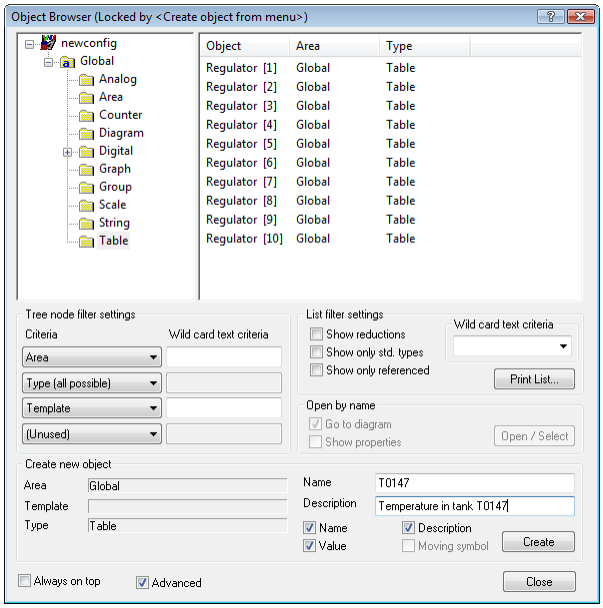


*Figure 3.40 In the **Object Browser** you type the unique name of the object and an optional description.*

2.

- Click **Create**. The table object properties dialog box appears.
- In the **Type** field, select **Fixed Table**.
- Type in the names and values shown in Figure 3.41.
- In the **Units** drop-down list, select `°C`.
- In the **Minimum value** field, type `0` and in the **Maximum value** field, type `100`.

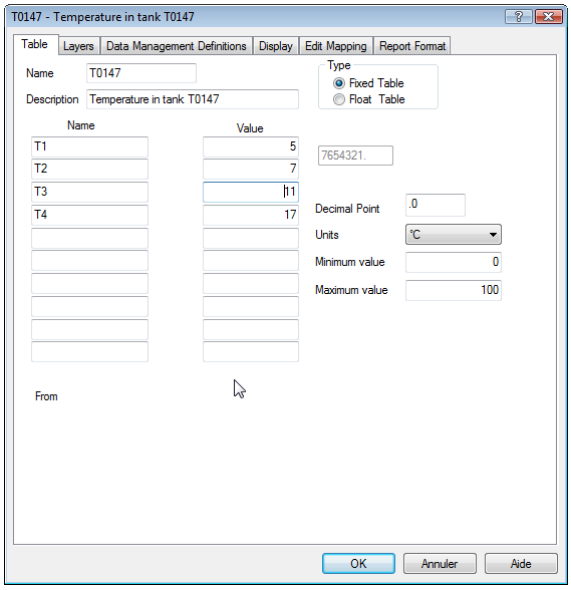
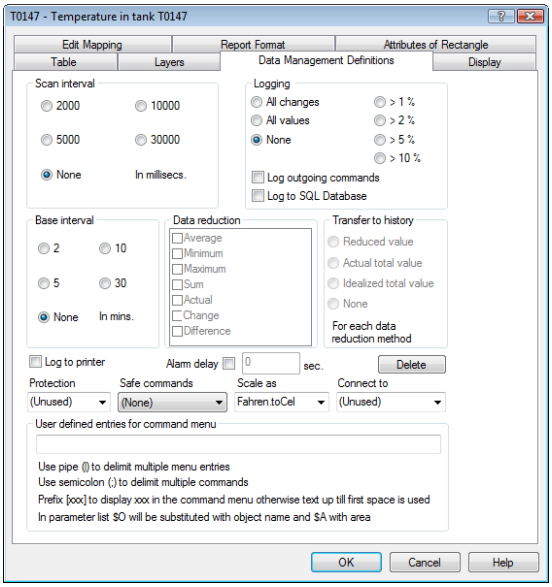


*Figure 3.41 On the **Table** tab you type the names of the individual temperature gauges and their initial values.*

Step	Action
3.	Click the **Data Management Definitions** tab and make the selections shown in Figure 3.42. As you can see, the selections differ from the ones for the analog objects as follows: • **Logging** is set to **None** which means that historical graphs of the object values cannot be shown. However, trend graphs can always be displayed, as they do not depend on logged data. • **Base interval** is set to **None** which means that there is no data reduction method and thus no values for the operational reports. • In the **Scale As** field, we have selected the scaling object, **Fahren.toCel** which we defined in the Define Scaling Objects section. The scaling object converts values between 32 and 212 to values between 0 and 100. • In the **Base interval** group set the base interval to 10. Put at checkmark in **Minimum** and **Maximum** in the **Data reduction** group. Select **Reduced value** in the **Transfer to history** group  *Figure 3.42 On the **Data Management Definitions** tab you define the data collection properties. Note that we use the **Fahren.toCel** object to convert the values from °F to °C.*

Step	Action

4. Click the **Display** tab.

- In the **State/Value** group, check the **Units** box to show the unit beside the table values.

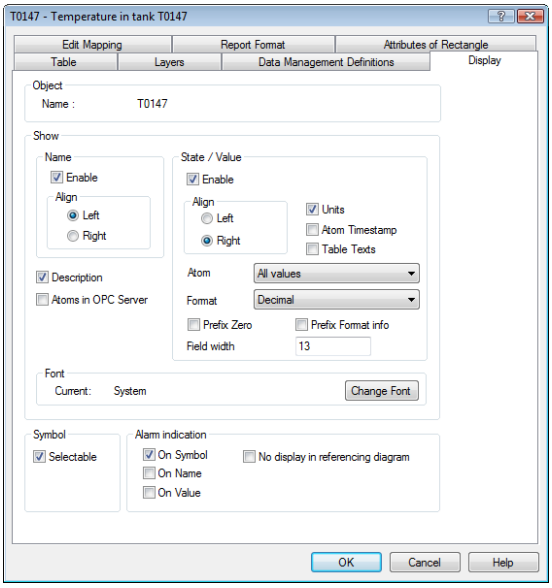


*Figure 3.43 On the **Display** tab you define that the values and units are shown with the table object.*

5. Click the **Edit Mapping** tab and type the values shown in Figure 3.44.

As the table object uses the external type **FP16S**, it occupies the addresses 18.00 to 21.00.

NOTE: Although the table object holds four values, you need only give one address, namely the one for the first value in the table. It is assumed that the other values in the table are on addresses that follow immediately after the first one.

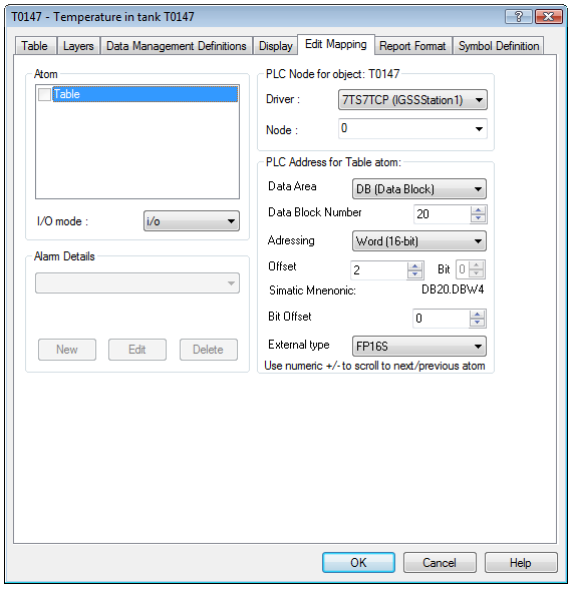


*Figure 3.44 On the **Edit Mapping** tab you type the specific PLC address. Note that you only need to specify one address. IGSS assumes that the values have consecutive addresses.*

Step	Action
6.	• Click **OK**. A small rectangle representing the table object appears. Position the rectangle and resize it to the appropriate size, then place the name above it and the values inside it.

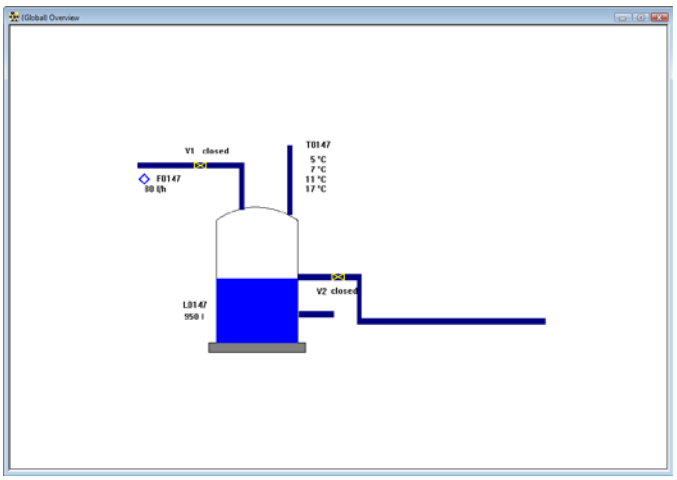


*Figure 3.45 The **Overview** diagram with the temperature gauges in position.*

Define Counter Objects

Purpose

We nearly have a complete project now. Only two things are missing:

- The counter that counts liters in the tank and
- The text that displays the current status

We will start by defining the counter object, **C0147**.

To define the counter object (C0147)

Perform the following steps:

Step	Action
1.	• Select **Objects** → **Rectangular Field**. The **Object Browser** appears. • Select **Counter** and type the name and description as shown in Figure 3.46.

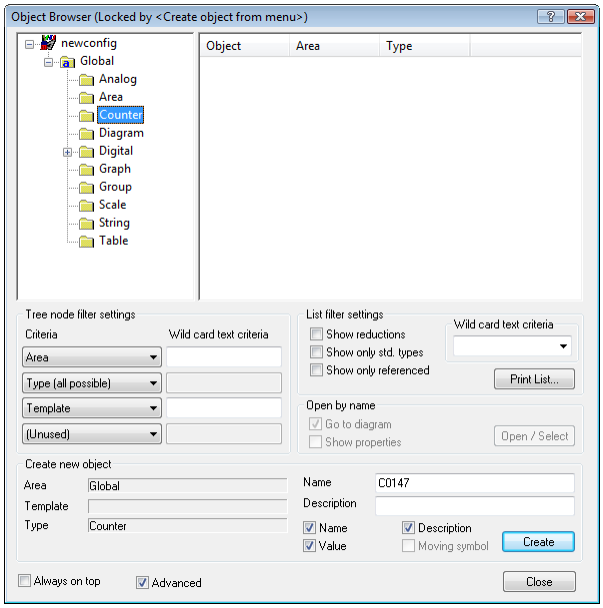


*Figure 3.46 In the **Object Browser** you type the unique name of the object and an optional description.*

2.	• Click **Create**. The counter object properties dialog box appears. • Select the measuring unit and the values as shown in Figure 3.47.

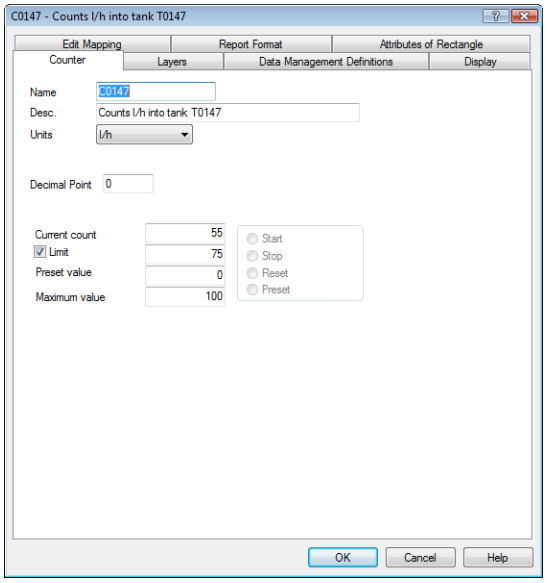


*Figure 3.47 On the **Counter** tab you specify the measuring unit, the preset and maximum values and whether you want to enable alarm supervision (Limit check box).*

Step	Action

3. Click the **Data Management Definitions** tab and type the values shown in Figure 3.48. As you can see, this counter object has no logging.

In the **Base interval** group set the base interval to 10. Put at checkmark in **Maximum** in the **Data reduction** group. Select **Reduced value** in the **Transfer to history** group.

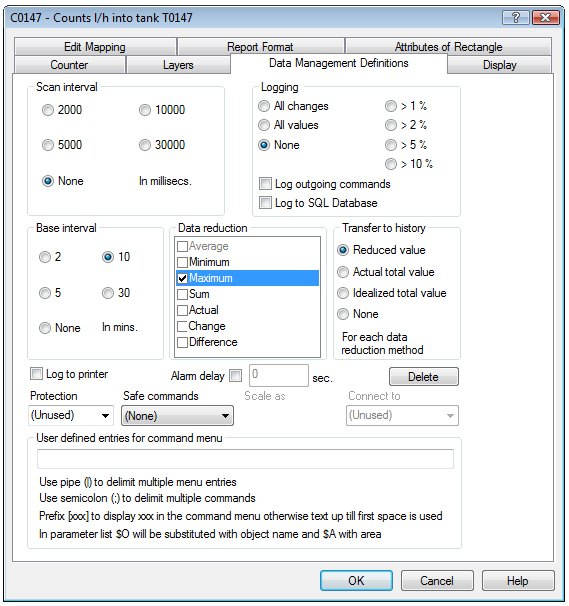


*Figure 3.48 On the **Data Management Definitions** tab you define the data collection properties. Note that there is no logging and base interval.*

4. Click the **Display** tab.

- In the **State/Value** group, check the **Units** box to show the unit on the process diagram.

5. Click the **Edit Mapping** tab and type the values shown in Figure 3.49.

NOTE: We use the **Offset** immediately after the table object, that is, 3.

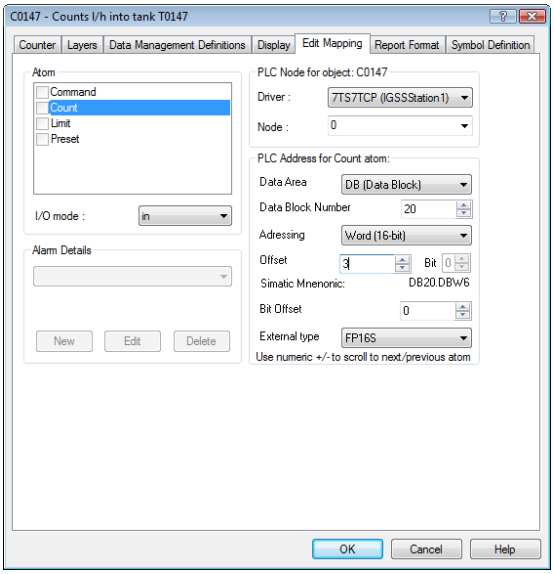


*Figure 3.49 On the **Edit Mapping** tab you type the specific PLC address. We use the **Offset** immediately after the table object, that is, 22.*

Step	Action
6.	• Click OK. A small rectangle representing the counter object appears. • Position the rectangle and resize it to the appropriate size, then place the name above it and the value inside it.

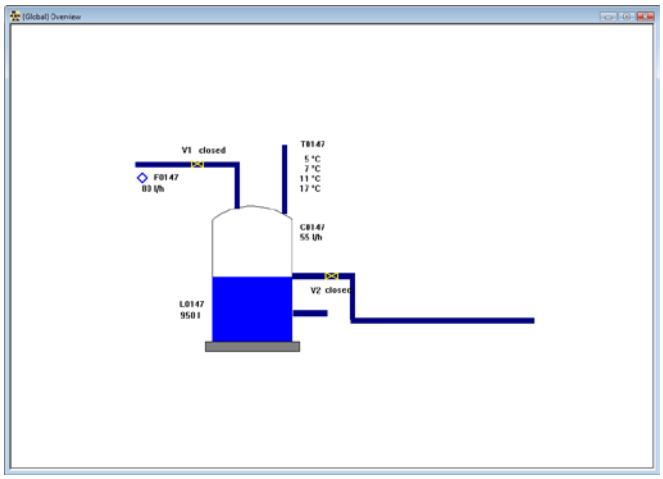


*Figure 3.50 The **Overview** diagram with the counter object, C0147, in position.*

Define String Objects

Purpose

The last object we will place on the diagram is the text describing the current state of the process. For that purpose we will define the string object, **Message**.

To define the string object (Message)

Perform the following steps:

Step	Action
1.	• Select **Objects → Rectangular Field**. The **Object Browser** appears. • Select **String** and type `Message` in the **Name** field • Clear the **Name** check box and check **Value**.

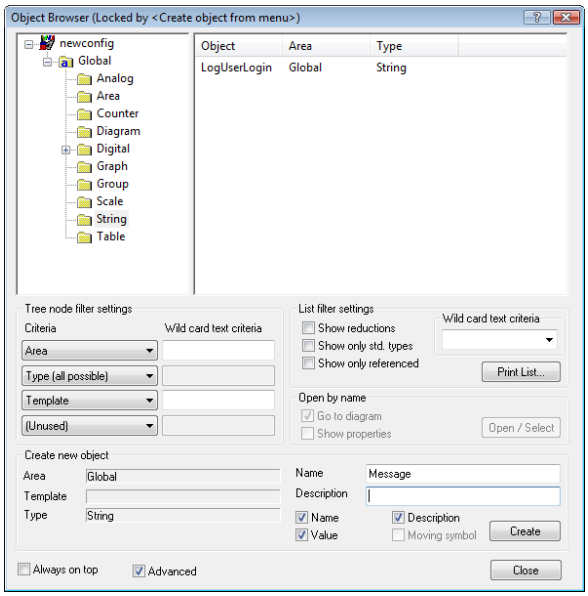


*Figure 3.51 In the **Object Browser** you type the name of the string object.*

Step	Action

2. Do the following:

- Click **Create**. The string object properties dialog box appears.
- In the **Maximum Length** field, type 70 and type the initial string shown in Figure 3.52.

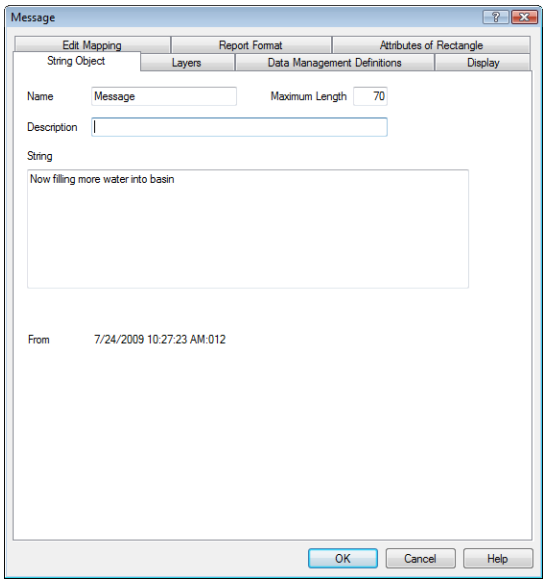


*Figure 3.52 On the **String** tab you type the max length of the text and an initial text string.*

3. Click the **Data Management Definitions** tab and make the selections shown in Figure 3.53.

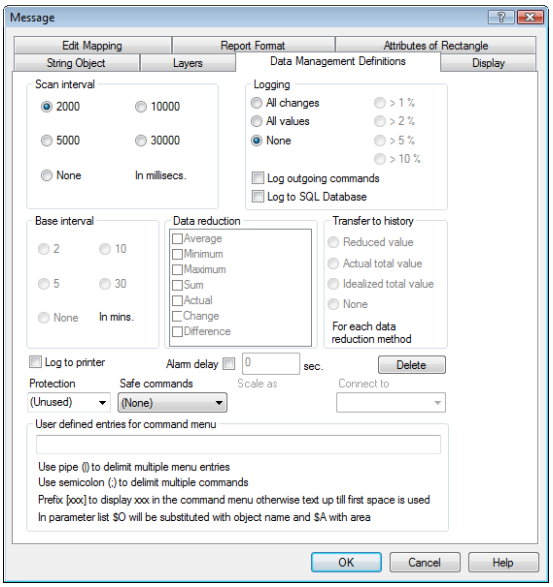


*Figure 3.53 On the **Data Management Definitions** tab you define the data collection properties. Note that there is a scan interval, but no logging.*

Step	Action

4. Click the **Edit Mapping** tab and type the PLC address as shown in Figure 3.54.

NOTE: We use a new data block for the string object, 21.

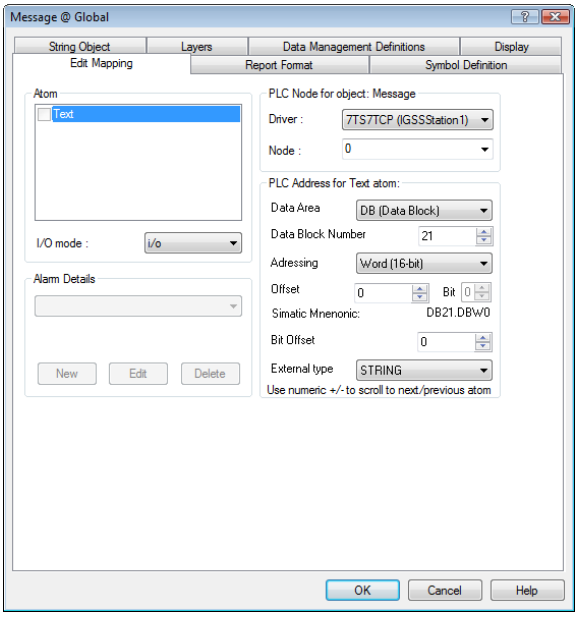


*Figure 3.54 On the **Edit Mapping** tab you type the specific PLC address. We use a new data group for the string object, 21.*

5. Do the following:

- Click **OK**. A small rectangle representing the string object appears.
- Position the rectangle and resize it to the appropriate size, then place the text string inside it.

RESULT: The project is now complete. To allow the operator to open the **Overview** diagram automatically, follow the procedure below.

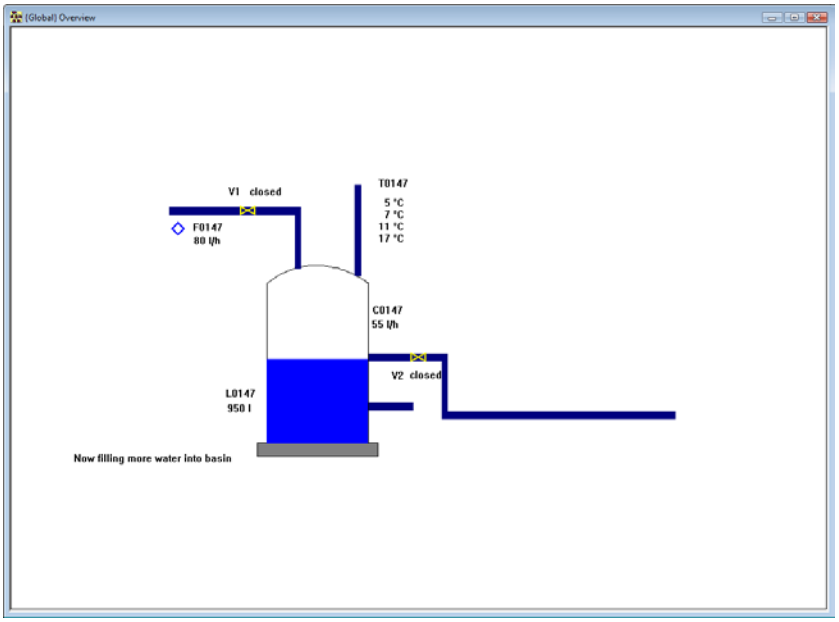


*Figure 3.55 The **Overview** diagram with the string object in position showing the current state of the process.*

To prepare the diagram for the operator

Perform the following steps:

Step	Action
1.	Select **Format** → **Set Initial Display** to make this diagram open automatically when **Supervise** is started.
2.	Select **File** → **Save** or press **CTRL + S** to save the work you have done so far. *NOTE:* As in any other program, you should save your work regularly to avoid losing valuable work and wasting the time to redo it.

Define Graph Windows

Introduction

There are two graph types in IGSS. One is the well-established graph which is presented in a separate graph window. The procedure below describes how you define this type of graph. The second type is the embedded graph which can be integrated in a process diagram. This graph type allows you to create XY plots apart from the traditional time plot which is, of course, supported by both graph types.

For details about the embedded graph type, refer to the Definition Help file.

Purpose

The project is actually complete, but we will also like to see the flow meter, the inlet valve and the level gauge in a graph window to get a general impression of the state of the tank T0147. For that purpose we will define the graph object, **G0147**.

To define the graph window (G0147)

Perform the following steps:

Step	Action
1.	Do the following: • Select **Graph** → **Create**. The **New Graph Properties** dialog box appears. • Enter the name and description shown in Figure 3.60. • Select the **Name to Menu** option to show the graph name in the **Graph** menu in **Supervise**. • Select the window elements to be shown on the diagram as shown in Figure 3.60.

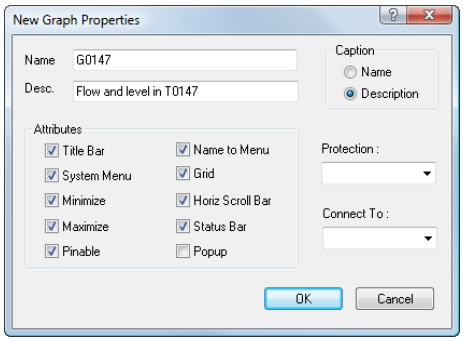


*Figure 3.56 In the **New Graph Properties** dialog box you enter the name and an optional description and select the window elements you want to show.*

Step	Action

2. Do the following:

- Click **OK**. The **Define Graph Parameters** dialog box appears.
- In the **Object name** column, select the objects shown in Figure 3.61 from the drop-down lists.

NOTE: Leave the remaining options with the default settings. For further details, click the ? in the upper right hand corner of the dialog box, then click the item you want information about.

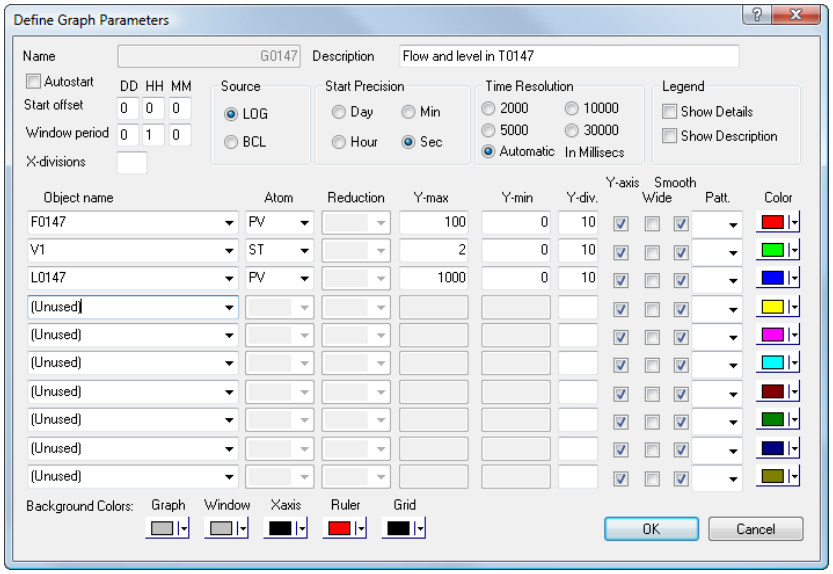


*Figure 3.57 In the **Define Graph Parameters** dialog box you define which process components you want to show, graph period and layout.*

3. Do the following:

- Click **OK**. The graph window appears.
- Scale the window to the desired size and position it where you want it to appear on the operator's screen.

TIP: If you want to ensure that the graph window always opens in the same size and position, you can lock these properties by clearing the check box **Allow graph move and resize** on the **Supervise** tab in the **System Configuration** module.

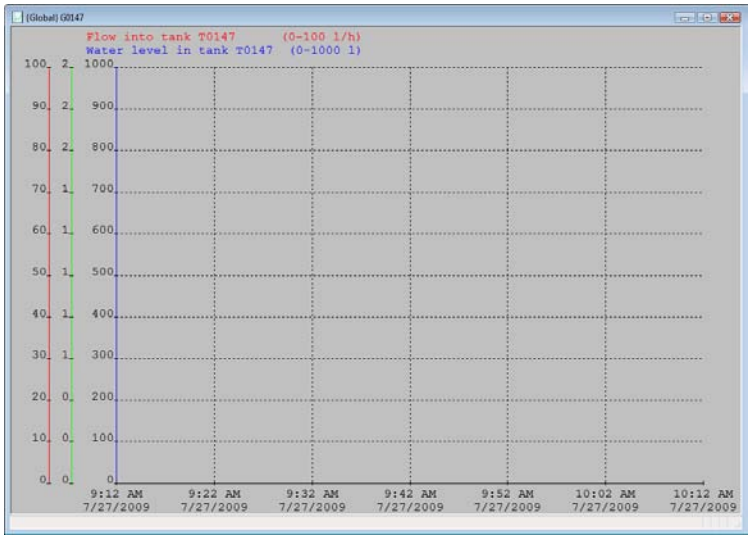


Figure 3.58 The graph window can be scaled and positioned as you like.

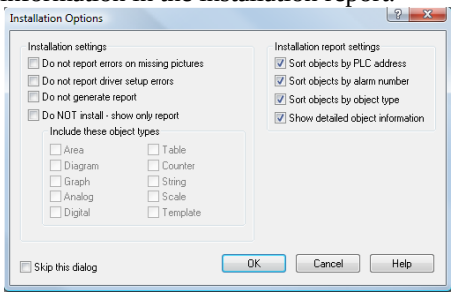
Install the Project

Purpose

The project is now ready for installation. Let us install it and correct any installation errors, if required.

To install the project

Perform the following steps:

Step	Action
1.	*TIP:* Select **File** → **Check and Install** or press CTRL + T. The **Installation Options** dialog box appears.
2.	Do the following: • In the Installation report settings group, check all the boxes to display this information in the installation report.  *Figure 3.59 The **Installation Options** dialog box allows you to control the contents of the installation report, <MyConfig>.prt and various other settings.* *TIP:* Check the **Skip This Dialog** box to install without seeing this dialog box in future. To show the dialog box again, hold down SHIFT while you select **Check and Install** in the **File** menu.
3.	The installation program is automatically launched and checks the entire project. • If the installation is successful, a message prompt appears informing you of how many objects the installed project holds. From the message prompt, you can access the installation report, <*MyConfig*>.prt by clicking the **Yes** button. • If there are any errors in the project, the **Troubleshooter** program appears automatically. The program lists the errors and allows you to correct the errors one by one. When all errors are corrected, repeat the installation.
4.	To run the project in **Supervise**, select the **Start** button under the **Home** tab in IGSS Master (This can be done both in **Runtime** or **Design** mode).
5.	If the project is running, you don't have to stop it to update the project. Simply use **Check and Update** under the **Design and Setup** tab and follow steps 2-3 above.

The installation report

When a project is successfully installed, a dialog box appears allowing you to view the installation report, *<MyConfig>*.prt. The report contains detailed information about the project, for example, scan intervals, base intervals, communication efficiency.

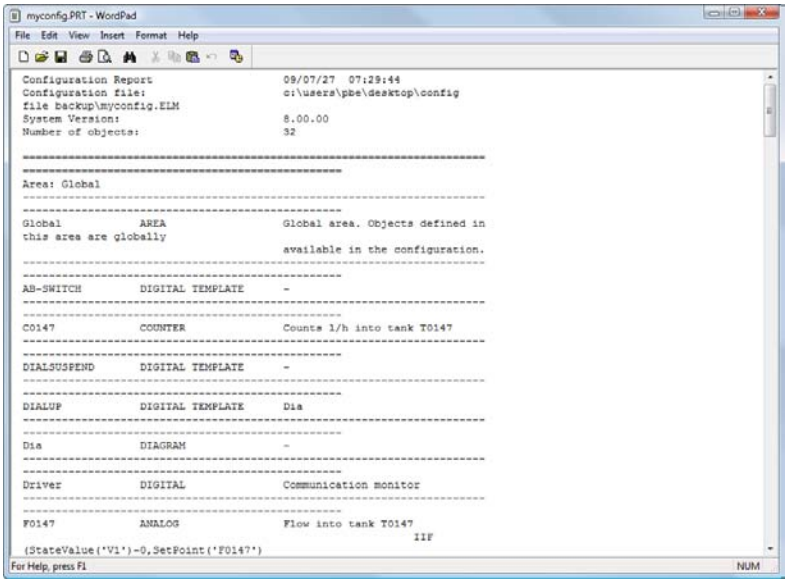


Figure 3.60 The installation report contains detailed information about the project.

Towards the end of the installation report, important information about the efficiency of the communication with the PLC is included as shown in Figure 3.65.

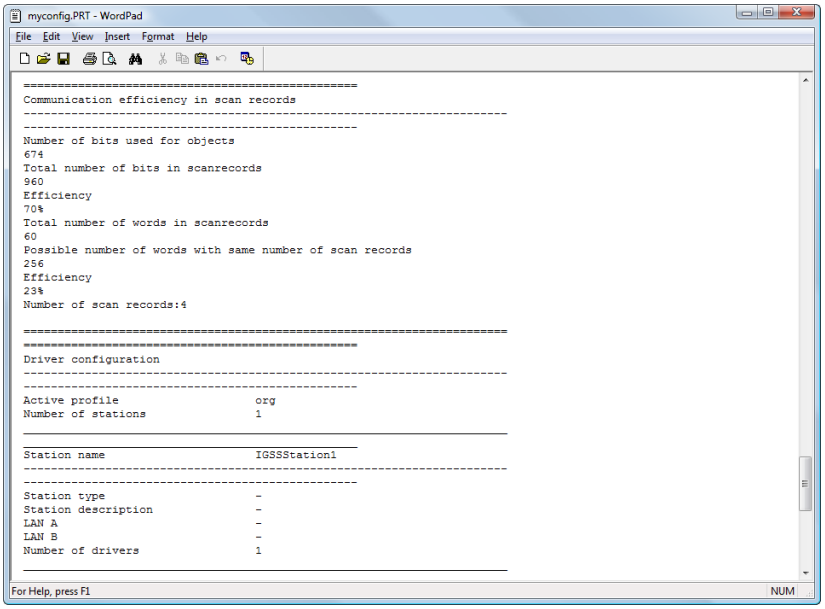


Figure 3.61 The installation report includes information about the efficiency of the communication with the PLC.

For further details about the installation report, search for "*installation report*" in the **Definition** Help file.

To correct installation errors

The Troubleshooter **program**

NOTE: If your installation is not successful, the **Troubleshooter** program automatically appears. The installation errors are listed. Double-clicking an error brings up a dialog box with further details. Clicking the **Locate Error in Definition** button guides you to the object which is in error.

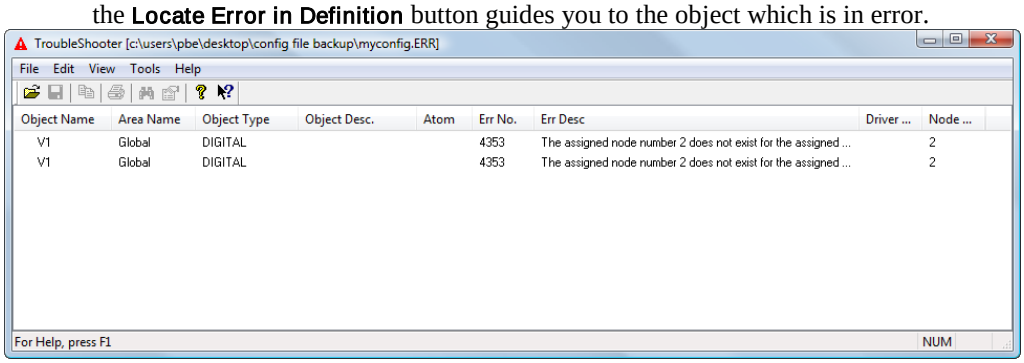


Figure 3.62 The error log file, <MyConfig>.err, clearly marks the errors found during installation allowing you to quickly find the erroneous objects and correct the errors.

To correct installation errors

Perform the following steps:

Step	Action
1.	Double-click the line representing the error you want to correct.
2.	Click the **Locate Error in Definition** button to go to the properties dialog box for the object in error.
3.	Correct the error using the information given in the **Troubleshooter** program, and click OK.
4.	Repeat step 1 to 3 for all the errors.
5.	Re-install the project. *NOTE:* You cannot start a project before all errors are corrected.

For details about installing projects, search for "*installing*" in the **Definition** Help file.

Define Operator Reports

Purpose

The final thing we need to do is to create the operational reports which the operator will be able to access from the **Supervise** module.

Reporting workflow

When you define new reports, you go through the following phases:

- create a report format
- create the report headings
- include the objects in the reports
- test the reports
- make the reports accessible in **Supervise**

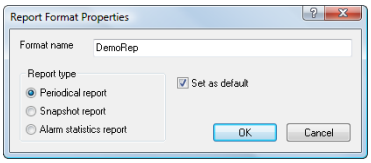
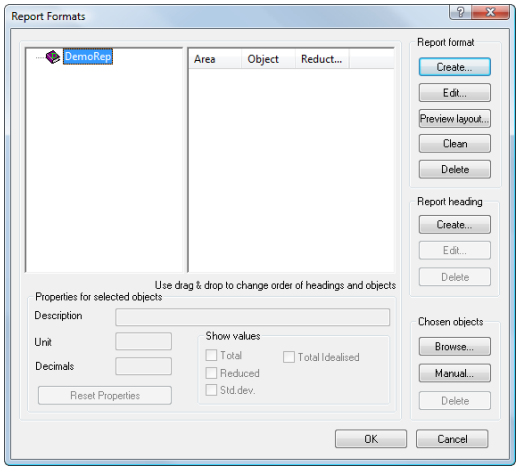
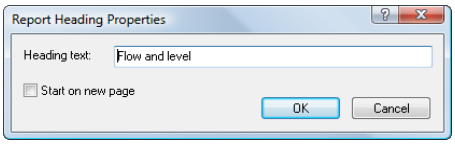
Report types

IGSS includes the following standard report types:

- Periodical report (daily, weekly, monthly, quarterly and yearly)
- Snapshot report (current process values)
- Alarm statistics report

To create a report format

In this example, we will create a report format to be used for periodical reports (daily, weekly, etc.). Perform the following steps:

Step	Action
1.	Select **Start → Programs → IGSS 9.0 → IGSS Master→ Switch to Design Mode (Under the dropdown menu) → Definition (Under Design and Setup tab)**. The **Definition** module starts.
2.	Click **Edit → Report Formats**. The Report Formats dialog box appears.
3.	• Do the following: • Click **Create** in the Report Format area. The **Report Format Properties** dialog box appears. • Type the name `DemoRep` in the **Format name** box.  • • Check **Set as default** to automatically suggest this report format when the operator requests a report. • Click the **Periodical** report option to allow the operator to base daily, weekly, monthly, quarterly and yearly reports on this format. • Click **OK** to return to the **Report Formats** dialog box.  *Figure 3.63 From this dialog box you create and maintain the report formats on which operator reports are based. A report format can be divided into sections (**Report Headings**).*
4.	Click the **Create** button in the **Report heading** area. The **Report Heading Properties** dialog box appears. • Type **Flow and level** in the heading text box as shown in Figure 3.68.  *Figure 3.64 In this dialog box you specify the names of the sections you want in the report.*
5.	Repeat step 4 for the two other headings named “Miscellaneous” and “Valves”
6.	Click **OK** to return to the **Report Formats** dialog box. *TIP:* To change the sequence of report headings, drag and drop the headings with the mouse. By default, headings are sorted alphabetically.

7. To include the objects, first click the appropriate report heading, in this case "Flow and level". Then click **Browse** in the **Chosen objects** area. The **Object Browser** appears.

   - We will now include the following objects:

This object name	Goes under this report heading
F0147 (Min/Max)	Flow and level
L0147 (Average)	Flow and level
C0147 (Max)	Miscellaneous
T0147 (Average)	Miscellaneous
V1 (Change)	Valves
V2 (Change)	Valves

8. - Do the following:
   - Select the first two objects in the list by holding down CTRL while you click each object, and drag them onto the "Flow and level" report heading in the **Report Formats** dialog box.
   - Repeat this step for the remaining objects, dragging the objects onto the "Miscellaneous" and "Valves" headings, respectively.

   RESULT: The report format is now ready for use. But we still need provide direct access to the report modules for the operator (see *"To include reports as user programs"*).

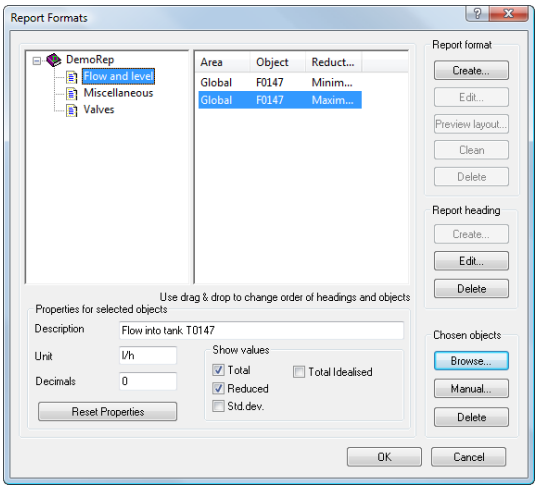


Figure 3.65 In this dialog box you include the individual objects in the report and specify the report heading to which the object belongs.

9. - Click **Close** to return to the **Report Formats** dialog box.

To include reports as user programs

The operator needs direct access to this report format, so we will include links to reports in the **User Programs** menu of the **Supervise** module.

NOTE: By default, the installation program adds links to the **Periodical Reports** and the **Snapshot Reports**. The procedure below describes how you do this manually.

Perform the following steps:

Step	Action
1.	In **Definition**, select **User Programs → Customize for Supervise**. The **Access to User Programs from Supervise** dialog box appears.

- Click **New**, then type `Dmyrep.mde` which is the file name of the **Periodical Reports program**. Click **OK**.

NOTE: During installation, the installation path of IGSS becomes part of the Windows PATH environment variable. This means that you do not need to specify the full path.

- In the **Menu Text** box, type Periodical Reports.
- Repeat for snapshot reports. This time type the file name, `Actrep.mde`.
- Click **OK**.
- Install the project (see the "Install the project" procedure in this section).

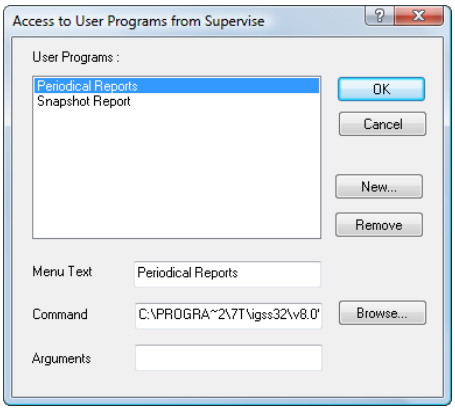


*Figure 3.66 In this dialog box you specify the paths and names of the programs you want to include in the **User Programs** menu of **Supervise**.*

2.	Verify the results in **Supervise** as follows:

- Select **IGSS Master→ Start (Under the Home tab)**.
- Select **User Programs → Periodical Reports**. The **Periodical Reports** dialog box appears.

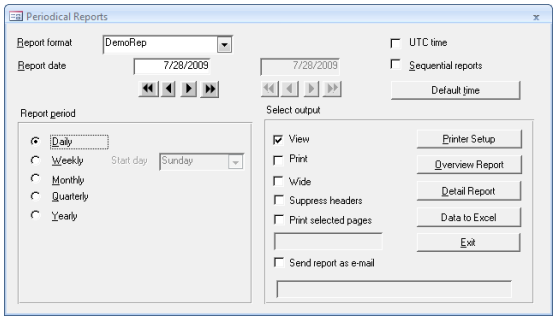


Figure 3.67 In this dialog box the operator selects the appropriate report type and report date and selects either an overview report or a detailed report.

Automatic printing of reports

If you want to print reports at regular intervals, we recommend using the **Job Scheduler** module. It allows you to start any program at a specified time. You may want to print a daily report every morning at 7:00 a.m. This is easily done using **Job Scheduler**.

For further details about automatic printing, refer to the **Job Scheduler** Help file.

For details about reports, refer to the **Report** Help file.

Index

Section D: Optional Design Procedures

Overview

About this section This section describes some of the advanced features in IGSS. To allow you to get acquainted with these facilities, we refine the project we have just built by using:

- The **Drawing** toolbar
- Standard descriptors (drawing objects, Windows controls, etc.)
- The **Library** toolbar

Contents

Using Advanced Features in IGSS

Introduction

In this section we will try out some of the advanced features in IGSS. These features allow us to present process components in completely new ways, for example, by using standard Windows controls.

Drawing toolbar

In older versions of IGSS, a background picture from an external drawing program was used, but now you can simply use a background color and draw the process from scratch using the **Drawing** toolbar and other features known from drawing programs.

The figure below shows the functions of the individual buttons of the **Drawing** toolbar.

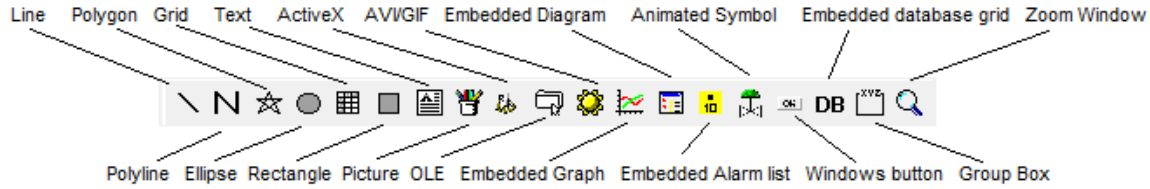


Figure 3.68 The Drawing toolbar allows you to create drawing objects and place graphics files and ActiveX/OLE objects and the embedded graph type on the process diagram.

The components you create using the **Drawing** toolbar can either be static or connected to an IGSS object. In the latter case, the appearance of, for example, a drawing object is linked to the state or value of the process component.

For details about the **Drawing** toolbar, search for "*toolbars; Drawing toolbar*" in the **Definition** Help file.

Standard descriptors

The most typical way of showing IGSS objects on a process diagram is to use the symbols from the built-in symbol file, Symbols.v20. However, a number of additional ways of displaying objects are also available.

- Drawing objects (line, polygon, etc.)
- Windows button (button, combo box, etc.)
- Graphics files (.bmp, .wmf, .emf, .gif, etc.)
- Multimedia files (.avi and .gif)
- OLE objects
- ActiveX controls
- Embedded Graph
- Embedded Alarm List
- Embedded Diagram
- Animated Symbol

When you use a standard descriptor to represent an IGSS object, you can link its appearance to the state or value of the object.

For details about standard descriptors, search for "*standard descriptors*" in the **Definition** Help file.

Library toolbar

The Library toolbar allows you to drag and drop your favorite graphics objects onto process diagrams.

The figure below shows the functionality of the toolbar.

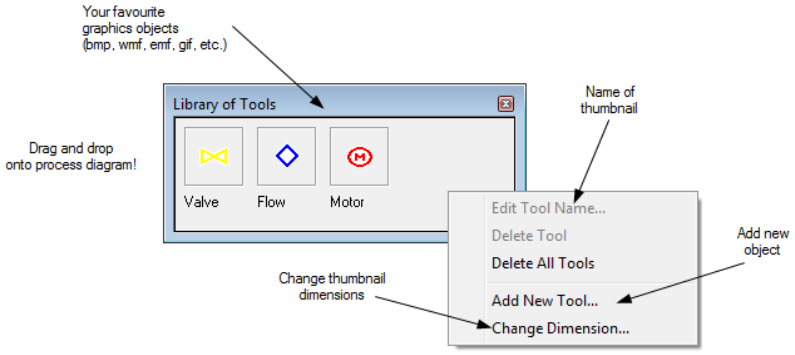


Figure 3.69 Place your favourite graphics files on the Library toolbar and drag and drop them onto process diagrams.

For details about the Library toolbar, search for "*Library toolbar*" in the **Definition** Help file.

Use Lines for Analog Objects

Purpose

Instead of using a standard symbol from the symbol file for the flow meter, **F0147**, you may want to use a line instead. The line could be placed on top of the inlet pipe to make it evident for the operator that an alarm on this object is directly related to the inlet pipe.

We will apply different colors for the alarm ranges and enable line flashing when the object is in alarm.

To use a line for the flow meter, F0147

NOTE: Before we start using the advanced features, we will create a new diagram, **Overview_New**. Create the new diagram as described in the *"Create Areas and Diagrams"* procedure in Section C.

Step	Action
1.	Select **Objects → Standard Descriptors → Line**. The **Object Browser** dialog box appears. • Select **Analog** and check **Value**. • In the right window list, select **F0147**. • Click **Create** and the line representing the object appears.

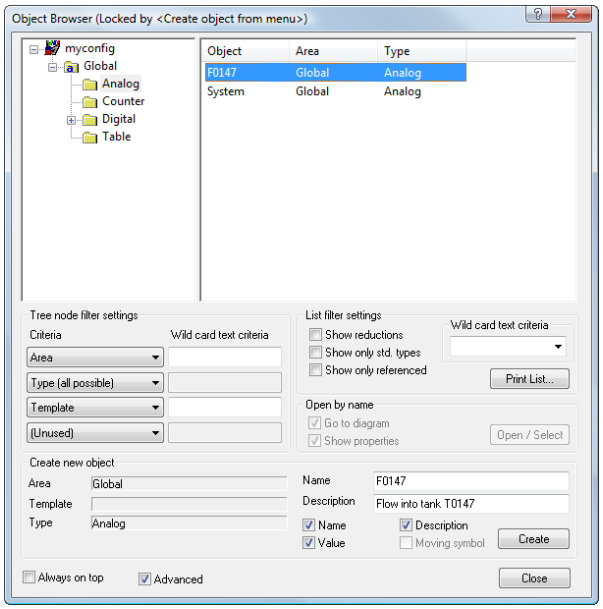


*Figure 3.70 The **Object browser** dialog box appears when you connect a standard descriptor to an IGSS object.*

2. Position the line as shown in Figure 3.75, then position the name and the value.

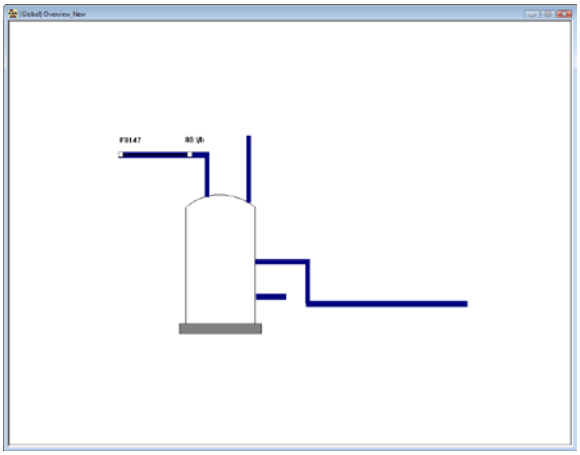


Figure 3.71 Position the line on top of the inlet pipe.

3. Double-click the line to define its properties. Click the **Attributes of Line** tab.

- In the **Line Color** group, double-click the **Bind Line Color** property to enable it.
- Double-click each of the color bars to choose the appropriate colors for the individual atoms (alarm limits).

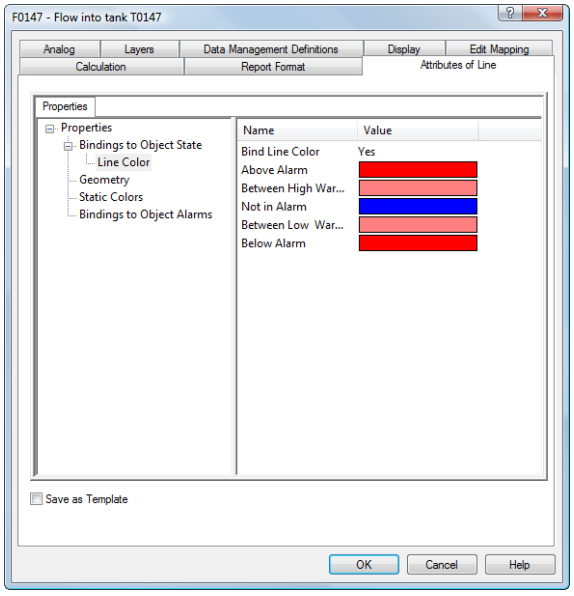


*Figure 3.72 In the **Line Color** group, you link the color of the line to the actual process value. You can specify individual colors for the different alarm ranges.*

4. Do the following:
   - In the **Bindings to Object Alarms** group, double-click **Flash Line** to enable line flashing when the object is in alarm.
   - Double-click each of the color bars to choose the appropriate colors.

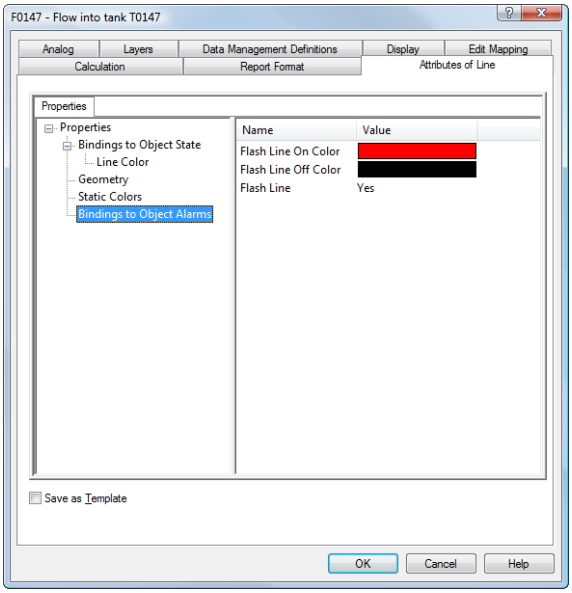


*Figure 3.73 In the **Bindings to Object Alarms** group, you enable line flashing when the object is in alarm and choose the appropriate colors.*

5. Click **OK**.

Use Polygons for Analog Objects

Purpose

If you have a tank with a non-square form, you may want to use a polygon to represent the level of the tank contents. In this example, we will use the existing object, **L0147**. We will make the background of the polygon flash when the process value exceeds one of the alarm limits.

This time we will use the Drawing toolbar to create the polygon and then later connect its appearance to **L0147**.

To use a polygon for an analog object

Perform the following steps:

Step	Action
1.	If the Drawing toolbar is not visible, select **View → Drawing toolbar**.
2.	Click  to activate the polygon-drawing tool.

3. Do the following:

- Click once where you want the top left corner of the polygon and draw the first vertical line.
- Click once where you want the first line to end.
- Repeat for all lines until you have the shape shown in Figure 3.78.
- Double-click on the border when you have completed the polygon.

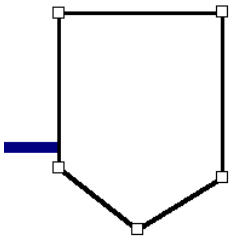


Figure 3.74 The polygon representing the tank is now drawn, ready to be connected to the appropriate IGSS object.

NOTE: If you place one of the corners of the polygon incorrectly you can click **Edit → Undo**. You can redo an undo command, by clicking **Edit → Redo**.

4. Right-click the polygon and select **Connect**. The **Object Browser** appears.

- Select **Analog** and check **Value**.
- In the **Name** area, select **L0147**.
- In the open by name area, check the show properties box.

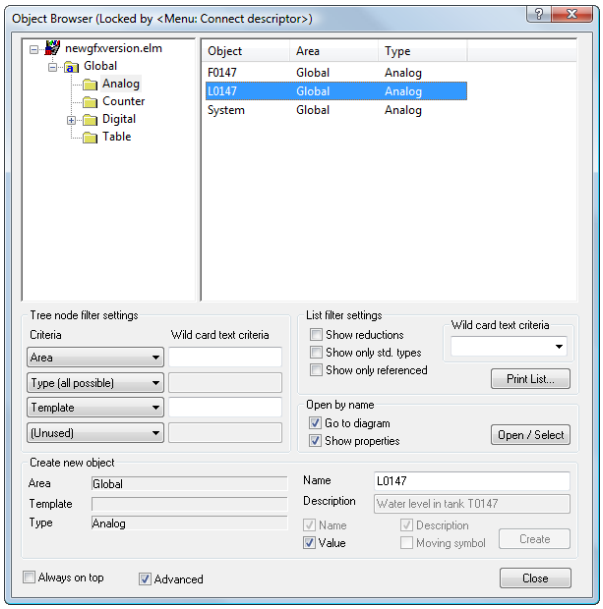


*Figure 3.75 The **Object Browser** appears when you connect a standard descriptor to an IGSS object.*

5. Click **Open / Select**. The object properties dialog box appears.

Click **OK** again, as we do not want to change any properties. The object name and value appear. Position them as shown in Figure 3.83.

6. Double-click the polygon and select the **Attributes of Polygon** tab.
   - In the **Background Color** group, double-click the **Bind Background Color** property to enable it.
   - Double-click each of the color bars and choose the appropriate colors.

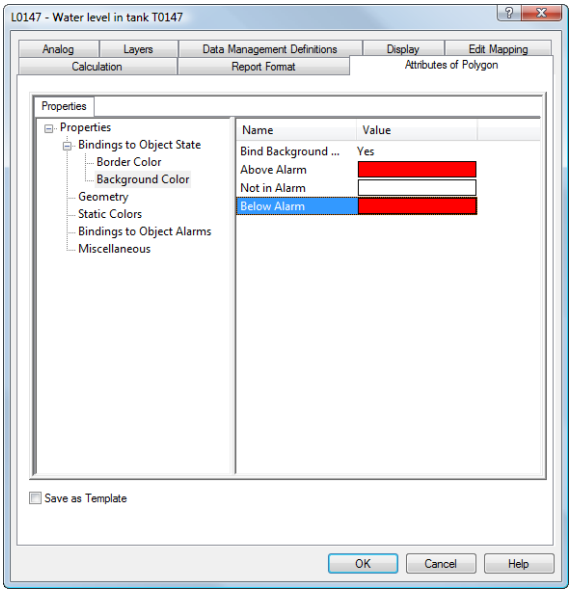


*Figure 3.76 In the **Background Color** group, you enable background flashing and choose the appropriate colors.*

7. Do the following:
   - In the **Bindings to Object Alarms** group, double-click the **Flashing Background** property to enable background flashing when the object is in alarm.
   - Double-click the **Flash Background On Color** bar and choose the appropriate color.

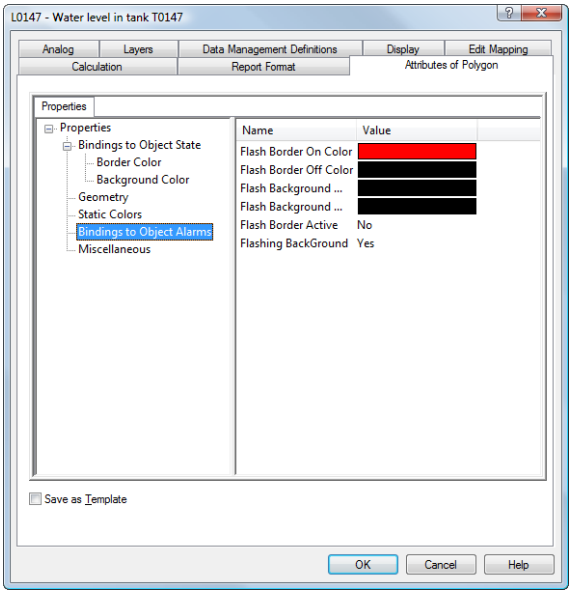


*Figure 3.77 In the **Bindings to Object Alarms** group, you enable background flashing when the object enters the alarm state and choose the appropriate colors.*

8. Do the following:

- In the **Miscellaneous** group, double-click each of the two color bars to choose the fill color and pattern.
- Double-click **Fill Direction** and select **Up**.
- Double-click **Fill Criteria** and select **Actual Value**.
- Double-click **Fill Active** to enable filling of the polygon according to the process value.

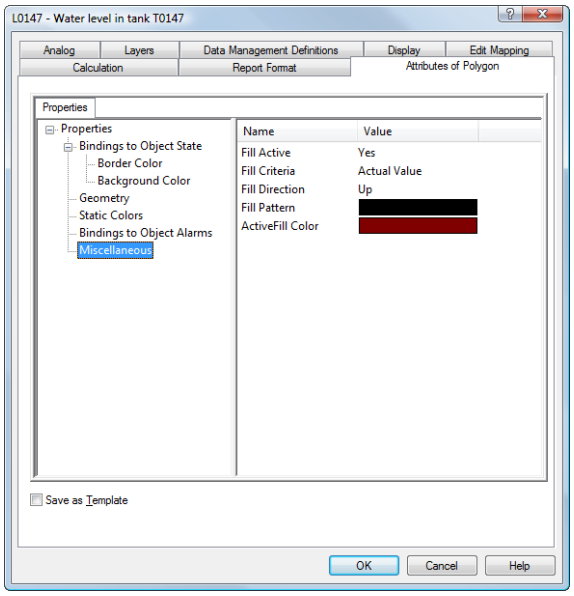


*Figure 3.78 In the **Miscellaneous** group, you select the fill color and pattern and the fill criteria, for example, **Actual Value** to show the process value. These properties determine the filling of the polygon.*

9. Click **OK**. The polygon should now look like this.

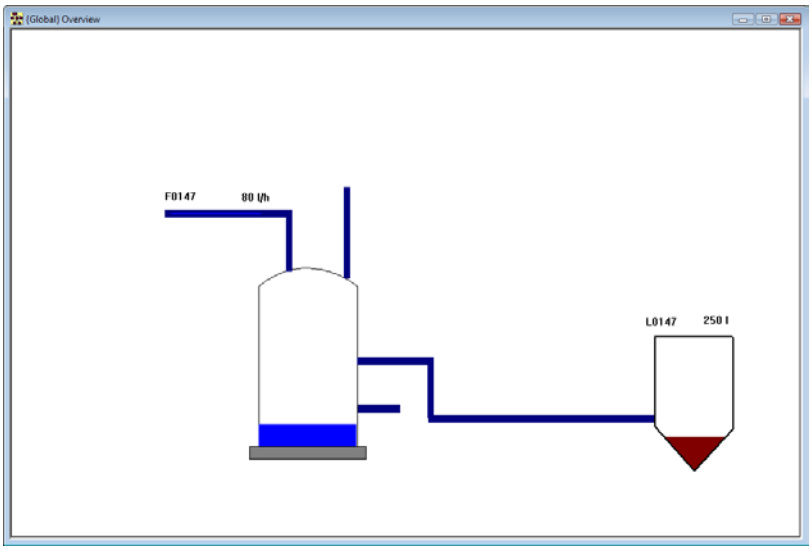


Figure 3.79 The polygon is positioned and the filling reflects the current process value.

Define Events

Introduction

The operator uses the **Event List** to get a quick overview of the most important system and object events. The events in the list are user-defined and can be configured both from the **Definition** module and the **Supervise** module. The **Event List** is presented just below the **Alarm List**.

The following event types can be defined for display in the **Event List**.

- OP connect/disconnect
- Periodical
- System start/stop
- User defined
- User login/logout
- Writing stopped/started
- Error packet

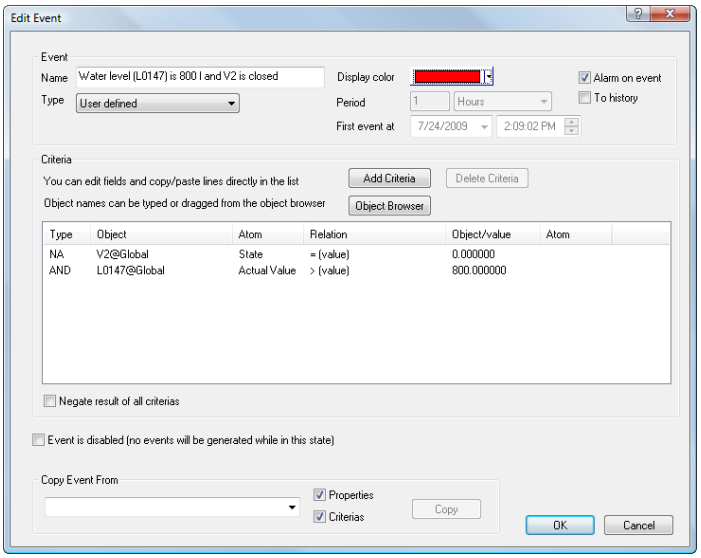
Purpose

In our project we need to register an event when the water level exceeds 800 l and the valve V2 is closed, so that the operator gets an early warning and can take the needed corrective action, before the water level object enters alarm state.

To define the event for V2 and L0147

Perform the following steps:

Step	Action
1.	Select **Edit** → **Event list**.... The **Events** dialog box appears.
2.	Click **Add**. The **Edit Event** dialog box appears.
3.	In the **Name** field, type: `Water level (L0147) is 800 l and V2 is closed`.
4.	In the **Type** drop-down list, select **User defined**.
5.	In the **Display color** list, select the color to be shown in the **Event List**.
6.	Select the **Alarm on event** check box to show the event in the **Alarm List**. *NOTE:* When the event is also shown in the **Alarm List**, the alarm and acknowledgement colors defined for alarm number 90 will apply. Refer to the "Showing events in the **Alarm List** topic in the **Alarm** help file.
7.	In the **Criteria** section, click the **Add Criteria** button.
8.	Click the **Object Browser** button.
9.	Find the object, V2, and drag it into the first line of the criteria field.
10.	Do the following: • Under **Atom**, select **State**. • Under **Relation**, select **=(value)**. • Under **Object/value** type `0` which corresponds to the digital command **Closed**.

Step	Action
11.	Repeat steps 7-10 for the **L0147** object and do the following: • Under **Atom**, select **Actual Value**. • Under **Relation**, select **>(value)**. • Under **Object/value** type `800`. Your dialog box should look like the example below. 
12.	Click OK.

The event list will look like the example below when the event occurs.

Simple Calculations

Purpose

In our project we need to control the flow F0147 and the valve V1 so that the flow into the tank stops, when the level in the tank is 850 l or above. This is done in two steps, first closing the V1 valve when the level in the tank is 850 l or above, this affects the set point of F0147 (since the valve is closed the flow will be 0). First we define the simple calculations for the V1 valve.

To define the simple calculation for V1

Perform the following steps:

Step	Action
1.	Right-click the **V1** object and select **Properties.**
2.	Click the **Calculation** tab.
3.	Set a check in the **Command** checkbox, to enter a calculation expression.
4.	Click the expression field, and type `IIF(Value('L0147')>850.00, 0,1)`. The tab should look as shown in Figure 3.84.

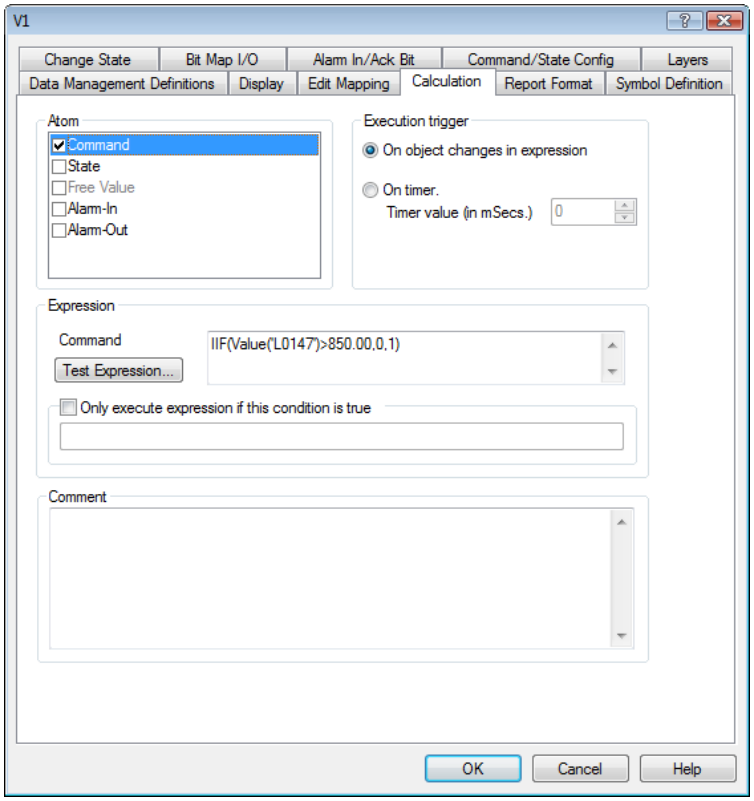


Figure 3.80 The calculation expression on the Calculation tab.

NOTE: The expression closes the valve V1 when the level in the L0147 tank exceeds 850.00 liters.

5. Click the **Test Expression** button to test that the expression is correct.

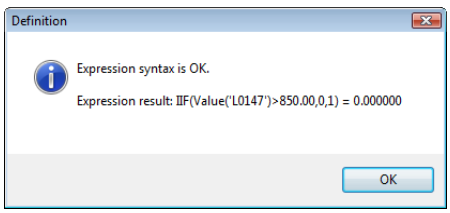


Figure 3.81 The dialog box from successful expression test.

Click **OK**.

6. Click **OK** to exit the properties dialog box.

The next step is to define the simple calculations for the set point of **F0147**.

To define the simple calculation for F0147

Perform the following steps:

Step	Action
1.	Right-click the **F0147** object and select **Properties**.
2.	Click the **Calculation** tab.
3.	Put a check mark in the **SetPoint** box in the **Atom** group.
4.	Click the expression field in the **Expression** group, and type: `IIF(StateValue('V1')=0,SetPoint('F0147')=0,1)`

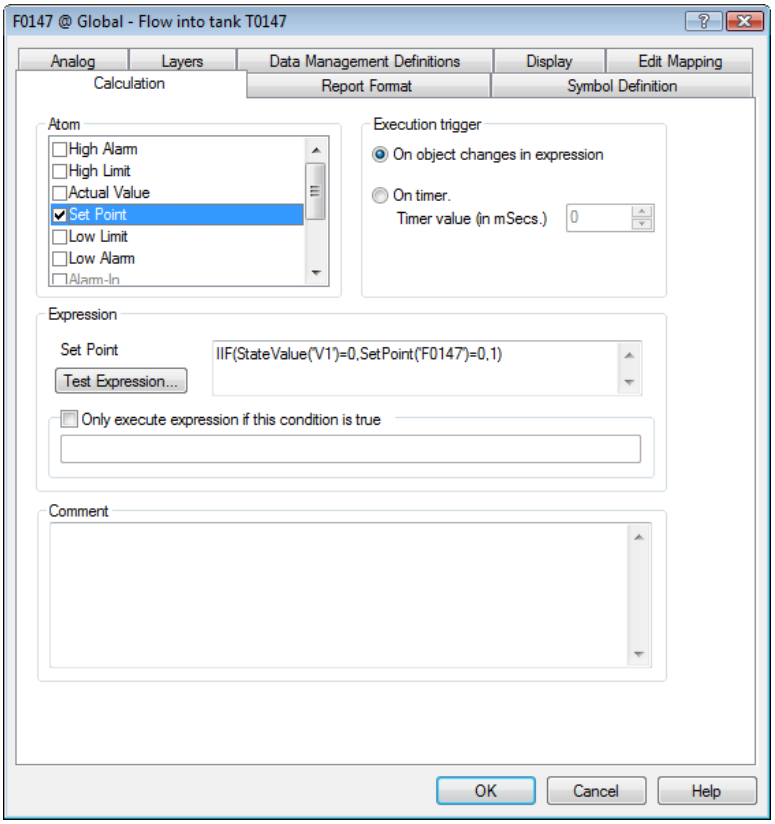


Figure 3.82 The calculation expression on the Calculation tab.

5.	Click the **Test expression** button to test that the expression is correct. Figure 3.87 shows the dialog box from testing a correct expression.

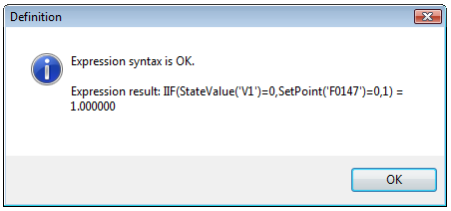


Figure 3.83 The dialog box from successful expression test.

Click **OK**.

6.	Click **OK** to exit the properties dialog box.

For further details, search for "*Calculation*" in the **Definition** Help file.

Refine Bar Displays

Purpose

When we defined the object representing the water level in the tank, **L0147**, we defined a standard bar display. We will now customize the display using some of the numerous layout features available.

To define a bar display (advanced)

Perform the following steps:

Step	Action
1.	Select **Objects → Bar Display**. The **Object Browser** appears. • Select **Analog** and check **Value**. • In the **Open by name** area, check the **Show properties** box. • In the **Name** area, select **L0147** and click **Create**. The **Attributes of Bar** tab appears.

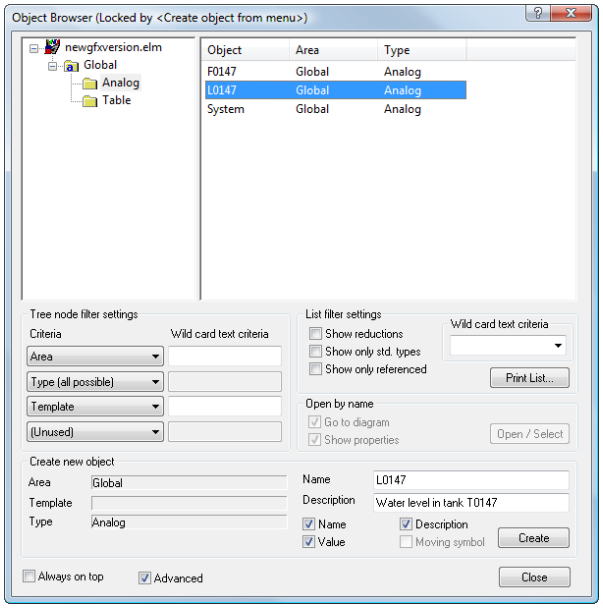


*Figure 3.84 The **Object Browser** dialog box appears when we define a new bar display. In this case, we choose the existing analog object, **L0147**.*

2. Do the following:

- In the **Show Limits** group, select **Lines + Arrows** to show the alarm limits.
- In the **Colors and Patterns** group, click **Limit** and select a red color for the alarm limit line.
- In the **Align Axis** group, select **Left** to show the value axis to the left of the tank.
- In the **Bar View** group, select **2-D View** to show the bar two-dimensionally.
- In the **Scale Attributes** group, check **Show Scale** and **Show Values**.
- Click **OK**. The bar display appears.

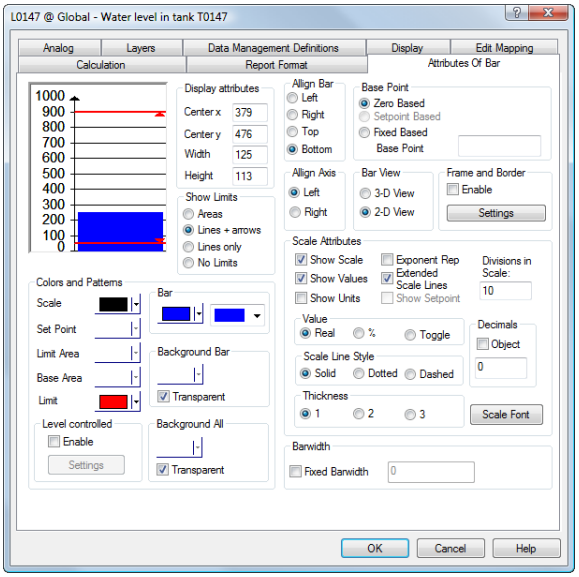


Figure 3.85 The layout properties of the bar display have been entered. Use the bar preview to verify your selections.

3. Move the bar display over the tank and resize it so that it fits within the tank as shown in Figure 3.90, then position the name and the value.

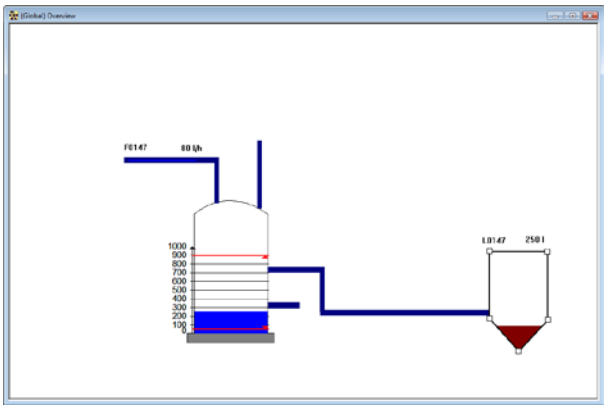


Figure 3.86 The bar display is positioned. Notice the two alarm limit lines which clearly alert the operator if the water level is nearing an alarm level.

Use Command Buttons for Counter Objects

Purpose

The counter object, **C0147**, which counts the number of liters let into the tank per hour, was initially defined as a rectangular field. By using a command button instead, we allow the operator to insert, for example, the preset value simply by clicking the button.

To use a command button for a counter object

Perform the following steps:

Step	Action

1. Select **Objects → Standard Descriptors → Button Control**. The **Object Browser** dialog box appears.

- Select **Counter** and check **Value**.
- In the **Name** field, type **C0147**.
- Click **Create**. The command button appears.

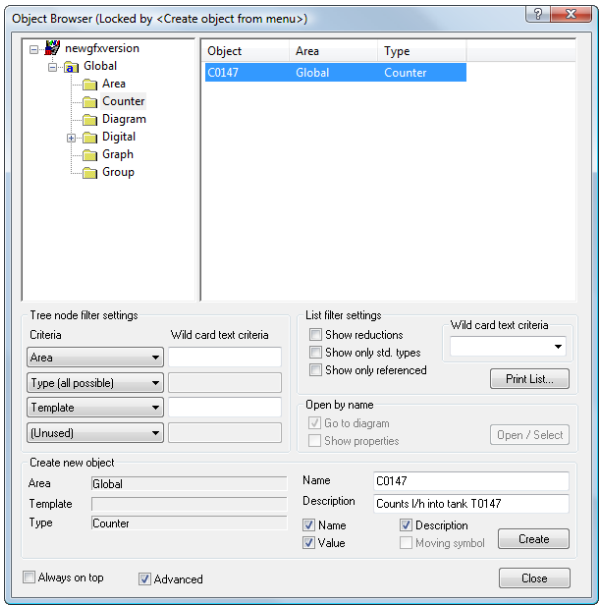


*Figure 3.87 The usual **Object Browser** dialog box appears when we correct a command button to represent an IGSS object.*

2. Move the command button, the name and the value to the position shown in Figure 3.93 and resize the button, as required.

3. Double-click the button and select the **Attributes of Button** tab.
   - In the **Command On Click** group, double-click the **Bind Command On Click** property and double-click the **Preset** property to enable the operator to issue this command by clicking the button.
   - In the **Miscellaneous** group, double-click the **Text to be displayed** property and type `Preset` in the ensuing dialog box and click **OK**.

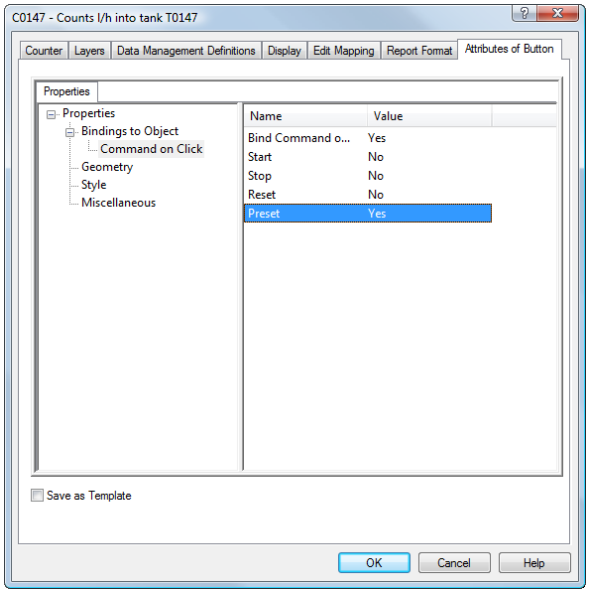


*Figure 3.88 In the **Command on Click** group, you bind the button to one of the four counter commands the operator can issue.*

4. Click **OK**. The counter object should now look like this.

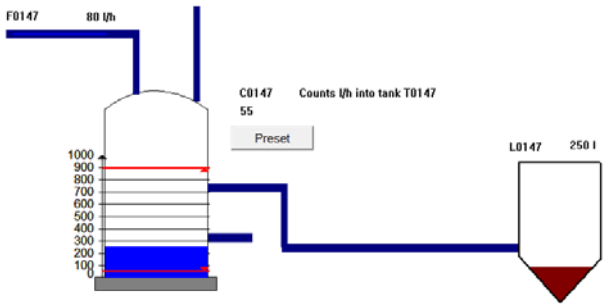


Figure 3.89 The command button representing the counter object is complete. The operator can issue the Preset command just by clicking the button.

Use Command Fields or Combo Boxes for Digital Objects

Purpose

The two valves, **V1** and **V2**, were initially defined using standard valve symbols from the symbol file. IGSS provides two useful alternatives, a command field or a combo box.

To define a digital object as a command field (V1)

Perform the following steps:

Step	Action
1.	Select **Objects → Command Field**. The **Object Browser** dialog box appears.

- In the **Tree view**, click the + sign beside **Global,** then the + sign beside **Digital** and select the **Valve** template.
- In the list of objects, select **V1.**

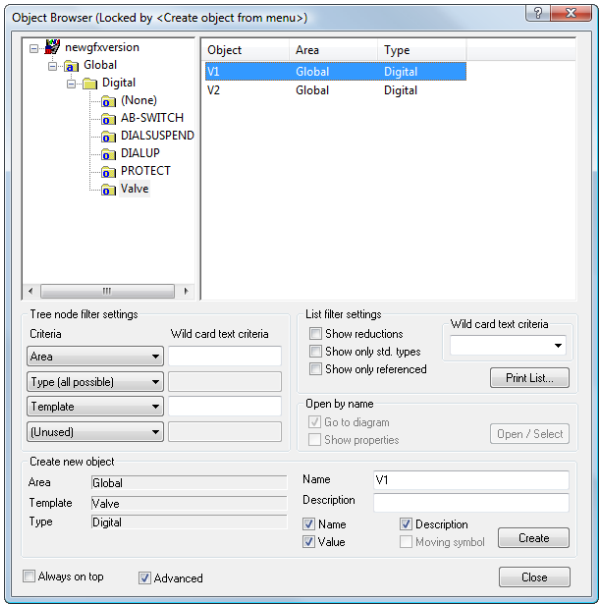


*Figure 3.90 The usual **Object Browser** dialog box appears when we define a command field.*

2.

- Click **Create**. The **Set Command Layout** tab appears.
- Check all four boxes to the right of the preview.
- In the **Align** group, select **Horizontal**.

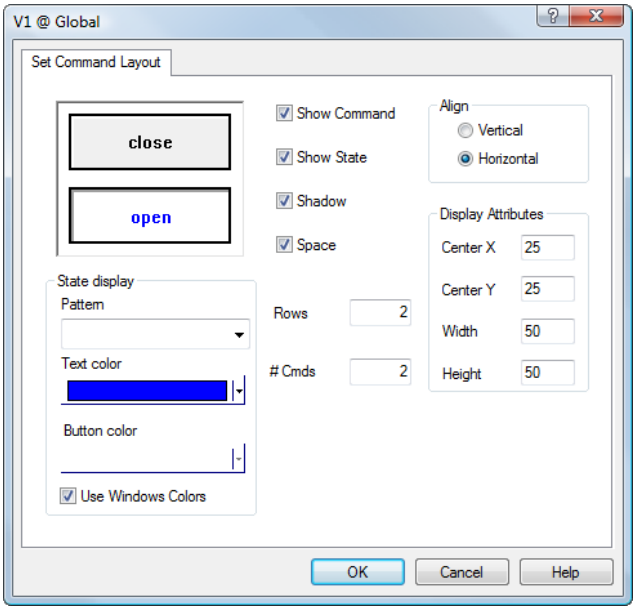


*Figure 3.91 On the **Set Command Layout** tab, you define the graphical display of the command field. Notice that you can show both commands and current state.*

3.

- Click **OK**. The command field appears.
- Position and resize the field as shown in Figure 3.96, then position the name.

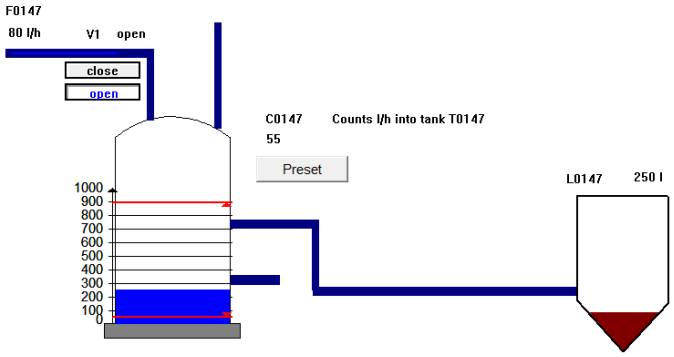


Figure 3.92 The command field is positioned. Notice that the operator can instantly view the available commands and the current state.

To define digital objects as combo boxes (V2)

Perform the following steps:

Step	Action

1. Select **Objects → Standard Descriptors → Combo Control**. The **Definition of Object Browser** dialog box appears.

- In the **Tree view**, click the + sign beside **Global**, then the + sign beside **Digital** and select the **Valve** template.
- In the list of objects, select **V2**.

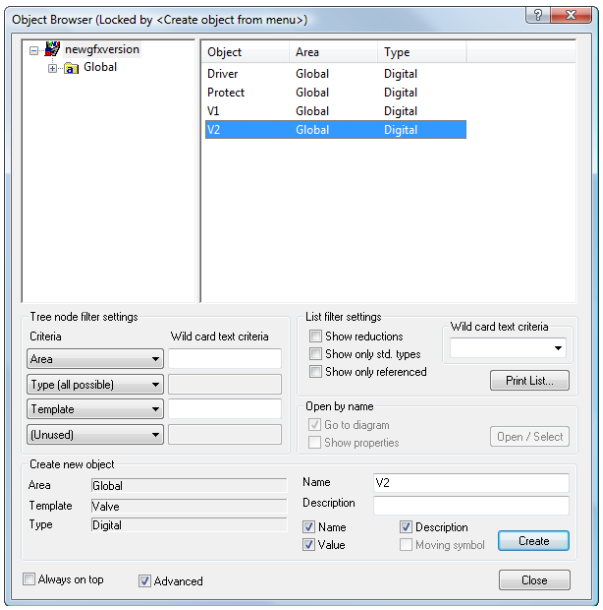


*Figure 3.93 The **Object Browser** dialog box appears when we define a combo box.*

2. Position and resize the combo box as shown in Figure 3.98, then position the name and the state.

TIP: To allow both commands to be shown in the drop-down list, extend the combo box area downwards. Click on the combo box and position the cursor over the centre handle in the bottom. When the hand appears, resize as required.

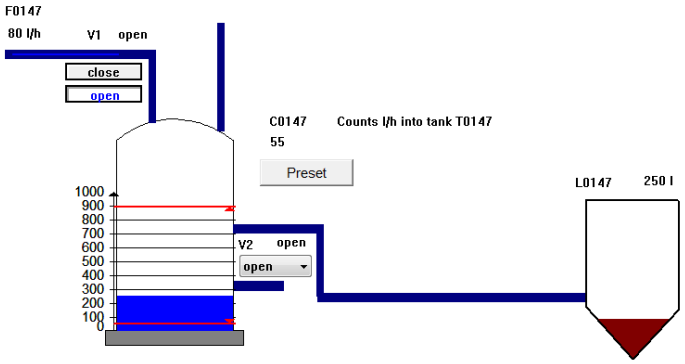


*Figure 3.94 The combo box representing **V2** is positioned. The operator selects the appropriate command by opening the drop-down list and selecting the command.*

The Embedded Alarm List

Purpose

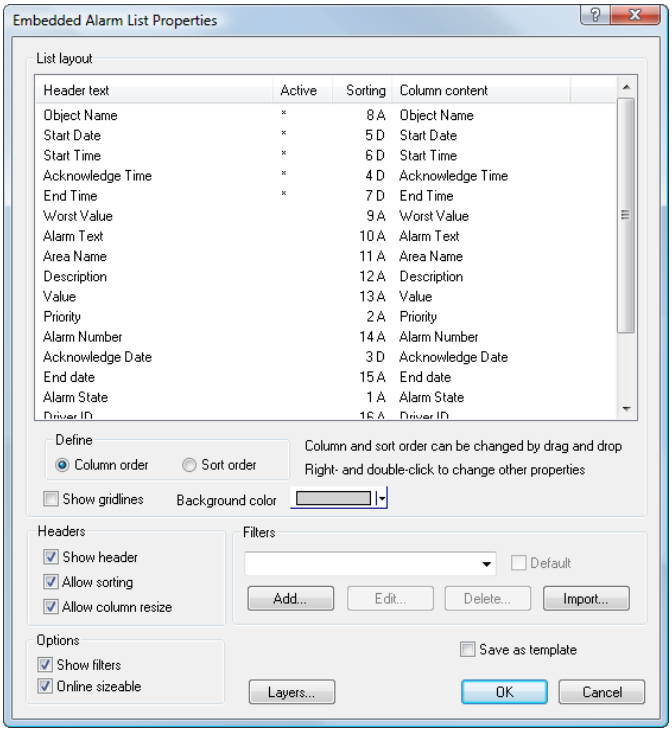
We now want to make an embedded alarm list that shows all the alarms from the flow, this will be alarm number 102 to 105.

A selection of the alarms from the project can be shown in an embedded alarm list. The embedded alarm list may for example contain alarms from the objects on a specific diagram.

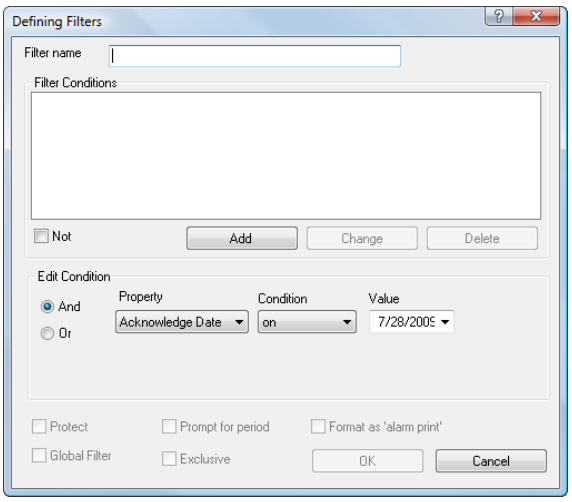
To use embedded alarm list

Perform the following steps:

Step	Action
1.	Select **Objects** → **Standard Descriptors** → **Embedded Alarm List**. An alarm list is placed on the diagram. Place the alarm list in the upper right corner of the diagram.
2.	Right-click the background of the alarm list and select **Properties**.
3.	The **Embedded Alarm List Properties** dialog box appears.

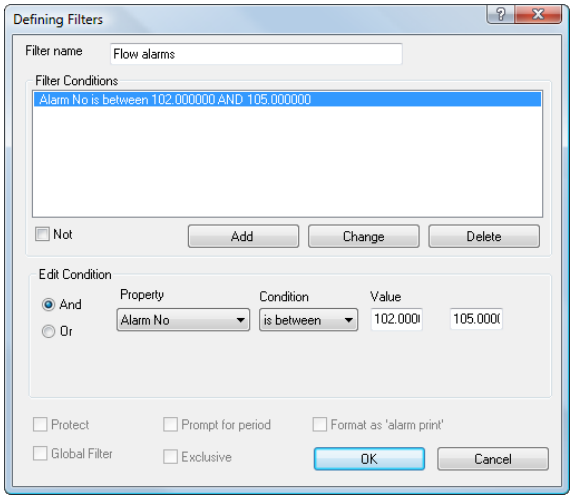


4.	Click the **Add...** button in the **Filters** group. The **Defining Filters** dialog box appears.



5. In the **Edit Condition** group do the following:
   - In the **Property** list select **Alarm no.**
   - In the **Condition** list select **is between**.
   - In the **Value** type `102` and `105`.

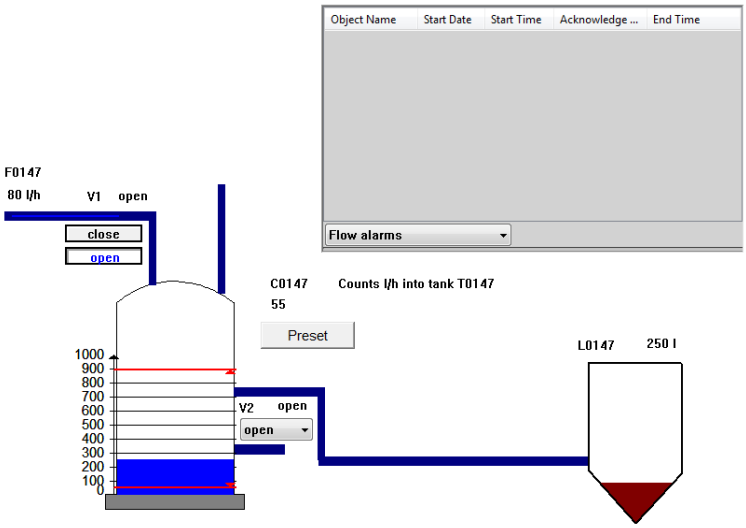
6. Click **Add** to add the filter condition. The dialog box should now look like this.



7. Click **OK**.

8. In the **Filters** group select the **Flow alarms** filter, and check the **Default** check box.

9. The diagram should now look like this.



Embedded Diagrams

Purpose

We now want to make an embedded diagram where we can watch both the Overview diagram and the Overview_New diagram. To do this we first create a new diagram and name it `Dualview`.

An embedded diagram collects a number of logically related subprocesses into one descriptor. The descriptor is embedded on a standard IGSS diagram.

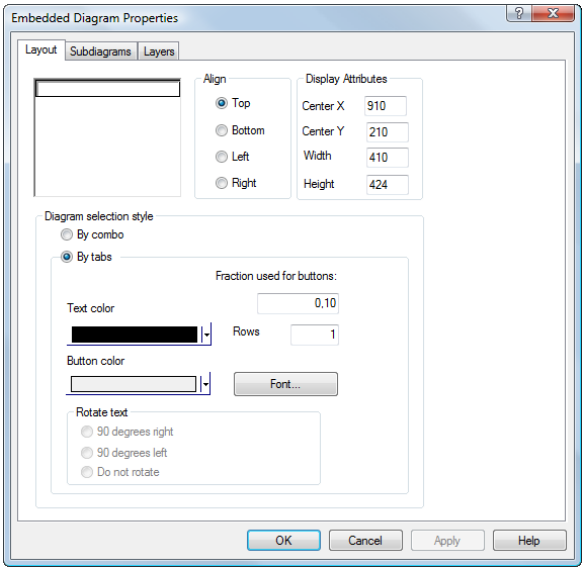
For each subprocess, a subdiagram is defined and a button appears for each of these. This results in a button bar from which the operator can choose the subprocess to view.

First we create a new diagram where we put the embedded diagram.

Perform the following steps:

To make an embedded subdiagram

Step	Action
1.	Select **Objects** → **Standard Descriptors** → **Embedded Diagram**. A diagram appears in the upper left corner. Resize the embedded diagram descriptor.
2.	Right-click the white bar in the top of the embedded diagram, and select **Properties**.
3.	The **Embedded Diagram Properties** dialog box appears. Set the fraction used for buttons to 0.1 and the **Text color** as wanted.



4.	Click the **Subdiagrams** tab and click the **Add** button in the **List of Subdiagrams**.
5.	In the **Display name** field type `Overview`.
6.	In the **Background** group, select **Picture** and click **Browse** to find the picture which is located in the [Install Path]**\Samples** folder. The **Open a Background Picture** dialog box appears.

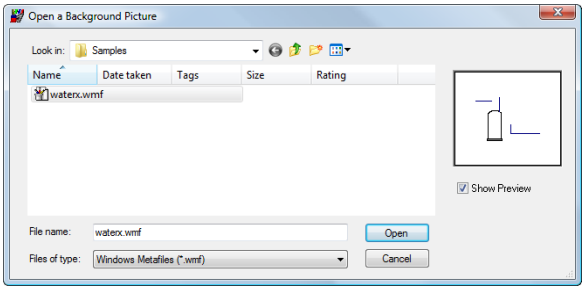
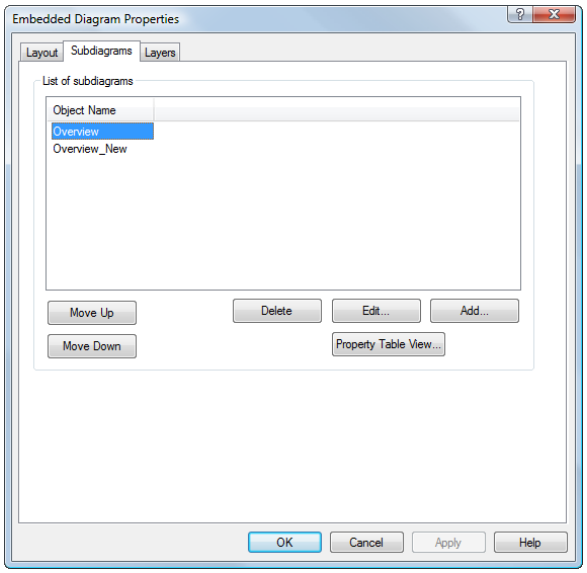


Figure 3.95 In this dialog box you choose the background picture for the diagram.

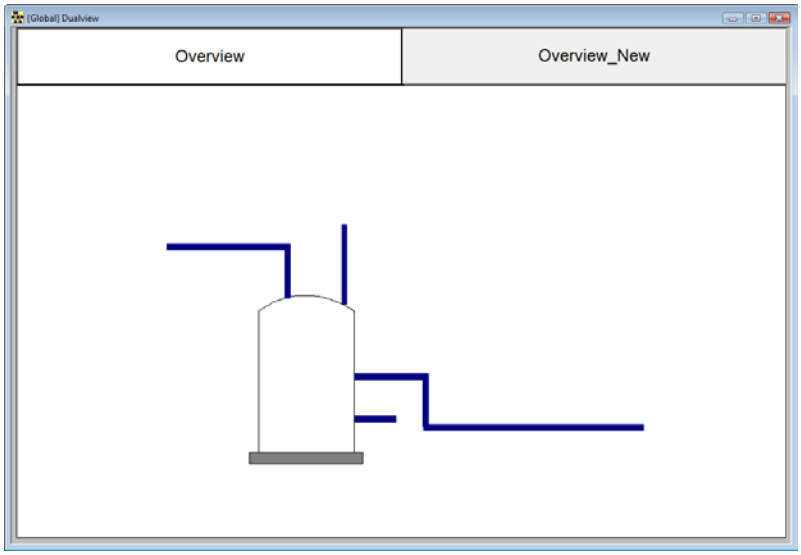
7.	Double-click the file **Waterx.wmf**.
8.	Click **OK**.

9. Repeat the procedure for the Overview_New diagram.
   The dialog box should now look like this.



10. Click **OK**.

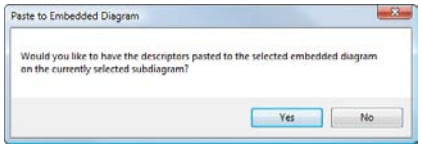
11. Your diagram should now look like this.



12. Go to the **Overview** diagram and select all the objects. Then copy them.

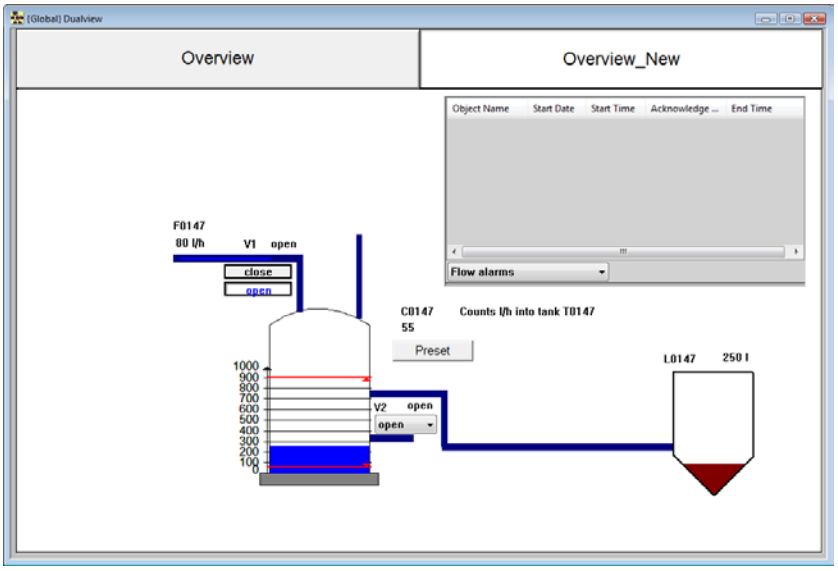
13. Go to the **Dualview** diagram and click the **Overview** subdiagram.

14. Select **Edit → Paste As Reference**. Click **Yes** when the following prompt appears.



15. Repeat the procedure for the Overview_New diagram.

16. Your diagram should look like shown below.



Grid Control (pinnable)

Purpose

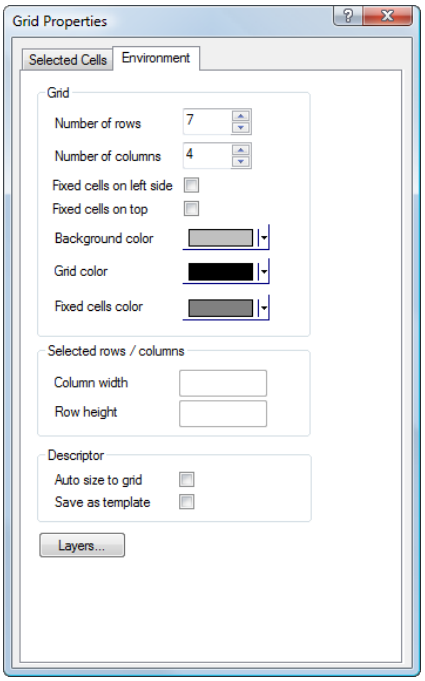
We now want to make a diagram containing the key values of the project.

First create a new diagram named `KeyValues`.

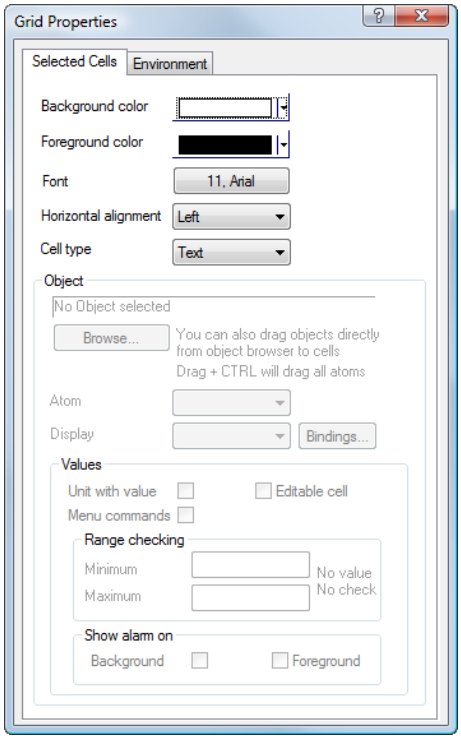
To make a grid control

Perform the following steps:

Step	Action
1.	Select **Objects** → **Standard Descriptors** → **Grid Control**. A grid appears on the diagram in the top left corner.
2.	Double-click the grid. The **Grid Properties** dialog box appears. Click the **Environment** tab and adjust the properties so that it looks like shown in the figure below.



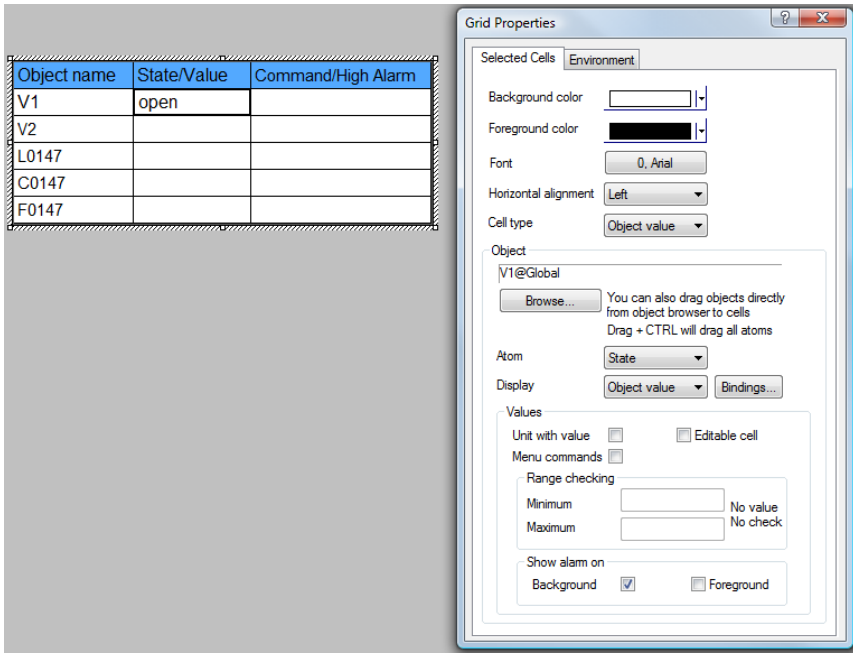
3. Click on the cell(s) you want to edit and go to the **Selected Cells** tab.



Adjust the table so it looks like the one shown in the figure below. The cells can be edited when you double-click them.

Object name	State/Value	Command/High Alarm
V1		
V2		
L0147		
C0147		
F0147		

4. Under Object name, type the texts in the **Object Name** column as shown below. Then click the **State/Value** cell for the V1 row, and select **Object value** under **Cell type**.



5. Click **Browse**. The **Object Browser** dialog box appears.

6. Find the V1 object and click **Open/Select**.

7. Select **State** in the atom list.

8. Select the background check box in the **Show alarm on** group to display when the object is in alarm state.

9. Repeat these steps 4 to 8 for the **Command/High Alarm** column, but select **Command** in the list instead.

10. Repeat the procedure for the remaining steps of the objects so that the table looks like the example shown in the figure below. (Select **Actual Value** and **High Alarm** for **L0147** and **F0147**. For **C0147** select **Count**. Remember to check the **Unit with value** and **Show alarm** boxes).

Object name	State/Value	Command/High Alarm
V1	open	close
V2	open	close
L0147	950 l	900 l
C0147	55 l/h	75 l/h
F0147	80 l/h	90 l/h

11. Check and install the project.

12. Start the project from the IGSS Master module.

13. Select **Diagram** → **KeyValues**.

14. Click the icon at the left edge of the title bar of the **KeyValues** diagram. The system menu appears, select **Pin** in the menu.

15. You can now browse through your project while keeping the **KeyValues** diagram on top.

Using Animated Symbols

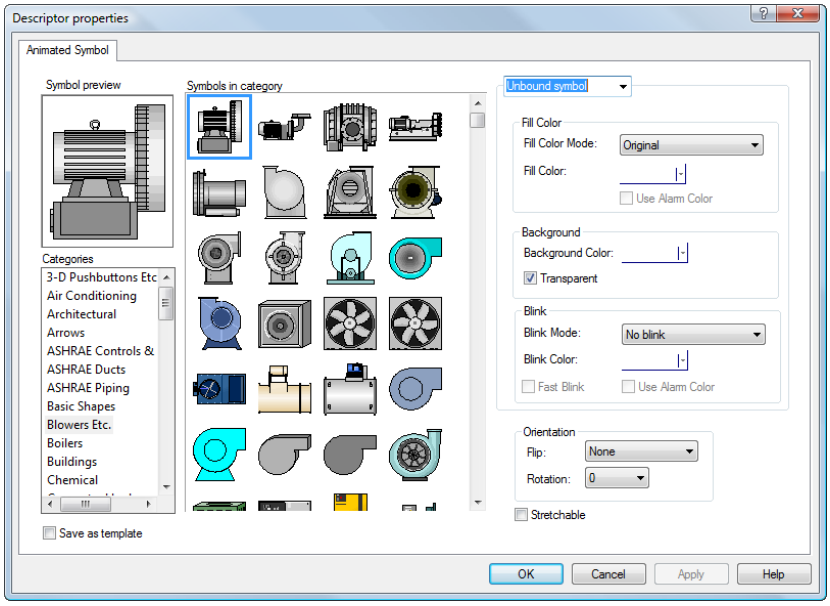
Purpose

We now want to display the V2 valve using an Animated symbol.

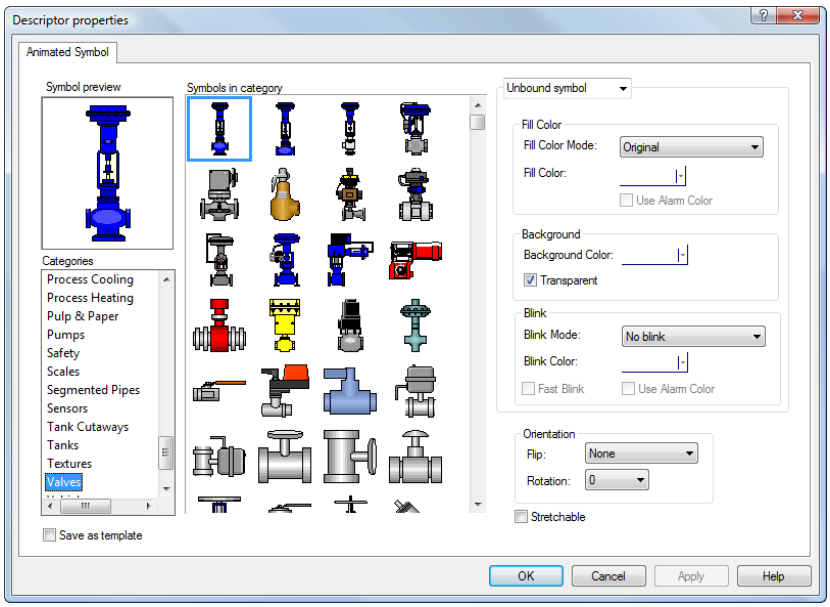
To make an Animated Symbol

Perform the following steps:

Step	Action
1.	Select **View** → **Drawing Toolbar** to open the toolbar.
2.	Find the  symbol and click on it, then click the diagram where you want the symbol to be placed.
3.	A graphic for a blower appears.
4.	Double-click the graphic and the page for **Animated Symbol** appears.

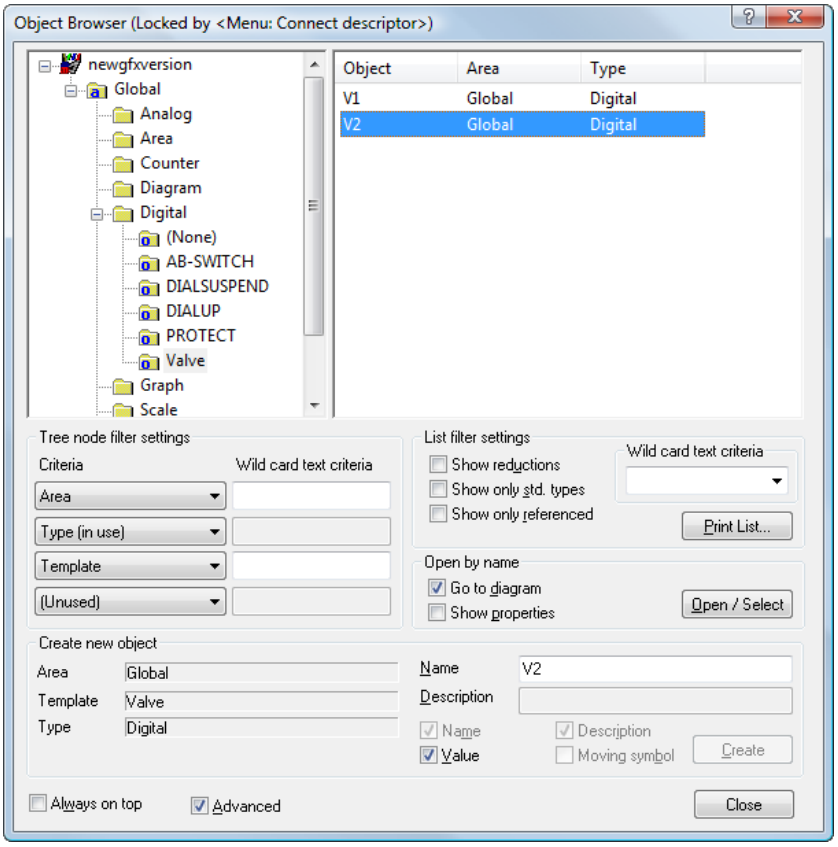


5.	Use the scroll bar to scroll down to the category **Valves** and use the one in to top left corner.



6.	Click OK and the graphic appears on the diagram.
7.	Right-click the symbol and select **Connect**.... The **Object Browser** appears.

8. Click the + sign beside **Global**, then **Digital** and select **VALVE** in the **Tree view** and click the V2 valve in the right pane.



9. Click **Open/Select**. The Animated symbol is now connected to the V2 valve.

10. Go to the **Animated Symbol** tab.

11. Make the following settings for the following groups:

In alarm:

- Set **Fill Color Mode** to **Shaded**
- Check the **Use Alarm Color** check box
- Set **Blink Mode** to **Invisible**

Closed:

- Set **Fill Color Mode** to **Shaded**
- Set **Fill Color** to blue

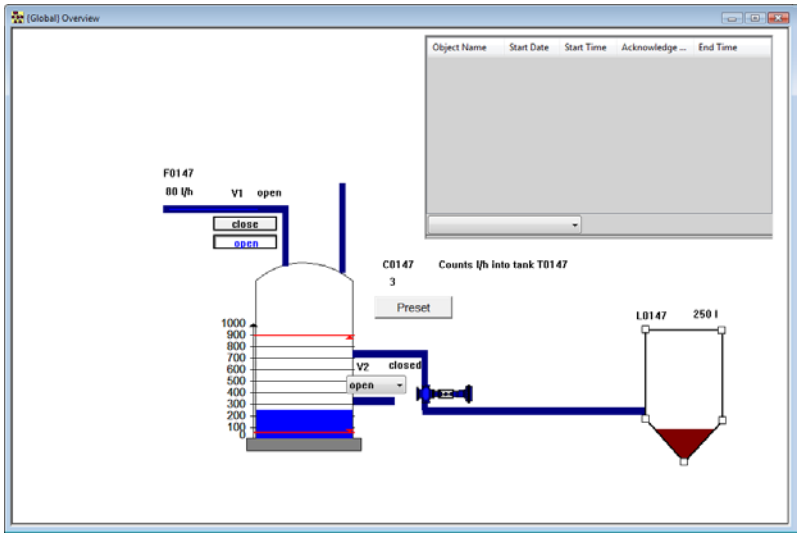
Open:

- Set **Fill Color Mode** to **Shaded**
- Set **Fill Color** to green

Orientation:

- Set **Flip** to **Vertical**
- Set **Rotation** to **90**

12. Position the graphic as shown below.



13. Add the following line in your *.sim file:

```
10 V2 1 1
```

This makes the animated symbol go into alarm state.

Place Your Favorite Graphics in the Library Toolbar

Purpose

Let us imagine that you are creating a project for a plant that has numerous identical tanks, but they are placed on different process diagrams. The tank is drawn in an external drawing program, but instead of using the copy/paste function, we will place the graphic on the **Library** toolbar.

To use the Library toolbar

Perform the following steps:

Step	Action
1.	Draw the tank in your favorite drawing program and export it or save it in one of the supported graphics formats. In the example we use the tank, tank-2.emf, from the Demo project.
2.	Select **View → Library Toolbar** to show the toolbar.
3.	Do the following: • Right-click the toolbar and select **Add New Tool** in the popup menu. • Select the picture and click graphic you created in step 1 and click **Open**, the path is **[IGSS installation path]**\Gssdemo\ENG. In Windows Vista the folder Gssdemo\ is located in the C:\ProgramData\[IGSS installation path] folder. The graphic appears on the toolbar.

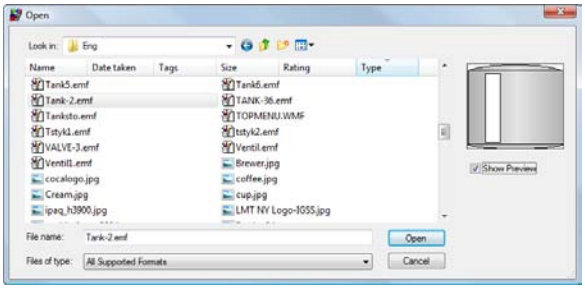


*Figure 3.96 In this dialog box you select the graphic you want to place on the Library toolbar. Check the **Show Preview** box to view the graphic.*

4. Do the following:
   - Right-click the graphic in the toolbar and select **Edit Tool Name** in the popup menu.
   - Type `Tank 2` in the ensuing dialog box and click **OK**.

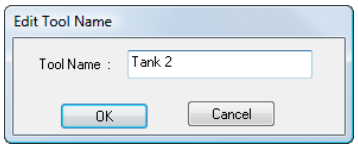


Figure 3.97 In this dialog box you type the name you want to show along with the graphic thumbnail on the Library toolbar.

5. Click the graphic in the toolbar and drag it onto the process diagram.

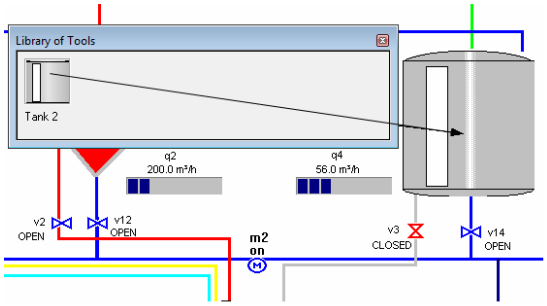


Figure 3.98 The tank has been dragged from the Library toolbar onto the process diagram. The tank can be reused any number of times you like.

Property Table View

Purpose

Let us say that you have created a project and you find out that you need to change the nodes for all of the objects in one specific diagram. You can then go to the diagram open the Property Table View, and make the changes for all of the objects much faster than if you were to edit the properties for every single object.

To use the Property Table View

Perform the following steps:

Step	Action
1.	Go to the **Overview_New** diagram. Select **Diagram → Property Table View**. The **Property Table View** appears.
2.	Click the **Atom** level. The properties for the atoms are displayed in the right pane.

3. Click the Node column. Enter `0` for each object. The table should now look like the example below.

Chapter 3: IGSS Types and Templates

About this chapter

This chapter contains the following information:

- Definitions of the key IGSS object types
- Examples of their typical use
- Detailed descriptions of each IGSS object type
- A description of IGSS templates

Contents

This chapter contains the following sections:

Section A: IGSS Types

Overview

About this section

This section contains the following information:

- Descriptions of each IGSS object type
- Descriptions of the most important object properties
- Descriptions of the dialogs used when defining new objects
- A visual guide highlighting the most important properties

Contents

What Is an IGSS Type?

Definition

An IGSS type is a predefined system object that ensures that you provide all the necessary information about each process component you define.

It reflects real life in the sense that different kinds of information are required for different types of objects. For example, for a motor you need to be able to start and stop it and know its maximum capacity. For a temperature gauge, you need to tell IGSS the temperature range you want to accept and the unit of measurement.

Use

Each time you define a process component (an IGSS object), it must have the properties of one of the IGSS types. When the relevant type is selected, you are automatically guided through a definition sequence ensuring that you provide all the necessary information.

IGSS types

The following types are used in IGSS:

- Area
- Diagram
- Graph
- Analog
- Table
- Counter
- Digital
- String
- Scaling

Area, diagram and graph are non-process objects, that is, they do not represent a physical process component, but they are containers of other objects. The remaining object types represent process components, except scaling which is an internal object.

For a detailed description of each type, refer to the descriptions in this section.

Type versus template

As you can see, an IGSS type is a generic system object. When building projects you will often see that many real life components are similar or share a number of properties: one type of valve may be closed, half open and open, one type of level gauge may measure levels between zero and 1000 m^3. To automate the definition of such components, IGSS includes a facility to define your own templates when components are identical or share several properties. A template holds all the information which is common to this set of objects. Templates make it very fast to configure and to make several similar projects. For further information about templates, refer to *Section B of this chapter*.

Defining a process component

When you define a process component, use the object wizard and you go through the following steps:

NOTE: The Object Wizard is only used in this general definition of a process component, otherwise the traditional way of defining a process component is used to give a better understanding of the settings you make.

NOTE: This procedure applies to the standard object types: analog, digital, counter, table and string. Therefore except area, diagram, and graph, and special display types are not included. For specific information on a particular type, refer to the descriptions in this section. Most of the steps tabs described in the procedure are common to all object types. However, if you are using special display types, for example, bar display, the **Symbol Definition** tab will be replaced by a special tab for that display type.

Step	Action

1 Do the following:

- Select **Objects → Create → By Using Object Wizard...** The **Object WizardBrowser** dialog appears.
- Click **Next**.

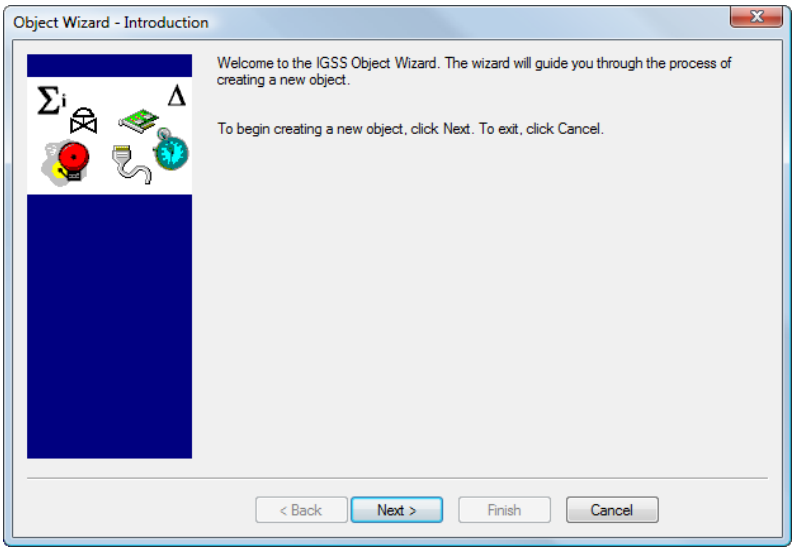


Figure 2.1 The welcome page of the object wizard

2 In the next dialog you select the type of object you want to create, and give it a specific name.

Click **Next**.

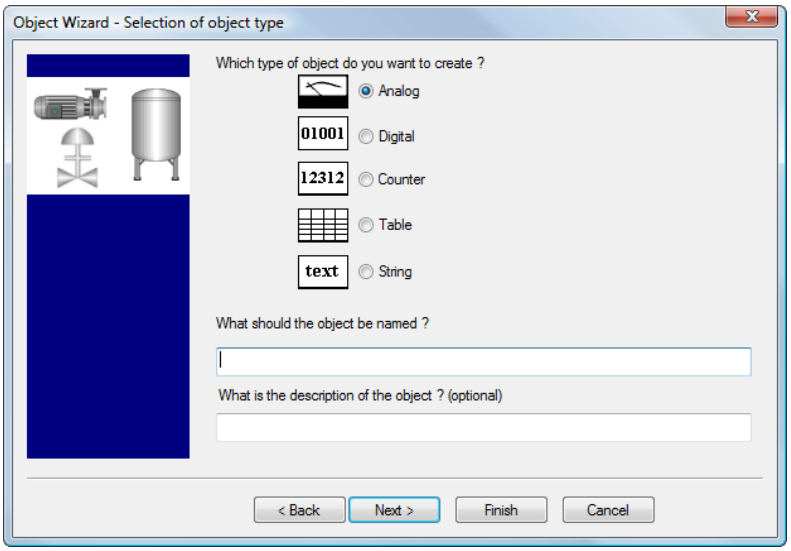


Figure 2.2 In this dialog you select the type of object you want to use and give it specific name.

3 In this dialog you specify the PLC address(es) where the data for this component is available or to which data must be written. It can be located on the **Edit Mapping** tab in the object property dialog.

Click **Next**.

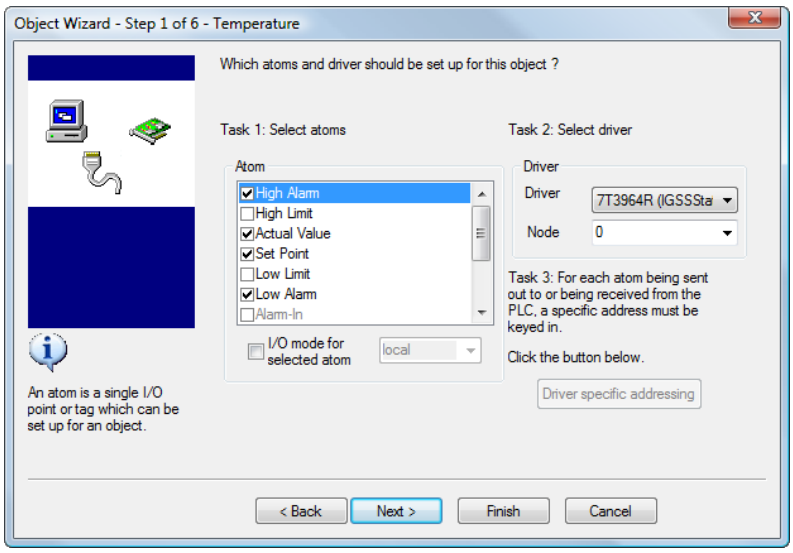


Figure 2.3 In this dialog you specify the PLC address(es).

4 In this dialog you specify the value range, the actual value, the set point and the alarm texts. In the object property dialog the entered values and alarm texts can be located on the **Edit Mapping** tab and the **type-specific** tab (in this example the **Analog** tab.).

Click **Next**.

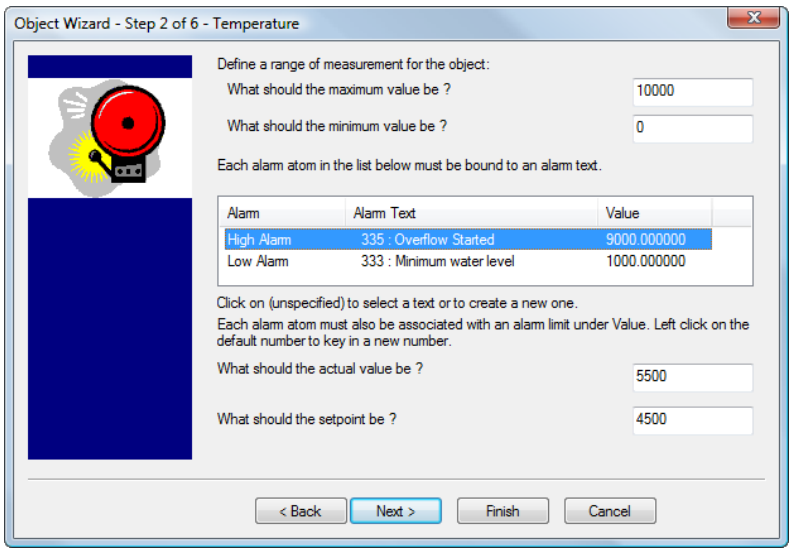


Figure 2.4 In this dialog you set the values and the alarm texts.

5 In this dialog you specify the scan interval. It can be located on the **Data Management Definition** tab in the object property dialog.

Click **Next**.

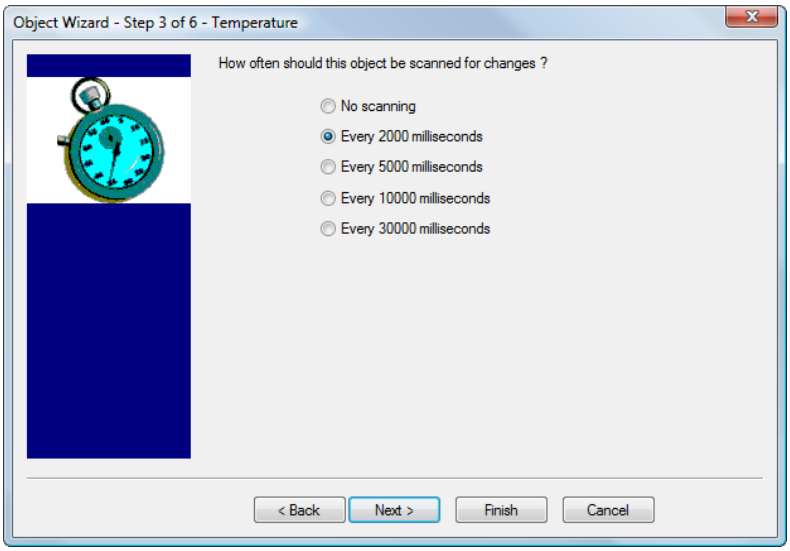


Figure 2.5 In this dialog you specify the scan interval.

6 In this dialog you specify the base interval. It can be located on the **Data Management Definition** tab in the object property dialog.

Click **Next**.

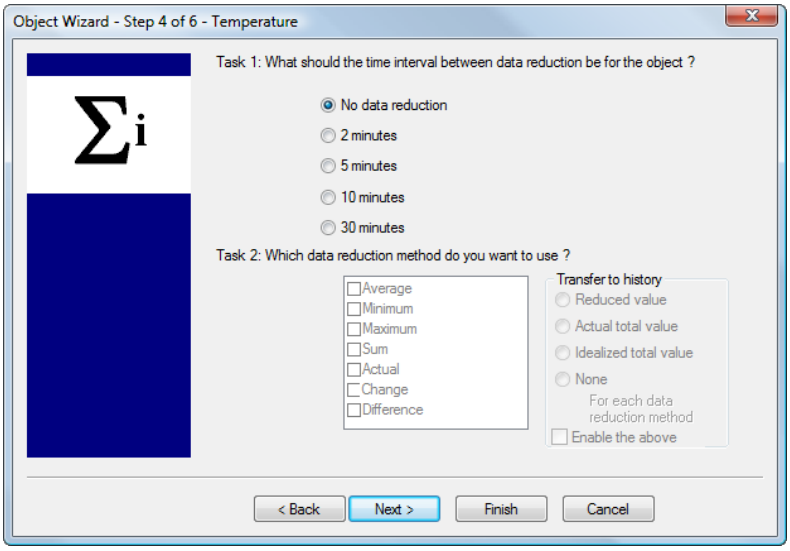


Figure 2.6 In this dialog you specify the base interval.

7 In this dialog you specify the log settings. It can be located on the **Data Management Definition** tab in the object property dialog.

Click **Next**.

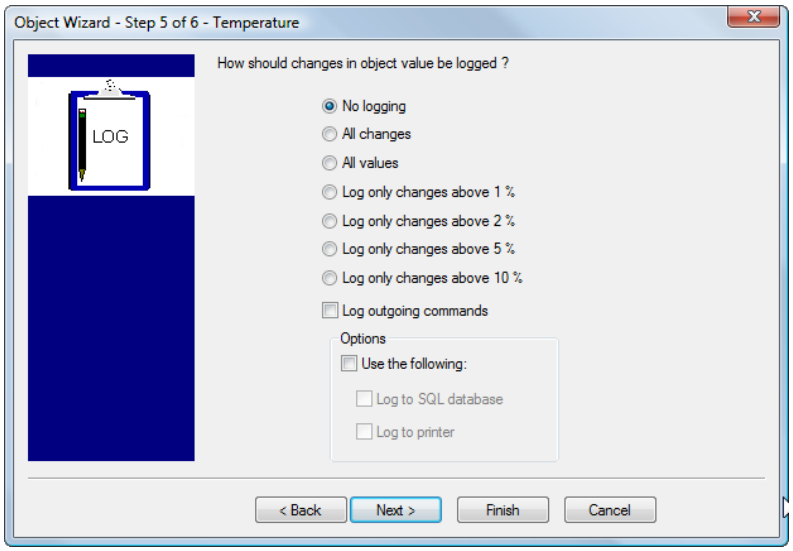


Figure 2.7 In this dialog you specify the log settings.

8 In this dialog you specify the symbol you want to use for the process component and what to display with the symbol. It can be located on the **Symbol Definition** tab and the **Display** in the object property dialog.

Click **Finish**.

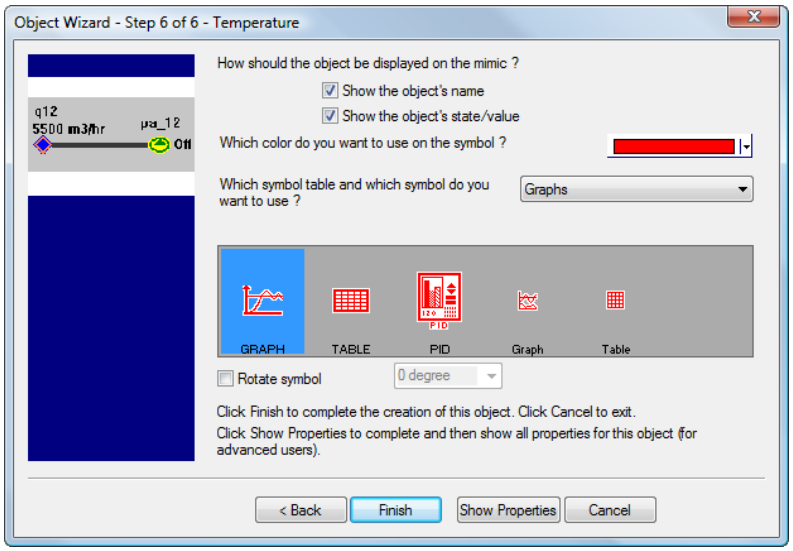


Figure 2.8 In this dialog you select the symbol and specify what to display.

9 Position the object symbol and caption on the diagram.

The Area Object Type

Definition An area is a collection of diagrams, graphs and objects that belong together.

Use Typically an area is used to depict a production line or a separate section of the process. If the process cannot be seen as divided into sections, only one area is used.

Global area IGSS includes a default area called Global. Everything that is defined in this area is global to the entire

project and may be used in any other area. Therefore, it is always a good idea to define templates and scaling objects in this area. For a description of how you define these objects, refer to "*Define Scaling Objects and Templates*" in Chapter 3.

User-defined areas

When building your own projects, you need to define your own areas. There are a few things to remember when defining your own areas:

- Give the area a unique and descriptive name so that it is easily recognised in the **Area** menu.
- All objects defined in a user-defined area are not available in other areas. If you know that a particular object will only be used in one particular area, define it there to limit the number of global objects.

Area menu

The **Area** menu contains all available areas provided that the **Name to Menu** option is selected for each area (see below). These areas are selected by the operator in the **Area** menu of **Supervise**.

Defining an area object

Step	Action
1	Select **Area** → **Create**. The **New Area Properties** dialog appears.

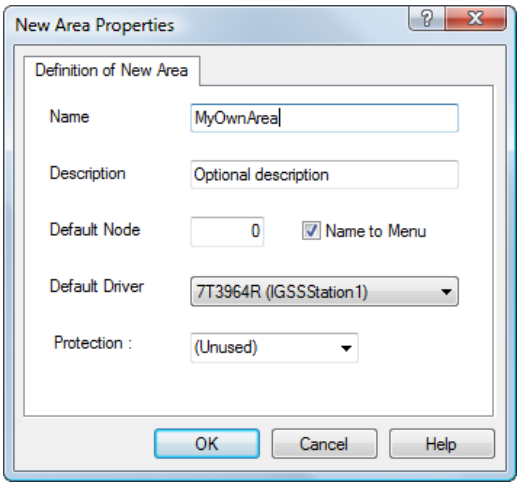


*Figure 2.9 In the **New Area Properties** dialog give the area a unique name and select the **Name to Menu** option to show the name in the **Area** menu.*

2	Type a unique name and select the **Name to Menu** option to show the area name in the **Area** menu.
3	If required, enter a default node number and select a default PLC driver. *NOTE:* The default node and driver are automatically suggested for all objects you create in this area.
4	Optionally, attach a **Protect** object to protect the area against unauthorized access. *NOTE:* For further information about user administration, refer to the Help function of **User Administration**.

For further details about areas, search for "*areas*" in the **Definition** Help file.

The Diagram Object Type

Definition

A diagram provides a graphical view of a section of the monitored process. A diagram typically consists of a static background picture, a number of static process objects and connectors and, most importantly, the dynamic process components represented as symbols. A process diagram is often called a mimic diagram.

Use

A diagram defined in **Definition** is exactly the same diagram that the operator sees during supervision. Depending on the complexity of the process, an area may contain a number of diagrams each representing a section of the process. A diagram gives the operator a quick overview of the monitored process and clear visual indication if there are any alarms.

Diagram background

In older versions of IGSS, the background picture of a diagram was made in an external drawing application in either bitmap (*.bmp) or Windows metafile (*.wmf) format. This option is still available, but many new graphics formats are supported, for example, Enhanced Metafile (*.emf) and Graphics Interchange Format (*.gif).

You can also use a background color and build the diagram from scratch. You may still need an external drawing application to create static components, such as tanks, containers, etc. but these components can then be freely positioned and resized on the diagram. You can easily draw the connectors between components using the **Drawing** toolbar.

Diagram menu

The **Diagram** menu shows all available diagrams in the current area provided that the **Name to Menu** option is selected for each diagram. A checkmark beside the diagram name means that the diagram is open. These diagrams are selected by the operator from the **Diagram** menu of **Supervise**.

Defining a diagram

To define a diagram:

Step	Action
1	Select **Diagram** → **Create**.
2	Define how you want to display the diagram (see *"The **Definition of New Diagram** tab"* below).
3	Assign function keys to the most commonly used operations (see *"The **Function Key Assignment** tab"* below).

The Definition of New Diagram tab

The figure below shows the **Definition of New Diagram** tab.

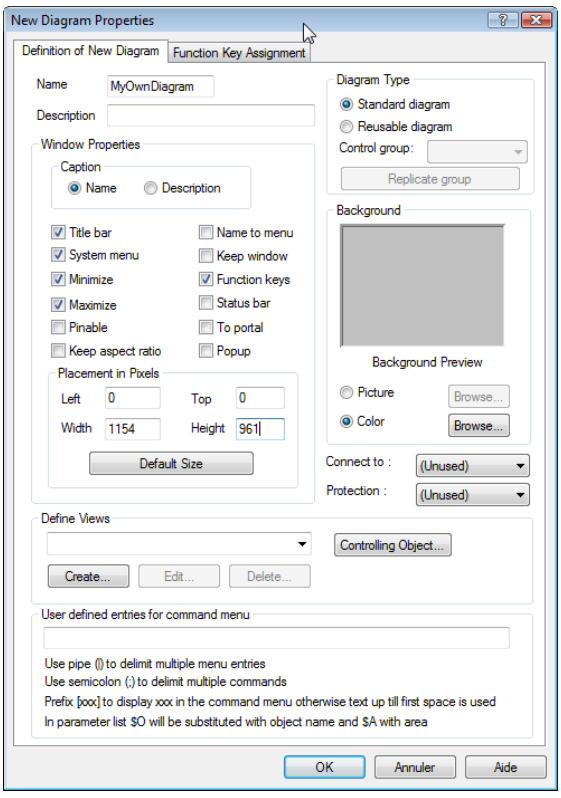


Figure 2.10 On this tab you specify the name of the diagram, include a background picture or color and select various display options.

This tab contains the following important object properties:

Property	Description
Name	Enter a unique and descriptive name.
Name to Menu	Select this option if you want to show the diagram name in the **Diagram** menu.

Background	Select **Picture** to include a background picture from an external drawing application. Select **Color** to include a background color.
Diagram Type	Select **reusable diagram** if you want to create multiple diagrams that are identical with the exception of the underlying process components. All the underlying process components will be created as a group in the project. *NOTE:* For further information about the group object refer to the *"The Group Object Type"* section.
Miscellaneous display options	Select the diagram window elements you want to show, for example, **Title Bar** and **Status Bar**.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The Function Key Assignment tab

The figure below shows the **Function Key Assignment** tab.

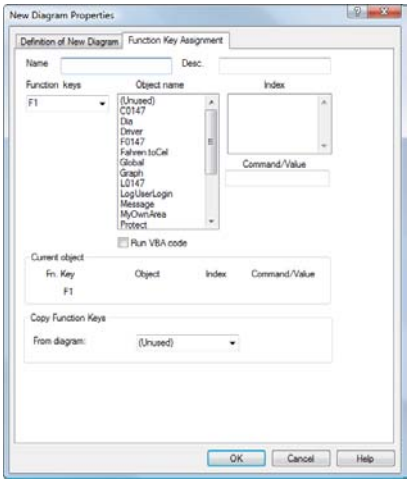


Figure 2.11 On this tab you assign function keys to the most frequently used operations.

This tab contains the following important object properties:

Property	Description
Function Keys	Select the function key to which you want to assign an operation. *NOTE:* By default, **F1** is used to access Help, but you can overwrite it, if required.
Object Name	Select the object that you want the function key to operate on.
Index	Select the atom you want the function key to activate, for example, **HA** (High Alarm) for an analog object.
Command/Value	Select the command you want to execute or the value you want to assign to the object when the key is pressed.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The diagram window

The figure below shows an example of a diagram window:

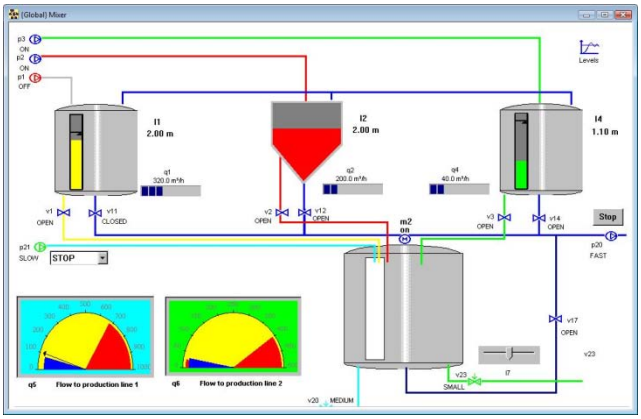


Figure 2.12 The diagram window shows a section of the monitored process.

OLE-embedded diagrams

You can also embed an OLE object as a diagram. This is useful, if you want the operator to open an external application simply by choosing that diagram. When the OLE-embedded diagram is opened, all the functionality of the server application is available.

For further information, search for *"OLE-embedded diagrams"* in the **Definition** Help file.

The Graph Object Type

Definition

A graph is a graphical chart showing the value or state of one or more process components. The data source for a graph can be either log files (*.log) or base class files (*.bcl). A graph can show historical data, current data or a combination of both.

Use

Use a graph to achieve the following:

- a graphical overview of the values and states of related process components
- detect adverse trends at an early stage

Three types of graphs

There are three types of graphs:

- A *predefined graph* is a graph defined by the system designer which the operator can access from the **Graph** menu or by clicking on a symbol representing the graph. Most of the graph properties cannot be changed by the operator during supervision, but he can change certain layout properties.
- A *dynamic graph* is a graph created on-the-fly by the operator during supervision. The operator simply selects the IGSS objects to include in the graph and then selects **Graph → Create Dynamic Graph**. This function is very useful, if the operator wants to monitor a specific process component before and after an intervention. A dynamic graph can be saved as a user-defined graph (*.usr). When re-opened, the graph will be dynamically updated.
- A *static graph* is a snapshot of a predefined or a dynamic graph that the operator wants to save for documentation purposes. A static graph can be saved as a graph file (*.gph). When re-opened, the graph can be shown, but not updated.

Export to CSV

The graph values can be exported to a comma-separated values (.csv) file. The values can then be further processed in another program, for example, MS Excel.

Graph menu

The **Graph** menu shows all available graphs in the currently selected diagram provided that the **Name to Menu** option is selected for each graph. A checkmark beside the graph name means it is open.

Defining a graph object

Step	Action
1	Select **Graph → Create**.
2	Define how you want to display the graph (see *"The **Definition of New Graph** dialog"* below).
3	Define the graph properties (see *"The **Define Graph Parameters** dialog"* below).
4	Scale and position the resulting graph window.

The Definition of New Graph dialog

In this dialog you assign the name and description to the graph and define the window elements you want on the graph window.

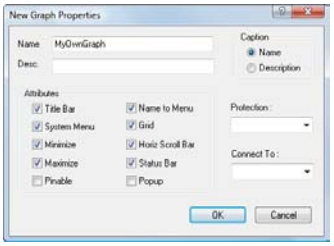


Figure 2.13 In this dialog you assign the name and description to the graph and define the window elements you want on the graph window.

This dialog contains the following important object properties:

Property	Description
Name	Type a unique and descriptive name.
Name to Menu	Check this box to show the graph name in the **Graph** menu.
Miscellaneous display options	Select the graph window elements you want to show, for example, **Title Bar** and **Status Bar**.

The Define Graph Parameters dialog

The figure below shows the **Define Graph Parameters** dialog.

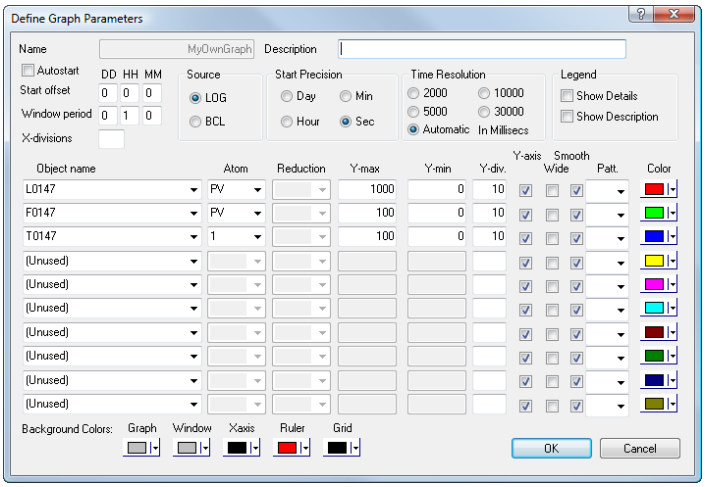


Figure 2.14 In this dialog you define which objects you want to represent in the graph, the scaling of the axes, colors and various other properties.

The dialog contains the following important object properties:

Property	Description
Start offset	Specify the offset from the current time with which you want the graph to start.
Source	Choose either *.log files or *.bcl files as the data source for the graph.
Object Name	Select the name of the object you want to show in the graph.
Atom (log data only)	Select the name of the object atom you want to show, for example, **PV** for the process value of an analog object.
Reduction (BCL data only)	Select the relevant reduction method, for example, **MV** to show the average value.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The graph window

The figure below shows an example of a graph window.

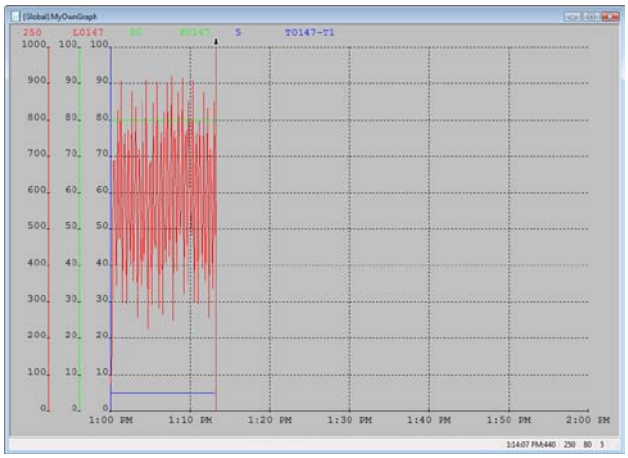


Figure 2.15 The graph window shows values or states of multiple process components.

The Analog Object Type

Definition

An analog type in the IGSS system is used to represent a process component that can take on any value within a specified range. Analog objects can include two sets of alarm limits and a set point.

Use

The following examples show what analog objects may be used for:

- a level gauge measuring the contents of a tank in litres. When the tank is empty, it contains 0 litres and when full it holds 520 litres. This would mean that the analog IGSS object would have a specified range of 0 to, for example, 550 litres.
- a temperature gauge measuring room temperature within the limits -5 to 35 ºC (used in the following example).

Defining an analog object

To define an analog object:

NOTE: The following procedure describes how you define an analog object using standard symbols. You may want to use alternative display types, for example, a bar display or a circular display. For further information, search for *"bar displays"* or *"circular displays"* in the **Definition** Help file.

Step	Action
1	Select **Objects** → **Analog Elements**. The **Object Browser** dialog appears.
2	Type a unique name and an optional description, select the area Global in the **Tree-view**, and then click **Create**. The analog object properties dialog appears.
3	Specify the measuring range, low and high alarm limits, number of decimals, etc. (see *"The Analog tab"* below).
4	Specify how you want to collect and log your data (see *"The Data Management Definitions tab"* below).
5	Specify what you want to show along with the symbol of the process component (see *"The Display tab"* below).
6	Specify the PLC address of the process component and attach alarm texts (see *"The Edit Mapping tab"* below).
7	Choose the symbol you want to represent the process component (see *"The Symbol Definition tab"* below) and click **OK**. The object symbol and caption appear.
8	Position the object symbol and caption on the diagram.

The Analog tab

The figure below shows the **Analog** tab:

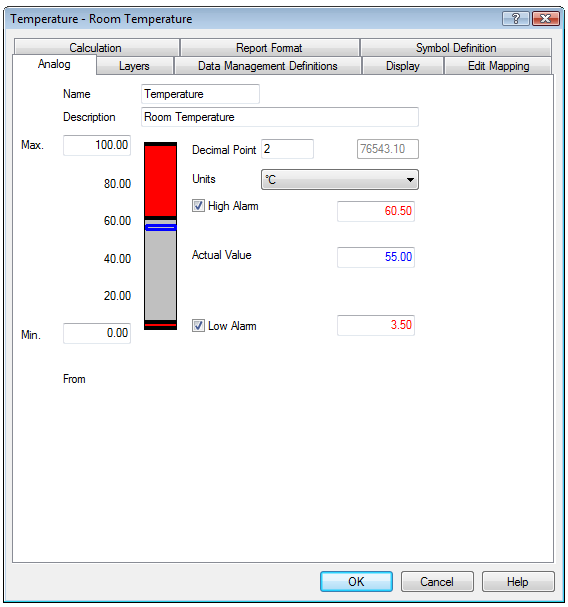


Figure 2.16 On this tab you specify the measuring range, the desired process value, unit of measurement, the number of decimals and alarm limits.

This tab contains the following important object properties:

Property	Description
Alarm limits	An analog object has two built-in sets of alarm limits expressing varying degrees of seriousness that may be used if relevant - or disabled if not required. Alarm supervision is enabled simply by checking the box next to the desired limit. When enabled, an alarm is generated and shown in the Alarm List during supervision when the actual value exceeds or goes below the limit. *TIP:* You can easily enable or disable the individual limits on the **Edit Mapping** tab.
Actual value	In this box you can type an initial process value. The value will, of course, be updated dynamically during supervision; the value defined in **Definition** is overwritten as soon as the data collection is started.
Set point	The set point is the desired process value, the value according to which the process value is calibrated.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

Data Management Definitions tab

The figure below shows the **Data Management Definitions** tab:

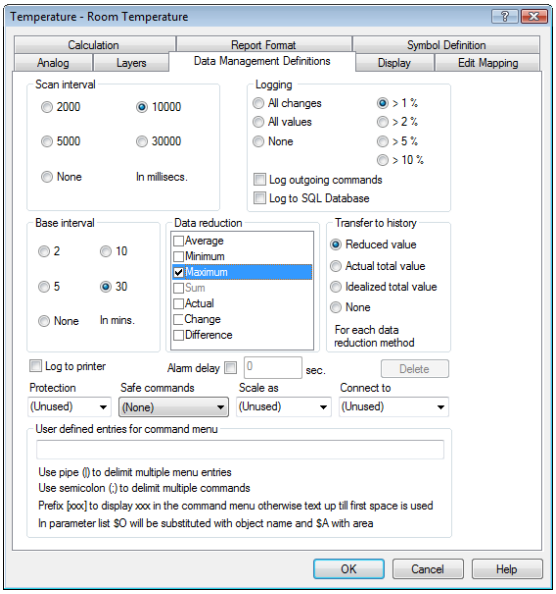


Figure 2.17 On this tab you specify how you want to collect and log data.

This tab contains the following important object properties:

Property	Description
Scan interval	Decides how often IGSS scans the component address in the PLC (the address itself is given on the **Edit Mapping** tab). In this example, the temperature does not change very rapidly, so a scan interval of 30 seconds (30,000 msec) is selected. Note that if you are using event-oriented communication, you must select **None**.
Logging	With the logging buttons, you decide whether you would like the system to save the values that are scanned with 30-second intervals for this component in the log files. You only need to select logging for the process components for which you want to log historical data (for example, to be used in graphs). If you do not need logged data for a particular component, select **None**. Note that the buttons have a percentage next to them. If you click **> 10 %**, the system will log all changes that are larger than 10 %.
Base interval	Defines how often the system reduces the scanned values to one value with the purpose of calculating statistics on the measured values. In this example, a base interval of 10 minutes is used which means that every 10 minutes, the system will reduce the up to 20 values (with a scan interval of 30 seconds) to one value. This reduced, statistically calculated value is subsequently used in the operational reports.
Data reduction	Defines how the data is reduced to one value according to the **Scan interval** and **Base interval** settings. By clicking one or more boxes in the **Data reduction** group, you select which method the system is to reduce by: calculate an average, save the smallest or the largest value in the 10-minute interval (**Min** and **Max**), calculate the sum of the values in the 10-minute interval, save the latest value (**Actual**) or save the number of times the process component has changed state (**Change**). Which method you choose will depend on the nature of the component. For a temperature measurement, **Average** is frequently selected.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

Display tab

The figure below shows the **Display** tab:

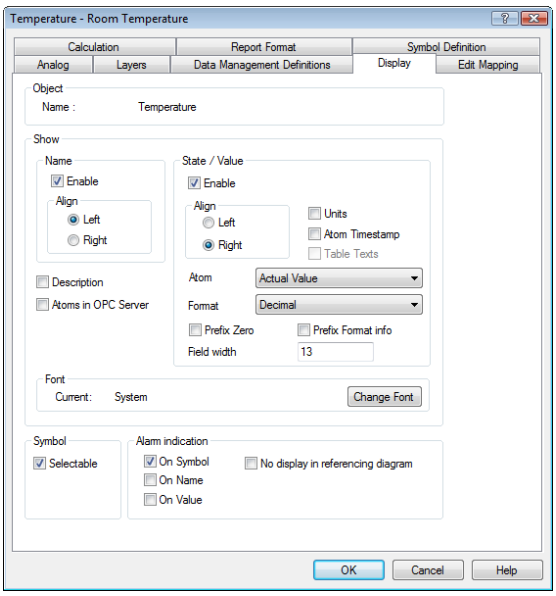


Figure 2.18 On this tab you specify what you want to show along with the symbol of the process component.

This tab contains the following important object properties:

Property	Description
Show	Check the relevant items you want to display on the diagram.
Symbol selectable	Check this box to allow the operator to select the object symbol on process diagrams.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

Edit Mapping tab

On this tab you specify the PLC address of the process component and attach alarm text(s). Note that a full PLC address consists of a node number, a data group, a word offset and a bit offset. The figure below shows the **Edit Mapping** tab:

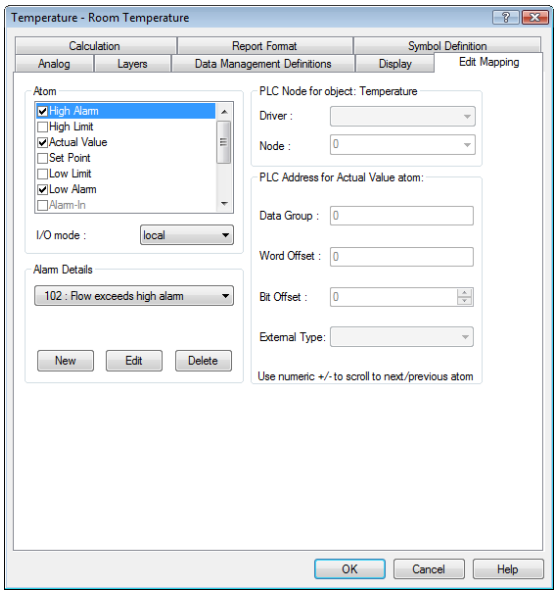


Figure 2.19 On this tab you specify the PLC address of the process component.

This tab contains the following important object properties:

Property	Description
Configure atom	Select the atom to which you want to assign a PLC address or an alarm text. The number of atoms listed depends on your selections on the **Analog** tab.
I/O mode	Select the relevant input/output mode in the drop-down list. In addition to an actual value (**Actual Value**), this object has also been configured with two sets of alarm limits and a set point; as this tab reflects the decisions made on the **Analog** tab, six atoms are listed. However, only one address needs to be entered, namely for the actual value. This is due to the fact that the limits (high alarm, high limit, low alarm and low limit) and the set point are all **local** to the PC system. Other possibilities for the limits and the set point are: **in**, **out** or **in/out** in which case PLC addresses should also be given for these values. Normally, though, **local** is preferred.
Alarm Details	Either attach an existing alarm text by selecting it in the drop-down list or create a new one by clicking **New** and then define the alarm text properties in the ensuing dialog. An alarm number must be given for each alarm limit with alarm supervision enabled on the **Analog** tab. To edit an alarm text, select it in the drop-down list, click **Edit** and change the alarm text properties, as required. *TIP:* You can also create and edit alarm texts by selecting **Edit** → **Alarm Details**.
Driver	Select the relevant PLC driver. The list of drivers corresponds to the drivers included in the active driver profile. The drivers are configured in Driver Setup. *TIP:* You can select a default driver in the **Area Properties** dialog.
Node	Enter the relevant node number to identify the PLC. Each PLC has a unique number. When there is only one PLC, node number **0** is default. *TIP:* You can select a default node in the **Area Properties** dialog.
Data Group	Enter the relevant data group. This setting identifies a section (data group) of the memory layout of the PLC which consists of a number of units or blocks of words (16 bit each).
Word Offset	Enter the relevant word offset. This setting identifies the precise word within the data group. In this example, data for the temperature measurement is read from PLC number **0**, from data group number **20** and from word number **16** within that block. *NOTE:* The system will always write one data word (that is, 16 bits) at a time. The sending of a command means that the 16 bits are sent to the PLC, even if only one or two bits have been defined as command bits.
Bit Offset	Enter the relevant bit offset. This setting identifies the precise bit within the word of the data group.
External Type	The last bit of information the system needs is the external data type in the PLC. Clicking the field will open a list of the data types available for the selected PLC driver. In this example, **FP16** (Fixed Point 16 bit) is selected. Please refer to the relevant driver manual for details. The external types are enabled or disabled in Driver Setup.

NOTE: Dependent on the PLC driver used, the text labels of the **Data Group**, **Word Offset** and **Bit Offset** fields may be replaced by driver-specific terminology. However, if you want to show the default terminology, hold down CTRL while you select the driver name.

For further details about driver configuration, refer to the Driver Setup Help file.

For further details about alarm texts, search for "*alarm texts*" in the **Definition** Help file.

Symbol Definition tab

The figure below shows the **Symbol Definition** tab:

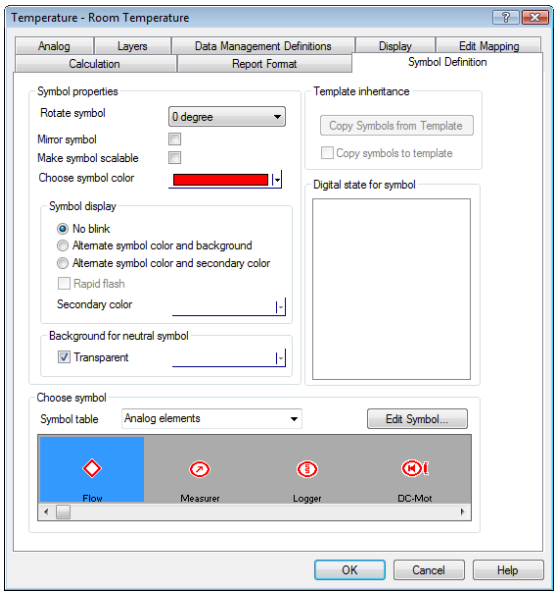


Figure 2.20 On this tab you select the symbol you want to represent the process component.

This tab contains the following important object properties:

Property	Description
Symbol color	Select the color of the symbol.
Symbol angle	Select an angle if you want to rotate the selected symbol.
Symbol table	Select one of the symbol tables from the drop-down list. The table names can be edited in Symbol Editor. *NOTE:* IGSS automatically selects the relevant symbol table for the object type you are currently defining.
Symbol preview	Select the symbol you want to use. This field shows the symbols of the currently selected symbol table.

For an explanation of the individual items in the dialog, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The Table Object Type

Definition

A table object, as is the case for an analog object, is used to represent a process component that can take on any value within a specified range. However, a single table object may be used for up to ten analog objects that belong together in some way.

Use

The following examples show what table objects may be used for:

- temperature gauges placed at different levels in a tank. Being placed at different levels, the gauges would probably give different measurements but it would still be interesting to see their values presented together. Their values might be temperatures within a range of say -3 to 40 ºC.
- the oxygen uptake in a tank monitored at four different locations (used in the following example).

When do I use a table object?

You should use a table object:

- when you have multiple analog objects that logically belong together and
- share the same measuring range, alarm limits and alarm texts

Inheriting alarm limits

A table object has no alarm limits and hence no alarm supervision. However, this may be avoided by creating an analog object that defines the alarm limits for the table object. The analog object is then connected to the table object by selecting the name of the analog object in the **Connect To** drop-down list on the **Data Management Definitions** tab.

For further details about inheriting alarm limits, search for "*table objects*" in the **Definition** Help file.

Defining a table object

To define a table object:

Step	Action
1	Select **Objects → Tables (Regulator)**. The **Object Browser** dialog appears.
2	Type a unique name and an optional description, select the Global area in the **Tree-view**, then click **Create**. The table object properties dialog appears.
3	Specify the constituent analog objects, a minimum and a maximum value, the number of decimals and measuring unit (see *"The Table tab"* below).
4	Specify how you want to collect and log your data (see *"The Data Management Definitions tab"* below).
5	Specify what you want to display along with the symbol of the process component (see *"The Display tab"* below).
6	Specify the PLC address of the table object (see *"The Edit Mapping tab"* below).
7	Choose the symbol you want to represent the table object (see *"The Symbol Definition tab"* below) and click **OK**. The object symbol and caption appear.
8	Position the object symbol and caption on the diagram.

The Table tab

The figure below shows the **Table** tab:

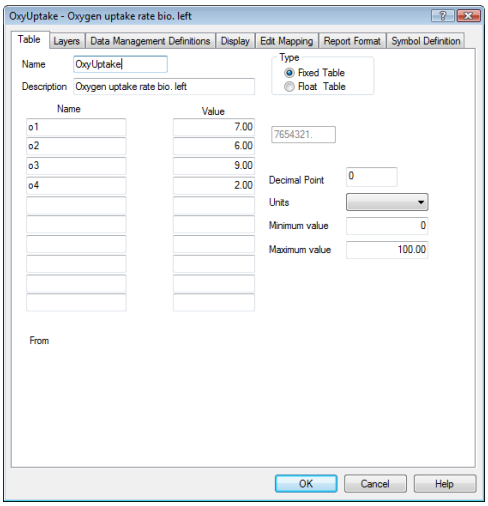


Figure 2.21 On this tab you specify the constituent analog objects, a minimum and a maximum value, the number of decimals and measuring unit.

This tab contains the following important object properties:

Property	Description
Name/Value	In this example, the oxygen uptake in a tank is monitored at four different locations and the results are shown in a table as the values **o1**, **o2**, **o3** and **o4**.
Type	The values in the table are presented as fixed values with a fixed number of decimals (**Fixed Table**). You may choose to have the values in the table represented as floating points instead (**Float Table**) in which case the values would be represented as, for example, **7.00000e+000**.
Decimal Point	Type the desired number of decimals in the box.
Minimum value	Enter a minimum value for the object.
Maximum value	Enter a maximum value for the object.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The Data Management Definitions tab

On this tab you specify how you want to collect and log data. This tab is identical to the one for analog objects. In this example, we have chosen to scan every 30 seconds (the oxygen uptake does not change suddenly) and to save all scanned values in the system's log files. Statistics - in the form of an average value - is calculated every 10 minutes.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Display tab

On this tab you specify what you want show to along with the symbol of the process component. The tab is identical to the one for analog objects.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Edit Mapping tab

On this tab you specify the PLC address of the table object. Note that a full PLC address consists of a node number, a data group, a word offset and a bit offset.

Note also that an external data type must be selected so that the system knows the PLC format of the process value.

NOTE: Although a table object can handle up to ten process values, only one address is given. This is because the system assumes that the values have consecutive PLC addresses.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Symbol Definition tab

On this tab you select the symbol you want to represent the process component. This tab is identical to the one for analog objects, except for the available symbols.

NOTE: IGSS automatically selects the relevant symbol table for the object type you are currently defining, but you are free to choose one of the other symbol tables.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Counter Object Type

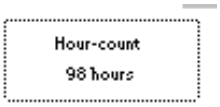
Definition

A counter object is actually a variation on the standard analog type. Similar to the analog type, a counter object may take on any value up to a given maximum. Unlike the analog object type, though, a counter object has only one alarm limit. The operator can issue four commands to a counter object: start, stop, reset and preset.

Use

A counter object is typically used for counting hours of operation of, for example, a motor to ensure that maintenance is performed on time. This use would imply that the PLC program would start the counter when the motor starts and stop it when the motor stops.

Defining a counter object

Step	Action
1	Select **Objects → Rectangular Field**. The **Object Browser** dialog appears. *NOTE:* A counter object is frequently made as a click-sensitive area, that is, an area on the screen merely displaying the name and the value.  When you define a rectangular field, you get a rectangle that you can freely position and resize.
2	In the **Tree-view** open the Global area, select **Counter**, type a unique name and an optional description, then click **Create**. The counter object properties dialog appears.
3	Type the alarm limit value and enable alarm supervision and type the preset and maximum values (see *"The Counter tab"* below).
4	Specify how you want to collect and log your data (see *"The Data Management Definitions tab"* below).
5	Specify what you want to show along with the symbol of the counter object (see *"The Display tab"* below).
6	Specify the PLC address of the counter object and attach the alarm text (see *"The Edit Mapping tab"* below).
7	Choose the symbol you want to represent the counter object (see *"The Symbol Definition tab"* below) and click **OK**. The object symbol and caption appear.
8	Position the counter object symbol and caption on the diagram.

The Counter tab

The figure below shows the **Counter** tab:

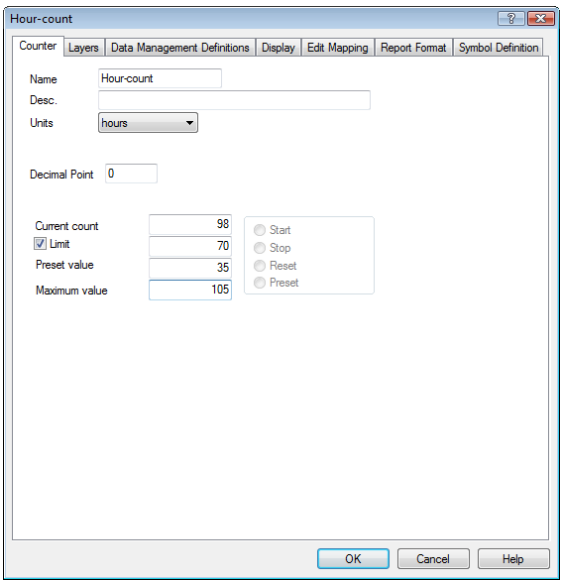


Figure 2.22 On this tab you specify the preset and maximum values and whether you want to enable alarm supervision.

This tab contains the following important object properties:

Property	Description
Limit	Check this box to enable alarm supervision so that an alarm will be generated when the limit value is exceeded.
Preset value	Enter the value you want to insert when the operator issues the **Preset** command.
Maximum value	Enter the maximum value for this object.

NOTE: Seen from the point of view of the system designer, pressing any of the four option buttons corresponds to sending a specific bit combination to the PLC. The bit combinations for the four buttons are:

Start 1000

Stop 1001

Reset 1010

Preset 1011

The Data Management Definitions tab

On this tab you specify how you want to collect and log data. This tab is identical to the one for analog objects. In this example, we have chosen to scan every 30 seconds (the motor does not start every other second) and we have chosen not to log (**None**) as we have no wish to see the counter object's historical values. We do, however, want to see the object values in the system's operational reports and therefore we have told the system to save the process value every half hour (**Base interval** = **30** and **Data reduction** = **Actual**).

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Display tab

On this tab you specify what you want to show along with the symbol of the counter object. The tab is identical to the one for analog objects.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Edit Mapping tab

On this tab you specify the PLC addresses of the counter object and attach the alarm text for the alarm limit. Note that a full PLC address consists of a node number, a data group, a word offset and a bit offset. The figure below shows the **Edit Mapping** tab.

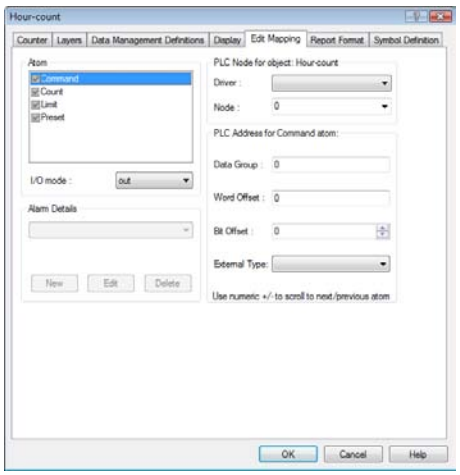


Figure 2.23 On this tab you specify the PLC addresses of the counter object.

A counter object contains the following atoms:

Select this atom …	and type the following:
Command	the address for the start/stop command that the operator can issue.
Count	the address where IGSS can read the current counter value.
Limit	In this example, we have chosen to use a **local** alarm limit, that is, an alarm limit that exists only in IGSS and has no connection to the PLC. You must also attach an alarm text for the counter alarm limit.
Preset	the address to which the preset value is to be sent to when changed by the operator.

Note also that an external data type must be selected so that the system knows the PLC format of the process value. In this example, select **Counter**.

NOTE: For each individual atom (**Command**, **Count**, **Limit** and **Preset**), you can choose I/O mode, that is, whether the system is to read from and/or write to an address in the PLC (**i/o**, **in**, **out**) or whether the value is to be internal in the system only (**local**).

The Symbol Definition tab

On this tab you select the symbol you want to represent the counter object. This tab is identical to the one for analog objects, except for the available symbols.

NOTE: IGSS automatically selects the relevant symbol table for the object type you are currently defining, but you are free to choose one of the other symbol tables.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Digital Object Type

Definition

A digital type is used to represent a process component that can take on a finite number of states and commands. The operator can issue these commands to change the state of the process component. Usually, digital objects are based on digital templates which offer several advantages compared to standard digital objects.

Use

Typical uses of digital objects are as follows:

- a valve that can be either open or closed
- a motor that can be started, stopped and run at different speeds

The standard digital type

In its most simple form, the IGSS digital type has two states: **0** and **1** and two commands also called **0** and **1**. The figure below shows the **Change State** tab of the object properties dialog of a standard digital object.

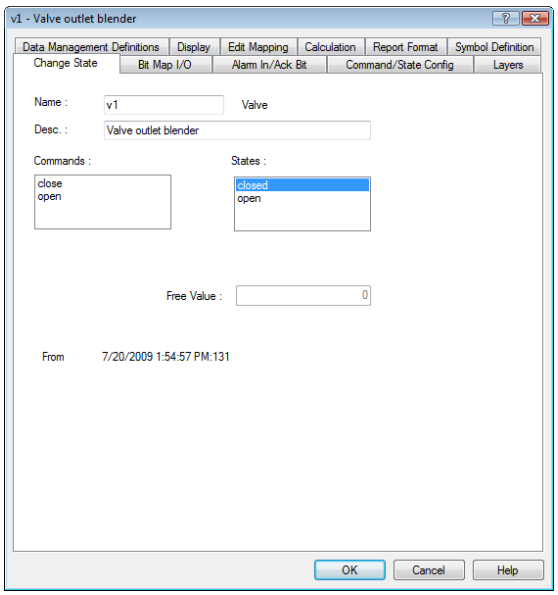


*Figure 2.24 The **Change State** tab of a standard digital object.*

In the dialog as you see it here, you have no possibilities of changing the state and command names or the number of states and commands.

Other tabs

The remaining tabs in this dialog are the same as for analog objects. For further information, refer to *"The Analog Object Type"* in this section.

Define digital templates

You will hardly ever define an object using the above type but you will practically always use a digital *template* to define the digital object.

With a digital template you can

- define exactly the number of states and commands you need
- give states and commands the names you like
- specify the valid commands for each state
- define any number of alarms
- obtain control right down to the individual bit
- tailor a template to be used again and again

For a description of how you define a digital template, refer to *"Defining an IGSS Template" in Section B of this chapter*.

The String Object Type

Definition

A string object is a text field displaying a message related to the monitored process.

Use

Typically, a string object shows a message when a specific part of the PLC program is running. In the following example, the operator will see a message on his screen when the cleaning process is initiated.

Defining a string object

To define a string object:

The following procedure assumes that you are using a rectangular field to display the string object. Alternatively, you may want to show the string in an Edit box or a text box. For further information, search for *"standard descriptors"* in the **Definition** Help file

Step	Action
1	Select **Objects → Rectangular field**. The **Object Browser** dialog appears.
2	In the **Tree-view** open the Global area, select **String**, type a unique name and an optional description, then click **Create**. The string object properties dialog appears.
3	Specify the text string you want to display and its max. length (see *"The **String Object** tab"* below).
4	Specify how you want to collect and log your data (see *"The **Data Management Definitions** tab"* below).
5	Specify what you want to display along with the text string (see *"The **Display** tab"* below).
6	Specify the PLC address of the string object (see *"The **Edit Mapping** tab"* below) and click **OK**. The rectangular field and object caption appear.
7	Position and resize the rectangular field representing the string object on the diagram. *NOTE:* An **Attributes of Rectangle** tab appears, if you double-click the field allowing you to specify the precise co-ordinates, width and height of the field.

The String Object tab

The figure below shows the **String Object** tab:

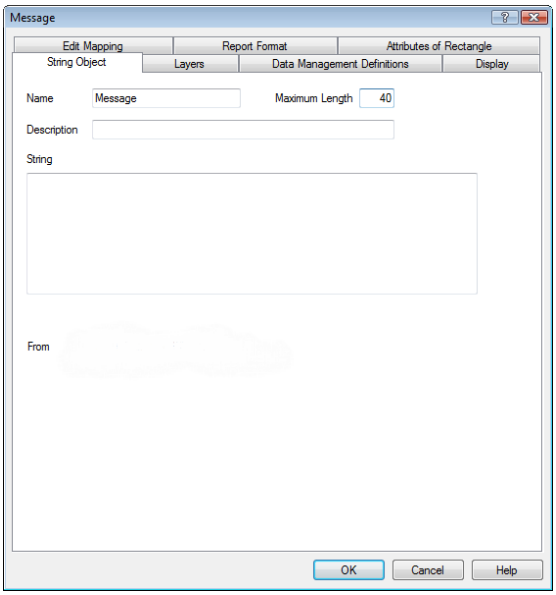


Figure 2.25 On this tab you specify the text string to be displayed and its max. length.

This tab contains the following important object properties:

Property	Description
Maximum length	Enter the maximum number of characters you need for this text string. *NOTE:* You can use up to 70 characters.
String	Enter the text string you want to display.

The Data Management Definitions tab

On this tab you specify how you want to collect and log data. The tab is identical to the one for analog objects.

You may select a scan interval and a log frequency. Note, though, that as it makes no sense to perform any statistical calculations on a string, the **Data reduction** and **Base interval** options are not selectable. Of course, the logged values cannot be presented in graphs as is normally the case, but the log files may be displayed and printed.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Display tab

On this tab you specify what you want to show along with the string object. The tab is identical to the one for analog objects. For further information about this tab, refer to the *"The Analog Object Type"* section.

The Edit Mapping tab

On this tab you specify the PLC address of the string object. Note that a full PLC address consists of a node number, a data group, a word offset and a bit offset. The figure below shows the **Edit Mapping** tab.

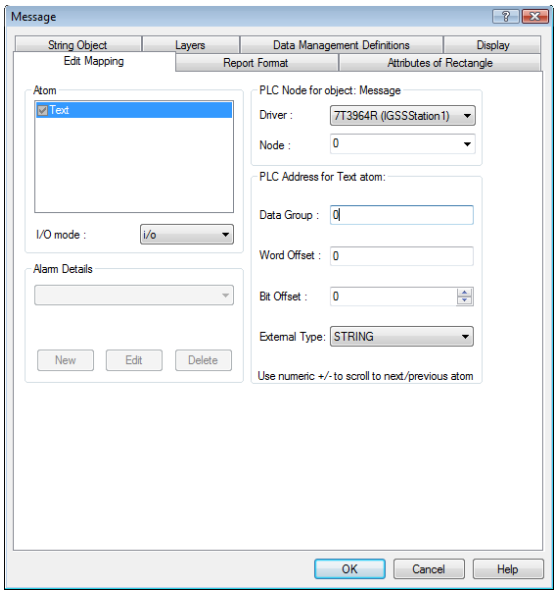


Figure 2.26 On this tab you specify the PLC address of the string object.

A PLC address for a string object specifies the beginning of the string. The number of characters defined in the **Maximum length** field on the **String Object** tab are automatically reserved. Note also that you must select an external data type.

For further information about this tab, refer to the *"The Analog Object Type"* section.

For further details about string objects, search for *"string objects"* in the **Definition** Help file.

The Attributes of Rectangle tab

On this tab you can optionally specify the precise co-ordinates, width and height of the rectangular field.

The Scaling Object Type

Definition

A scaling object maps one set of values to another set of values. Note that a scaling object is an internal object and therefore does not represent a physical process component.

Use

Use the scaling object when you need to map one set of values to another, instead of writing the necessary PLC code. You can use a scaling object to convert values from one measurement unit to another, for example, from °C (Celsius) to °F (Fahrenheit).

NOTE: You can also define unit conversions without using a scaling object. Search for *"Unit Conversion dialog" in the **Definition** Help file.*

To define such a scaling object, refer to *"Define Scaling Objects" in Chapter 3.*

Defining a scaling object

To define a scaling object:

NOTE: It is recommended to define scaling objects in the **Global** area to make them globally available in the project.

Step	Action
1	Select **Objects** → **New Unreferenced**. The **Object Browser** dialog appears.
2	In the **Tree-view** open the Global area, select **Scale**, type a unique name and an optional description, then click **Create**. The scaling object properties dialog appears.
3	Specify the input/output values (**I/O value)** and the corresponding values (**Real value**) to which you want to map the original values (See *"The **Scaling Specification** tab"* below).

The Scaling Specification tab

The figure below shows the **Scaling Specification** tab:

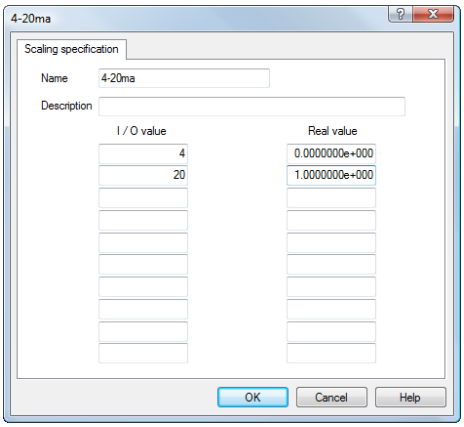


*Figure 2.27 On this tab you specify the input/output values (**I/O value)** and the new values (**Real value**) to which you want to map them.*

This tab contains the following important object properties:

Property	Description
I/O value	Enter the input/output values you want to map to another set of values.
Real value	Enter the values you want to use instead of the input/output values.

In this example, the scaling object maps values within the area 4 to 20 onto values in the area 0 to 100. This means that when, for instance, the value **12** is sent to IGSS, the scaling object maps the value onto **50**.

Connecting a scaling object to an analog object

A scaling object may be used any number of times to scale analog values. To connect a scaling object to an analog object:

Step	Action
1.	Open the diagram containing the analog object to which you want to connect a scaling object.
2.	Double-click the symbol representing the analog object.
3.	Click the **Data Management Definitions** tab.
4.	In the **Scale As** field, select the appropriate scaling object in the drop-down list which shows all scaling objects in the active project.

The Group Object Type

Definition

A Group is a collection of any number of related objects and descriptors that you want to treat as one entity. The members of a Group will typically have a number of dependants in the source project. These

dependants may be templates, alarm numbers, report formats, VBA code, etc. and they will automatically become part of the Group. This makes the Group self-contained allowing you to either copy/paste the Group within the current project or export it to a file for import into another project at a later time.

The group object includes the following features:

- Copy/paste of Group members into the current project
- Export/import of Group members into another project
- User-defined name substitution rules allow fast replication of similar diagrams
- User-defined address substitution rules allow fast replacement of PLC addresses
- Groups can be members of other Groups allowing you to build a hierarchy of Groups
- Linked groups

The linked groups allow the designer to change the "parent" group and make the changes effective in the "child" groups.

Use

The following examples show what the group object may be used for:

- A production containing two or more identical production lines.
- A ship containing two or more identical motors requiring the same parameters.

Group objects are often used together with the reusable diagram feature.

Defining a group object

To define a group object:

Step	Action
1	Select **Edit → Group Manager…**. The **Group Manager** dialog appears.
2	Click the **New Group…**. button to create a new group. The **Enter Name of Group** dialog appears.
3	Enter the name of the group, and click **OK**.
4	Select the objects that should be included in the group object. This can be done in one of three ways: • Click the Browse button, and through the object browser drag and drop the objects into the group manager. • Click Add Selected Objects, when creating a group in an existing diagram. • Click Add Selected References, when creating a new diagram.
5	Specify the settings when pasting new objects on the Paste Options tab
6	If the group should be available in another project export the group by clicking **Export...**, give the group a descriptive name, the default export filename is the group name, and click **Ok**. The group has now been exported.
7	Click Close to exit the Group Manager dialog.

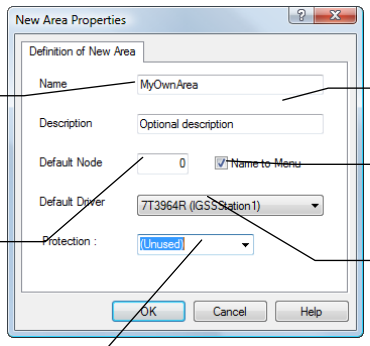
Visual Guide to Type-specific Properties

Introduction

This section is a graphical illustration of the fields and buttons on the tabs containing the type-specific properties.

When you are working with IGSS, we highly recommend that you use the What's This? Help topics to get specific information on the individual item in a dialog. For information on how you use this function, refer to the *"IGSS User Documentation"* section at the beginning of this manual.

Area



Enter a unique name of max. 30 characters. Do not use spaces in the name.

Type the default node number identifying the appropriate PLC in the network. This node number is automatically suggested for new objects you create in this area.

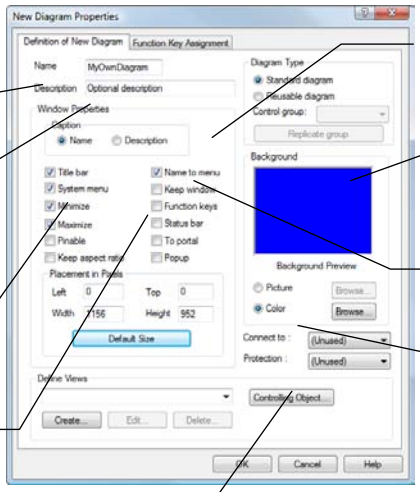
Optionally, protect this area by attaching a **Protect** object. If the current user owns the user privileges of the Protect object, he gains access to this area.

Enter an optional description of max. 254 characters.

Check this box to show the area name in the **Area** menu.

Select a default driver in the drop-down list. The driver is automatically suggested for new objects you create in this area.

Diagram



Enter a unique name of max. 30 characters. Do not use spaces in the name.

Enter an optional description of max. 254 characters.

Check the window elements you want to show, for example, the status bar.

Check this box before you assign function keys on the **Function Key Assignment** tab.

Optionally, protect this diagram by attaching a **Protect** object. If the current user owns the user privileges of the Protect object, he gains access to this diagram.

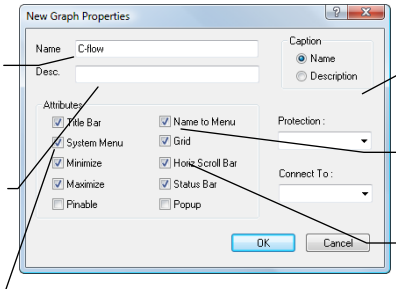
Select **Name** or **Description** to show either in the title bar of the diagram.

Displays a preview of the selected background picture or color.

Check this box to show the diagram name in the **Diagram** menu.

Select either **Picture** or **Color** as the background for you diagram. Click **Browse** to find the appropriate picture or color.

Graph



Enter a unique name of max. 30 characters. Do not use spaces in the name.

Enter an optional description of max. 254 characters.

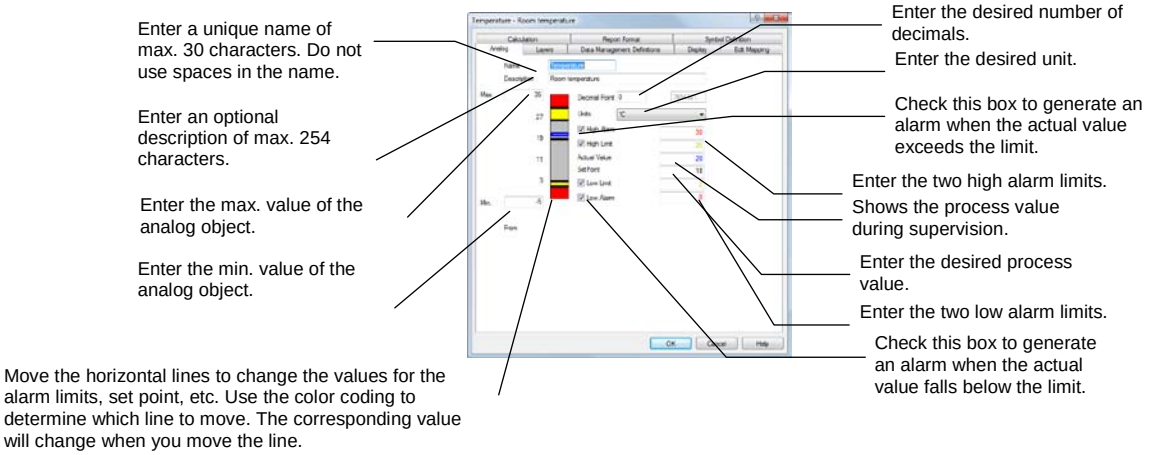
Check the window elements you want to show, for example, the status bar.

Select **Name** or **Description** to show either of the two in the title bar of the graph.

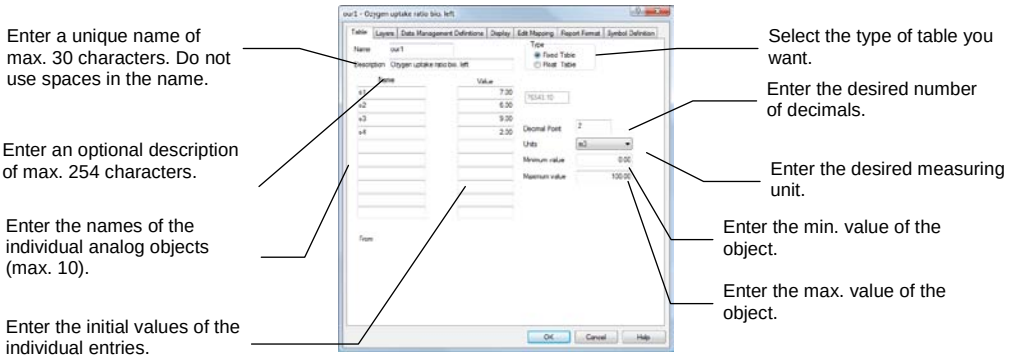
Check this box to show the graph name in the **Graph** menu.

Check this box to display a grid behind the graph.

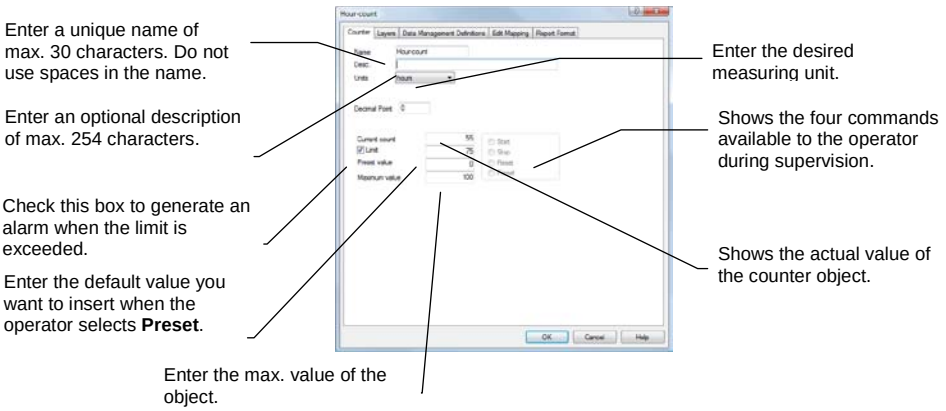
Analog



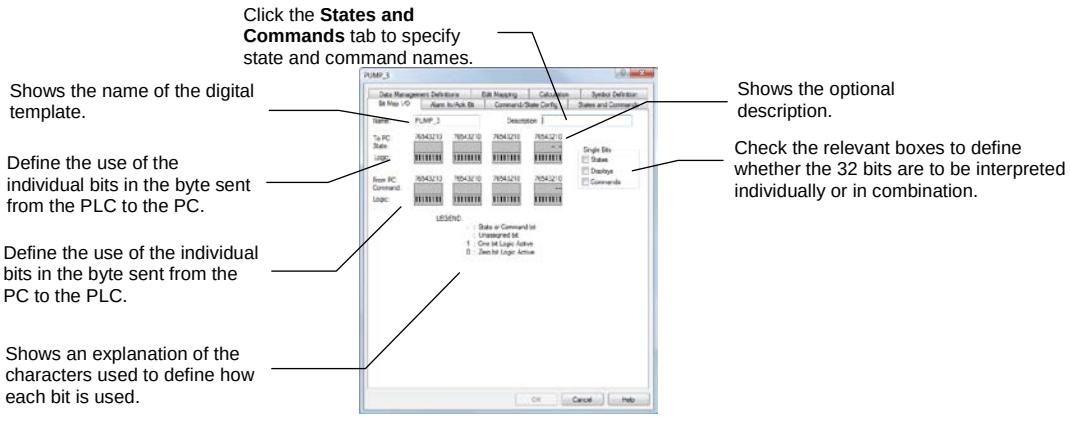
Table

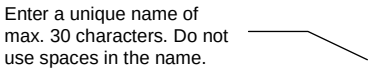


Counter

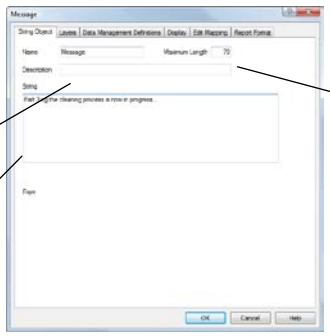


Digital





String

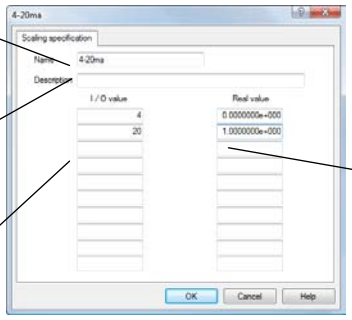


Enter an optional description of max. 254 characters.

Enter the text string you want to show.

Enter the max. length of the text string.

Scaling



Enter a unique name of max. 30 characters. Do not use spaces in the name.

Enter an optional description of max. 254 characters.

Enter a range of incoming values, for example, from 4 to 10. Max. 10 values may be given.

Enter a range of real values, for example, from 0 to 100 to which you want to map the **I/O values**. Max. 10 values may be given.

Section B: IGSS Templates

About this section

This section contains the following information:

- A description of what a template is and what it is used for
- An example where we define a digital template

Contents

This chapter contains the following topics.

What Is an IGSS Template?

Definition

An IGSS template is a customized template - based on one of the IGSS object types - that the user creates when a number of process components are very similar and share several properties. The real process components are then defined using the template, thus eliminating the repetitive task of entering the same information for each component. In fact, the user only has to enter a unique name and a specific PLC address to make a new component based on a template.

Why use templates?

There are several reasons why you should use templates extensively:

- They ensure consistency within a project for process components based on common templates.
- They save valuable engineering time by eliminating the need of entering the same information for a number of very similar process components.
- They limit the task of creating new process components to entering a unique name and a specific PLC address.
- They facilitate making changes to multiple objects at a time, simply by changing the template properties.

Four types of templates

Templates may be defined for the following object types:

- Analog
- Table
- Counter
- Digital

The digital templates are the most widely used templates. The main difference between the digital templates and the other template types is that you gain control right down to the individual bit sent to and from IGSS. For an example of how you define a digital template, refer to *"Defining an IGSS Template" in this section.*

Built-in templates

A few templates are included for your convenience, for example, the **PROTECT** template which is a template defining protection levels to be used in connection with the **User Administration** module. If required, you may define new **Protect** objects based on the **PROTECT** template.

Example: An analog template

You have 16 different temperature gauges in your plant that all

- measure temperatures in the range -5 to 35 ºC
- share the same alarm limits
- share the same alarm texts
- have their current process value scanned every 10 seconds
- must be included in the operational reports

This would mean that it would make perfect sense to make a template including all these properties and then use this template to define each of the temperature gauges T1 to T16. The only two properties that would be different in these 16 components would be their name and their specific PLC addresses.

Defining an IGSS Template

This example

In the following example we will define a pump template, PUMP_3. The pump template will have the following states and commands:

This command …	Results in this state …
STOP	OFF
SLOW	SLOW
MEDIUM	MEDIUM
FAST	FAST

Advantages of using a digital template

By defining a digital template you can:

- define exactly the number of states and commands you need
- give states and commands the names you like
- define any number of alarms
- obtain control right down to the individual bit
- tailor a template to be used again and again

Usually, you will define one template for each type of valve, motor, pump, etc. If you need two templates for two different types of pumps, simply copy the first template (select **Template → Create Template**) and use the **Copy From** function, make the necessary adjustments and give it a new name, for example, PUMP_2.

Defining a digital template

Step	Action
1.	Select **Template → Create Template**. The **Create Template** dialog appears.
2.	In the **Type** group, select **Digital** and type a unique name for the template (in this case, **PUMP_3**) and click **OK**. The digital template properties dialog appears. *NOTE:* To easily distinguish the names of templates and process components, we recommend that you use ALL CAPS for template names and normal case for process components.
3.	Define the bits used for states and commands (see *"The **Bit Map I/O** tab"* below).
4.	Define the bits used for alarm indication and alarm acknowledgement (see *"The **Alarm In/Ack Bit** tab"* below).
5.	Assign names to the individual states and commands (see *"The **States and Commands** tab"* below).
6.	Define the default command and valid commands for each state (see *"The **Command/State Config** tab"* below).
7.	Specify how you want to collect and log your data (see *"The **Data Management Definitions** tab"* below).
8.	Specify the parts of the PLC address which are common to all process components you are going to base on this template (see *"The **Edit Mapping** tab"* below).
9.	Choose a color and symbol for each state (see *"The **Symbol Definition** tab"* below).
10.	Click **OK** to save the template. *RESULT:* The template is now ready for use. For an example where we use a template to define a process component, refer to *"Define Digital templates" in Chapter 3*.

The Bit Map I/O tab

The figure below shows the **Bit Map I/O** tab:

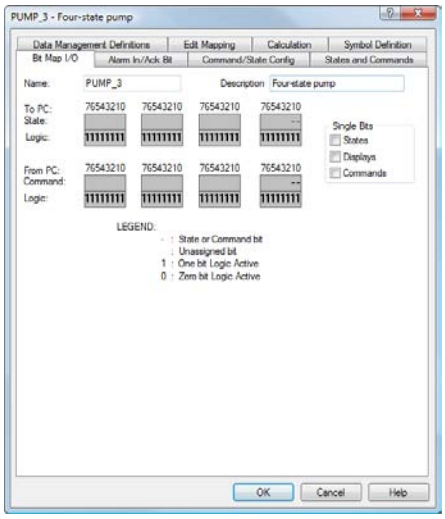


Figure 2.28 On this tab you specify how you want to use the individual bits sent to and from IGSS.

This tab contains the following important object properties:

Property	Description
To PC (State)	Define how you want to use the individual bits communicated from the PLC to IGSS. You have 32 bits for state and command indicators. In the example, bits **0** and **1** are used as state bits. The symbols are described in the **LEGEND**.
From PC (Command)	Define how you want to use the command bits sent from IGSS to the PLC. Here two command bits are used. Similar to the two bits used for states, two bits give you the opportunity to name four commands. The four commands represent the four bit combinations: 00. 01, 10, 11.

For an explanation of the remaining items, click the ? in the upper right hand corner of the dialog, then click the item you want information about.

The Alarm In/Ack Bit tab

The figure below shows the **Alarm In/Ack Bit** tab:

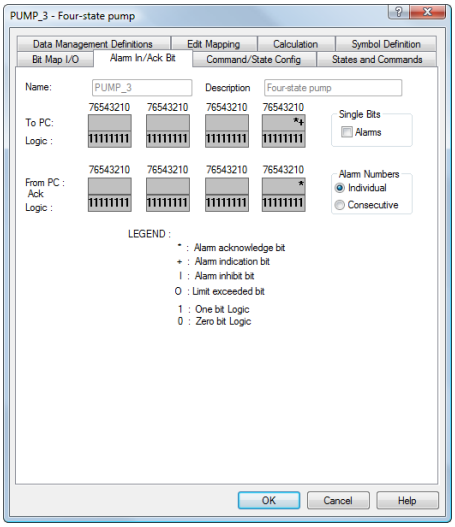


Figure 2.29 On this tab you specify the alarm indication and alarm acknowledgement bits sent to and from IGSS.

This tab contains the following important object properties:

Property	Description
To PC	Define the alarm indication or alarm acknowledgement bits communicated from the PLC to IGSS. In the example, bit **0** is used as an alarm indication bit (**+**) and **1** as an alarm acknowledgement bit (*****).
From PC	Define the alarm acknowledgement bit communicated from IGSS to the PLC. In the example, bit **0** is used as an alarm acknowledgement bit (*****).

TIP: It is recommended to set an acknowledgement bit both **To PC** and **From PC**. This ensures that the operator acknowledgement is sent to the PLC and that IGSS gets an acknowledgement back from the PLC. If you only set it **From PC**, you cannot be sure that the PLC has received the bit.

For details about alarm indication and acknowledgement bits, search for "*alarms*" in the **Definition** Help file.

The States and Commands tab

The figure below shows the **States and Commands** tab:

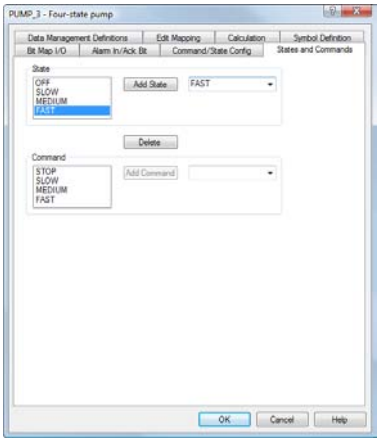


Figure 2.30 On this tab you specify the names of the states and commands of the digital template.

This tab contains the following important object properties:

NOTE: The number of states and commands is determined by the number of state and command bits defined on the **Bit Map I/O** tab.

Property	Description
Add State	Renames the selected state in the list box with the state name you enter or select. You can either enter a new state name or select existing states by opening the drop-down list.
Add Command	Renames the selected command with the command name you enter or select. You can either enter a new command name or select existing commands by opening the drop-down list.

The Data Management Definitions tab

On this tab you specify how you want to collect and log data. This tab is identical to the one for analog objects. In this example, we will choose **Logging Out**, because we want every command that the operator issues to be registered in the system's log files. We will choose **> 0 %** because we want to log all state changes. Every five minutes the system saves the number of state changes in the .bcl files (the data reduction method **Change** is selected). These values are later used in the calculation of the values for the operational reports.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Edit Mapping tab

On this tab you specify the PLC address of the process component. Note that a full PLC address consists of a node number, a data group, a word offset and a bit offset.

NOTE: Remember that we are defining a *template* and therefore we will not specify a specific PLC address. What we can do, though, is to specify the node number and the data group but leave the specific word and bit offset open to be defined for the individual objects when they are subsequently defined.

Specifying alarm texts poses no problem - all components that will later share this template will all share the same alarm texts.

For further information about this tab, refer to the *"The Analog Object Type"* section.

The Symbol Definition tab

On this tab you select a color and a symbol for each state of the digital object. This tab is identical to the one for analog objects, except for the available symbols.

By checking the **Copy symbols to template** box, you save all the color and symbol selections as part of the template. When you later define new objects based on this template, you can import these selections by clicking the **Copy Symbols From Template** button.

For further information about this tab, refer to the *"The Analog Object Type"* section.

Advanced options

There are a number of other possibilities in the dialog that we will not describe in detail here:

- you may choose to look at the bit used for, for example, states as a single, individual bit, or "un-coded" as some would have it, rather than as a bit combination. Looking at two state bits individually would give three states rather than four, that is, one state for each bit and the common zero state when all bits are set to **0**.
- you may choose to have the system automatically give alarm numbers consecutively rather than select numbers yourself.
- you may choose to use inverse logic so that **0** rather than **1** means that a bit is set high while **1** means that it is not set.

For further details about advanced template options, search for "*digital templates*" in the **Definition** Help file.

Glossary

Term/abbreviation	Definition
actual value	The actual value is the current process value of an analog object.
alarm	An alarm is a notification which is generated when an error situation occurs, for example, when a value falls below or exceeds a certain limit.
alarm acknowledgement indicator	The alarm acknowledgement indicator is a specific bit indicating that an alarm has been acknowledged. The alarm acknowledgement indicator bit is defined as part of the digital template.
alarm delay	The alarm delay is a time delay specifying how long an alarm must exist before being registered as such. The default alarm delay is specified in the **System Configuration** module.
alarm icon	The alarm icon shows the total number of active alarms and the color of the alarm with the highest priority. Double-clicking the alarm icon will open the **Alarm** module. The alarm icon is also shown in the Windows System Tray (lower right corner of the Windows Taskbar).
alarm indicator	An alarm indicator is a specific bit defined to indicate incoming alarms from a digital object. The alarm indicator bit is defined as part of the digital template.
alarm priority	The alarm priority describes the seriousness of the alarm. The priority is a value within the range from 255 (highest priority) to 1 (lowest priority). Each alarm priority should be associated with a specific color. We recommend that you carefully plan the number of alarm priorities and their associated colors to avoid any confusion for the operators.
Alarm module	The **Alarm** module is opened by double-clicking on the alarm icon. The **Alarm** module allows the operator to view active and historical alarms. The operator can acknowledge alarms and make alarm notes which will be visible for all other operators in a multi-user system.
alarm text	An alarm text is a general description of an error situation, for example, "motor overheated". An alarm text consists of the following components: an alarm number, an alarm priority, a short alarm text and the operator instructions. A number of additional properties can be set, including sound and events to occur when the alarm arises.
analog object	An analog object is a process component that can take on any value within a specified range. Typical examples of analog objects are flow meters, level and temperature gauges.
area	An area is a collection of diagrams, graphs and process components that belong together. Areas may be used to reflect the division of a plant into different logical sections. If a plant cannot be seen as divided into different sections, the system designer may use only one area. When you define an IGSS object, you specify which area of the project it belongs to. However, one area is special because all objects defined here are automatically known in all other areas. This area is called ‘Global’ and is automatically created in every

	IGSS project. Do not rename or remove the Global area.
atom	An atom corresponds to a potential PLC address. As an example an analog object has 6 atoms attached, i.e. 6 entities that might have an address in the PLC: high alarm, high limit, actual value, set point, low limit and low alarm.
background picture	A background picture is a drawing used as the static background for a process diagram. As an alternative, you can also use a background color and create the diagram from scratch using the built-in drawing tools.
bar display	A bar display is way of visualizing the process value of analog or table objects in a bar graph. A typical example of use is to show the water level in a tank.
base class file (BCL file)	Base class files hold historical data processed by the system on the basis of the seven built-in data reduction formulas (Average, Minimum, Maximum, Sum, Actual, Change and Difference). The basis for the calculations made by the system are the data scanned in from the PLC at the specified scan intervals. There are four intervals with which calculations may be made; the intervals may be changed in the **System Configuration** module. Each interval is called a 'base class' and result in a separate file. The lowest base class (the lowest calculation interval) is called base class 2 and the highest is called base class 5. Examples of file names (GxYYMMDD.bcl): G2970128.bcl G3970128.bcl G4970128.bcl G5970128.bcl The second character in the file name is the base class, the ensuing six characters form the date when the files were created and the extension is an abbreviation of 'base class'. When all four calculation intervals are used in a project, there will be four files for each day. The base class files are located in the project's report folder.
base interval	The base interval determines how often the system reduces the scanned values read from the PLC to one data reduction value, for example, average. See also "data reduction".
bit offset	A bit offset is a number identifying the precise bit within the word of the data group. The bit offset is defined as part of the PLC address.
bitmap file (BMP)	A bitmap file is a graphic saved in the *.bmp format. It can be used as the background picture of a diagram, as an independent graphic or to represent an IGSS object.
click-sensitive area	A click-sensitive area is a field on a diagram on which the operator can click to open an IGSS object. A click-sensitive area is defined as a rectangular field in IGSS. A typical example is to use rectangular fields on an overview diagram where the operator simply clicks on the field to open the relevant sub-diagrams.
command	A command is a named command that the operator can issue to control a digital object. For example, an "open" command to open a valve and a "close" command to close it. Command names are defined as part of the digital template.
project	A project is a model of an actual process being monitored and controlled; the process may be anything from a purification plant

	to a luxury liner or a production line. A project consists of a number of process diagrams with dynamic representations of the process components (the valves, motors, flow meters, etc.) that the operator can control from his screen.
context-sensitive Help	Context-sensitive Help is a Help text describing the specific user interface object from which you requested help. In dialogues, context-sensitive Help is called What's This Help.
counter object	A counter object is a process component that can take on any value up to a given maximum limit. Typically a counter object is used to visualise a PLC counter, for example, one that counts the hours of operation of a motor.
data collection (DC)	The data collection engine (DC.exe) is the heart of IGSS. DC collects data from the process and sends data back to the process, for example, if the operator issues a command to stop a pump. DC also writes data to the .log, .bcl and .alm data files and distributes data to the operator stations in a multi-user system. In the **System Configuration** module, you can control various data collection settings.
data group	A data group is a number identifying a section of the memory layout of the PLC which consists of a number of units or blocks of words (16 bit each) numbered from 0 to 256. The data group is specified as part of the PLC address.
data reduction	Data reduction defines the method used to reduce the scanned process values to one data reduction value, for example, average. The scan interval defines the interval between the individual readings of the process values and the base interval defines the interval between the individual reductions.
Definition	The system designer's main module in IGSS. This is where you build the project that the operator should be able to monitor in the **Supervise** module.
diagram	A process diagram is a graphical view of a process or part of a process. A diagram typically consists of a static and a dynamic part. The static part comprises the process pipes, the tanks, etc. while the dynamic part shows the contents of the tank, the valves, the motors, etc. that change state or value. A diagram may be opened from the Diagram menu, from a click-sensitive area, from a symbol or using a function key.
digital object	A digital object is a process component that has a finite number of states and commands. Typical examples are valves, motors and pumps.
driver	A driver is a control program enabling IGSS to communicate with the PLC or other data collection device which collects the data from the process. 7-Technologies has developed a wide range of communication drivers, but you can also use the generic driver based on the OPC (OLE for Process Control) standard.
enhanced metafile (EMF)	An enhanced metafile is a graphic saved in the .emf format. It can be used as the background picture of a diagram, as an independent graphic or to represent an IGSS object.
external type	The external type identifies the data type used in the PLC to represent the process value. When IGSS knows this format, it automatically converts the value to normal integers. The available data types are driver-specific and can be enabled or disabled in the **System Configuration** module. Examples of external types are: FP8 (fixed point 8 bit), FP16 (fixed point 16 bit) and FP32 (fixed point 32 bit).

function key	A function key is one of the F-keys on the keyboard. In IGSS you can assign frequently used operations to function keys. Function keys are defined as part of the diagram properties, for example, F2 to start the pump and F3 to stop it. Up to 24 function keys can be defined for each diagram. Additionally, 24 global function keys can be defined. A prefix key is used to activate function keys 13 - 24.
Global area	The Global area is a special area. All objects defined in this area are automatically known in all areas. The Global area is automatically created in an IGSS project. Do not rename or remove this area. We recommend that you define templates and scaling objects in the Global area to make them globally available in the project.
global parameter	A global parameter defines a global setting for IGSS, for example, data management and data collection settings. The global parameters are configured in the **System Configuration** module.
graph	A graph is a graphical chart showing the values or states of a set of process components. The source data can be either log data (.log files) or reduced values (.bcl files).
grid	A grid consists of two sets of lines that crisscross at right angles. On a diagram there is an invisible grid of horizontal and vertical dots. In IGSS you can set the grid size (in mm) and snap objects to that grid to easily align objects.
I/O mode	The I/O mode defines whether the value is read from (in) or written (out) to a PLC address or both (in/out). Some values can be set to "local" if they are generated within IGSS. This is typically used for alarm limits on analog objects. IGSS detects when the process value exceeds the specified alarm limit and generates an alarm.
I/O value (scaling object)	The I/O value is a value that IGSS can convert to another value (see "real value"), for example, to convert from one measuring unit to another.
IGSS	Interactive Graphical SCADA System
initial display	The initial display is the start-up view that the operator will see when he starts the **Supervise** module. The system designer chooses the initial display in the **Definition** module. The system designer should define an initial display for each area of the project. Forgetting to do so will result in a blank screen when the operator opens the area in the project.
installation	When a project has been created in the **Definition** module, the system must check it for consistency and completeness. This is done using the "Install Project" command in the File menu. If the project is running when the system designer chooses to install the project in the **Definition** module, he is prompted to temporarily stop the project. After installation, the project can be started again.
Job Scheduler	**Job Scheduler** allows you to define and maintain a set of jobs or events that need to be automatically executed either at a given point in time or at a specified frequency. You can use it to run a program or to just display a message to remind you of something.

Keep Window option	The Keep Window option ensures that a particular diagram is always kept open. During supervision four diagrams may be open simultaneously. When diagram number five is opened, the first one closes unless you have enabled the Keep Window option. The option is a diagram property.
Library toolbar	The Library toolbar allows you to place your favourite graphics and multimedia files and IGSS objects represented by symbols on a floating toolbar. You simply drag the objects to the toolbar and when you need to use them again, you drag them onto the process diagram.
local	Local is the I/O mode used for atoms which are generated locally within IGSS, for example, an alarm which is generated when the process value exceeds the alarm limit.
log file	A log file can contain process values, digital states, operator commands and login/logout information. Process values and states are logged according to the logging deadband selected on the "Data Management Definitions" tab. For example, if you specify > 5% a scanned value will not be logged until it deviates with more than 5% from the previous logged value. To log operator commands, select the "Out" check box. The log files are located in the project's report folder and are named (YYMMDDHH.log): 01112708.log 01112709.log 01112710.log There is one log file for each hour in which the data collection is active. The log data can be used as the basis for graphs. The log data can be viewed via the ODBC interface.
node	A node is a unique number identifying the PLC in a network. The node number is defined in the **System Configuration** module. When you define an object in the **Definition** module, the node numbers defined in **System Configuration** can be selected as part of the PLC address. TIP: You can define a default node number for each area in the project. The node number will then be suggested automatically for each object you create in this area.
object caption	An object caption is the text(s) describing the object. The object caption may include the object name, object description, the current process value and unit. What you want to show in the object caption is defined on the "Display" tab of the object properties dialogue.
OLE Linking and Embedding (OLE)	OLE is a standard used for linking or embedding components made in third party programs into IGSS. You can, for example, define an OLE-embedded diagram that refers to an MS Excel worksheet that the operators can view during supervision. Note that the functions of the OLE server program become available as soon as you activate such a diagram.
operator	The operator is the person who monitors and controls the monitored process. He will typically only use the **Supervise** and **Alarm** modules. These two modules are designed to make the

	monitoring task very easy and straightforward for the operator.
periodical report	A periodical report is a report generated by the operator during supervision of the plant. It is based on the historical data generated by IGSS. A periodical report can cover five standard periods: daily, weekly, monthly, quarterly and yearly. The system designer can define a number of report formats that the operator can choose between during supervision.
PLC	Programmable Logic Controller
PLC address	The PLC address is a unique address used to enable communication with the individual process components. A PLC address may hold current process values, states, commands, alarms, etc. A PLC address consists of a node number, a data group, a word offset and a bit offset. The address is specified on the Edit Mapping tab of the object properties dialogue.
predefined graph	A predefined graph is a graph defined by the system designer in the **Definition** module. The system designer can choose to include the graph name in the Graph menu, embed the graph on a diagram or create a link to the graph. During supervision, the operator will typically choose the predefined graph in the Graph menu.
preset value	The preset value is a value that the operator can issue for a counter object with the Preset command from the **Supervise** module.
process component	A process component is a physical process component in the plant, for example, a motor, a pump, a valve, etc.
properties	The properties are the attributes or characteristics of an object. The object properties are defined and edited from a dialogue containing all object properties. For example, to edit the properties of an analog object, simply double-click the object symbol and edit the properties as required.
Protect object	The Protect object is automatically included in every IGSS project you create. It is used to protect IGSS objects from unauthorized use. By connecting the Protect object to an IGSS object, you can control what the operator is allowed to do with this object. The user privileges are set up in the **User Administration** module. Example: By connecting the Protect object to an analog object and by setting up the necessary parameters in the **User Administration** module, you can allow some operators to change the set point for the object and other operators will not be able to do it.
PROTECT template	The PROTECT template is a built-in template defining protection levels. By default, one object called "Protect" is based on this template and will be included in every IGSS project you create. If required, you can create additional "Protect" objects based on this template.
real value (scaling object)	The real value is the value you want to use instead of the I/O value, see "I/O value (scaling object)", for example, to convert from one measuring unit to another.
reference	A reference is a link to an existing IGSS object. A reference is typically used to show an already existing object on another diagram. If you copy an IGSS object, you can paste it as a new object or as a reference.
report format	A report format is a report template that the system designer can

	configure in the **Definition** module. Each report format is associated with one of the standard report types in IGSS: Periodical report, snapshot report or alarm statistics report A report format consists of a name, a number of report headings and a number of objects from the project. When a report format is defined, the operator can choose its name when he wants to generate one of the above standard report types.
right-click menu	A right-click menu is a context-sensitive menu which is accessed by clicking the right mouse button. The menu gives you access to the most frequently used commands associated with the user interface element you clicked on.
SCADA	Supervisory Control & Data Acquisition
scaling object	A scaling object is an internal object used to map values from one range to values within another range, for example, to convert values from one measuring unit to another. A scaling object is used to scale analog or table object values.
scan interval	The scan interval defines how often the component address in the PLC is scanned. The interval is defined on the Data Management Definitions tab of the object properties dialogue. Four different scan intervals can be selected in the **Definition** module. They are defined in the **System Configuration** module.
set point	The set point is the desired process value to which the process value is calibrated. The set point is defined as part of an analog object. The set point value can be changed by the operator during supervision.
simulate	To simulate data means to make IGSS use simulated process values in the project. This enables the system designer to simulate how the operator will view the process during supervision and to visually check the diagram layout when the process "comes alive". The data collection engine (DC.exe) must run simulated, if you want to use simulated data. The simulation mode is enabled in the **System Configuration** module.
snap (to grid)	Snap to grid means to align an object to the invisible grid of a diagram. This function is used to align objects neatly on a process diagram.
snapshot report	A snapshot report is a report generated by the operator during supervision. It contains the current values from the monitored process. The operator can choose to base the snapshot report on a predefined report format or simply include all objects from an area of the project.
standard descriptor	A standard descriptor is a standard object that you can use to represent an IGSS object on a diagram. The standard descriptors are divided into the following categories. {bmc bullet.bmp} Drawing objects (line, polygon, text, etc.) {bmc bullet.bmp} Windows controls (command button, edit box, slider control, etc.) {bmc bullet.bmp} Graphics files (.bmp, .emf, .wmf, .gif, etc.) {bmc bullet.bmp} Multimedia files (.avi and .gif) {bmc bullet.bmp} ActiveX controls and OLE objects

	Once the standard descriptor is positioned on the diagram, you can bind its appearance to the values, states and alarm limits of the IGSS object by right-clicking the descriptor and then choosing Descriptor Properties in the popup menu.
state	A state is a particular state that a digital object can enter. A valve may, for example, enter an "open" or a "closed" state. The operator can force a digital object into another state by issuing a command.
state indicator	A state indicator is a specific bit representing the state of a digital object. The state indicator bit is defined as part of the digital template.
status bar	The status bar is the area at the bottom of a window showing the current status or giving other information, such as the meaning of a particular command. Note that the diagram status bar contains key information about the selected IGSS object, cursor co-ordinates, etc. The diagram status bar can be enabled or disabled in the Diagram Properties dialogue.
string object	A string object is a text field displaying a message related to the monitored process, typically describing that a part of the PLC program is operative. An example: "Water is now being filled into basin ...".
Supervise	The module used by the operator to supervise and control the monitored process. The **Supervise** module always launches the **Alarm** module to allow operators to continuously monitor the alarm state.
symbol	A symbol is a graphic used to represent a process component, for example, a valve. Symbols are click-sensitive and during supervision open dialogues where the operator can set parameters like alarm limits or issue commands like ‘close’. A standard symbol file (Symbols.v20) containing industry standard symbols is supplied with the system. Symbols are pixel-based and can be created or modified in the Symbol Editor program.
Symbol Editor	The program in which the system designer can create new symbols or modify the existing symbols in the symbol file. IGSS comes with a predefined symbol file, Symbols.v12, which contains industry standard symbols that the system designer can use immediately. The appropriate symbol for an IGSS object is applied in the object properties dialogue.
symbol file	The symbol file is a library of symbols. IGSS comes with a default symbol file, Symbols.v20. The system designer can modify or expand this file or create his own symbol file in the Symbol Editor program.
symbol table	A symbol table is a collection of symbols for a specific type of component. A symbol table may, for example, contain symbols for valves. The symbol file contains a number of symbol tables. The names of the symbol tables are shown in the lower portion of the "Objects" menu in the **Definition** module.
symbol table	The symbol table is a table containing a group of symbols which can be accessed from the **Definition** module. The default symbol file, Symbols.v20, contains a number of tables such as Valves,

	Graphs, Analog objects, etc. In the **Definition** module, the system designer selects the symbols from these tables by selecting the appropriate symbol table and then selecting the specific symbol he needs. Using the Symbol Editor program, the system designer can append his own symbol tables to the existing ones.
system administrator	A system administrator is a person who is responsible for administering the use of a multi-user system. His duties include setting up the user administration, allocating storage space for the data files in the system (for example, .log and .bcl files), backing up data files before they areremoved from the system and administering the network server and operator stations.
System Configuration	The global setup module in IGSS. This is where the IGSS servers, operator stations and PLCs are set up by the system designer.
system designer	The system designer is the person who builds an image of the monitored process and makes sure that data can be received from and sent to the process components. The system designer is typically a highly skilled engineer who uses a number of Igss modules to build the project that the operators will later use when monitoring and controlling the plant. The system designer's main progam is the **Definition** module.
tab	A tab is a "page" of a dialogue similar to the index tabs of a card file. A tab is accessed by clicking one of the tab names at the top of the dialogue. Each tab contains a collection of related properties, for example, data management properties.
table object	A table object, like the analog object, is used to represent a process component that can take on any value within a specified range. However, a single table object may be used for up to ten different analog objects that belong together in some way, for example, a set of temperature gauges at different locations within a tank.
template	A template is a user-defined template - based on one of the IGSS types - that you should create when a number of process components are very similar and share several properties. The real process components are then based on this template eliminating the repetitive task of entering the same information for each component. Templates may be defined for the following IGSS types: analog, table, counter and digital.
type	An IGSS type is a built-in template that ensures that you provide all the necessary information about each process component you define. There are nine IGSS types:·area, diagram, graph, analog, table, counter, digital, string and scaling. Area, diagram and graph are non-process objects. The remaining object types represent process components, except the scaling object which is an internal IGSS object used for conversion purposes.
UTC	Universal Time Coordinated (formerly Greenwich Mean Time), used as the basis for calculating time in most parts of the world. IGSS uses this time format internally. You can switch between UTC and local time by enabling or disabling "UTC Date/Time" in the "View" menu.
What's This? Help	What's This? Help is a Help text describing a specific item in a

	dialogue. To view What's This? Help, simply click the "?" in the upper right corner of the dialogue, then click the item you want information about.
window element	A window element is a part of a window in the Windows environment. Window elements include the minimize and maximize buttons, the status bar, the title bar, etc. These elements can be shown or hidden in diagram and graph windows in IGSS.
Windows control	A Windows control is an item which allows the user to enter information, select from a list or issue a command. Windows controls include command buttons, combo boxes, list controls, sliders, text boxes, etc.
Windows metafile (WMF)	A Windows metafile is a graphic saved in the .wmf format. It can be used as the background picture of a diagram, as an independent graphic or to represent an IGSS object.
WinPager	WinPager is an add-on utility used to route alarm messages to personal pagers, mobile phones, e-mail accounts or telefaxes. In WinPager, you can set up duty schedules, which define the periods where you want WinPager to handle alarms. This would typically be evenings or weekends. Also, WinPager allows for remote acknowledgement of IGSS alarms by using a touch-tone telephone or by sending an SMS message.
word offset	The word offset is a number identifying the precise word within the data group. The word offset is one of the components of a PLC address. "Word offset" is the standard terminology used internally in IGSS. For some PLC drivers, this term may be replaced by the term relevant for the selected driver.

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