

## Preliminary

Thank you for purchasing HG1X Series product from **IDEC**. HG1X Series Products are versatile operator interfaces with Windows based configuration Software.

This manual will help you to **safely** install, configure and operate HG1X Products.

**All the safety warnings and precautions must be followed to ensure proper unit performance and personal safety.**

### Warnings used in this manual:

#### DANGER



Danger Warnings are used to indicate situations, locations and conditions that can cause serious injury or death.

#### CAUTION



Caution Warnings are used to indicate situations and conditions that can cause operator injury and/or unit damage

### IMPORTANT

**HG1X Series Products are intended to be operator interfaces, to work with PLCs which actually take control actions. It is assumed that the user is well acquainted with the PLC system being used. Never use HG1X units to perform emergency stop applications. It is advised that separate switches be used outside the PLC for ANY emergency stops.**

**Any mechanical or electrical modification to this unit will void all warranties.**

We hope that you find this manual informative. If additional information or technical assistance is needed please contact:



**IDEC Corporation**  
1175 Elko Drive,  
Sunnyvale,  
CA 94089, USA  
Tel - (800) 262-IDEC  
Fax - (800) 635-6246  
Website - [www.idec.com](http://www.idec.com)

### Manual Revisions:

If you contact us in reference to this manual, please include the following revision number

Name: **IDEC-HG1X Series Operation Manual**  
Revision: **QMAN\HG1X\1001\Rev0**

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## Introduction

In this chapter. . . .

- Purpose of this Manual
- Introduction to HG1X
- HG1X Series
  - HG1X-252
  - HG1X-452

### 1.1 Purpose of this Manual

The intention of this Operation Manual is to provide a guide for Safe installation, Configuration and operation of HG1X series models.

***Read this operation manual thoroughly before installing and operating HG1X products.***

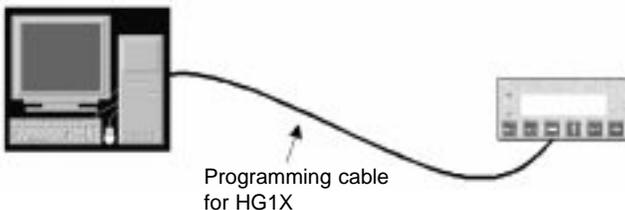
*This document is based on information available at the time of its publication. While efforts have been made to be accurate, the information in this document may not cover all the details or variations in hardware or software. Features described herein may not be present in all hardwares. IDEC CORPORATION reserves the right to update information in this publication without prior notice.*

### 1.2 Introduction to HG1X

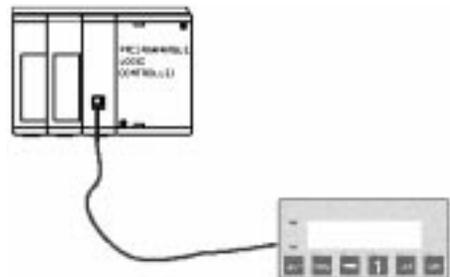
HG1X Series operator interfaces provide man-machine interface to your PLC system. HG1X communicates with your PLC using serial communication. HG1X models take power from PLC on their PLC port.

#### Configuration of HG1X:

Each HG1X has to be configured using the WindMSG Software before connecting it to the PLC.



#### Normal Operation:



Connect HG1X to PLC using the correct PLC-HG1X cable and your HG1X is running.

### 1.3 HG1X Series

Currently models included in the HG1X Series are as follows: HG1X - 252 and HG1X - 452. HG1X Models take power from the PLC. Detailed specifications for all the models is given in the following section.

#### HG1X-252



##### Specifications:

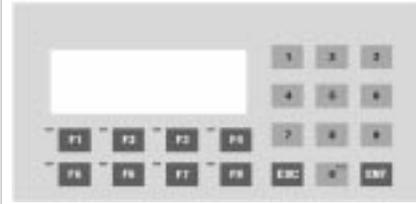
Power:	5 VDC± 5%, 130mA typically from PLC port
Display:	2 lines of 16 characters Backlit LCD
Bezel:	IP65 rated Keypad
Keys:	6 User definable keys with tactile feedback
LEDs:	2 LEDs
Memory:	24K Application Memory
Communication:	Two RS232 ports, one for connecting to the PLC and one for programming / serial printing.
Temperature:	0 to 50 °C
Humidity:	10% to 90% (Non condensing)
Immunity to ESD:	Level 3 as per IEC1000-4-2
Immunity to Transients:	Level 3 as per IEC1000-4-4
Radiated Susceptibility:	Level 3 as per IEC1000-4-3
Emissions:	EN55011 CISPR A

##### System Components:

- HG1X-252 unit with LCD display and Membrane keypad
- Installation Kit: Gasket, Two Mounting clamps, Two M4 screws, Four hex nuts.

Note: User should order PLC cables and Software separately.

#### HG1X-452



##### Specifications:

Power:	5 VDC± 5%, 140mA typically from PLC port
Display:	4 lines of 20 characters Backlit LCD
Bezel:	IP 65 rated Keypad
LEDs:	8 LEDs
Keys:	20 User definable keys with tactile feedback
Memory:	24K Application Memory
Communication:	Two RS232 ports, one for connecting to the PLC and one for programming / serial printing.
Temperature:	0 to 50 °C
Humidity:	10% to 90% (Non condensing)
Immunity to ESD:	Level 3 as per IEC1000-4-2
Immunity to Transients:	Level 3 as per IEC1000-4-4
Radiated Susceptibility:	Level 3 as per IEC1000-4-3
Emissions:	EN55011 CISPR A

##### System Components:

- HG1X-452 unit with LCD display and Membrane keypad
- Insertable Legends
- Installation Kit: Gasket, Two Mounting clamps, Two M4 screws, Four hex nuts.

Note: User should order PLC cables and Software separately.

## Hardware

In This Chapter. . .

- Mounting, Panel Cutouts
- Power Requirements
- Serial Port
- PLC Port

This chapter is installation guide for HG1X Series.

### 2.1 Installation Instructions

HG1X should be mounted on a panel. Gasket, mounting screws and clamps are provided with each HG1X unit for proper mounting.

#### Environmental Considerations:

Make sure that the unit is installed correctly and that the operating limits are followed (see Specifications for HG1X). Do not operate HG1X in areas subject to explosion hazards due to flammable gases, vapors or dusts. HG1X should not be installed where fast temperature variations are present. Highly humid areas are also to be avoided. High humidity causes condensation of water in the unit.

#### Location Considerations

Care should be taken when locating equipments behind the HG1X to ensure that AC power wiring, PLC output modules, contactors, starters, relays and any other source of electrical interference are located away from HG1X. Particular care should be taken to the position of Variable speed drives and switching power supplies.

#### Mounting

HG1X should be mounted on a panel. Dimensional sketch and Panel cutout for each HG1X model is given in section 2.2. Clearance behind the panel may vary with HG1X Model. Follow the procedure given below for proper mounting:

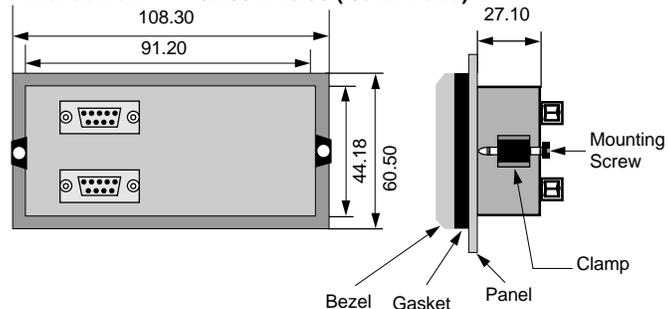
- 1) Make a cutout of the required size. Panel cutout tolerance is  $\pm 0.1\text{mm}$ .
- 2) Put the gasket behind the bezel. The gasket may be sealed to the case using an adhesive.
- 3) Put the HG1X through the panel cutout.
- 4) Insert the clamps into the case.
- 5) Pullback the clips until they seat into the retaining slots.
- 6) Tighten the clamping screws in an even pattern until the HG1X is secured into the panel.

### 2.2 Dimensional Sketches and Panel Cutouts

This section presents the dimensional sketches and panel cutouts for all the HG1X models. **All dimensions are in mm. Not to Scale.**

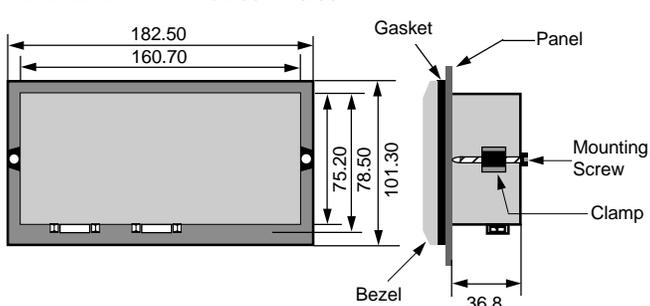
#### HG1X-252

Panel cutout: **92.00 x 45.00 (1/8 DIN size)**



#### HG1X-452

Panel cutout: **162.00 x 79.00**



### 2.3 Power Requirements

HG1X models are DC powered. The specified voltage range is  $+5\text{VDC} \pm 5\%$ . Make sure to check PLC power before connecting cable to HG1X models.

Please follow the instructions given below while making connections for HG1X models:



If wiring is to be exposed to lightning or surges, use appropriate surge suppression devices.

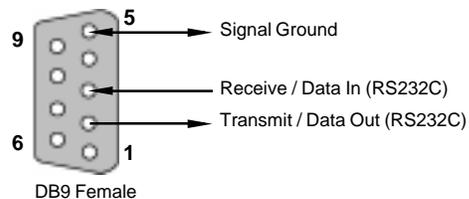


Keep AC, high energy and rapidly switching DC wiring separate from signal wires.

Each HG1X unit has two RS232 ports - a PLC Port and a Serial Port. Description of each is given in following topics.

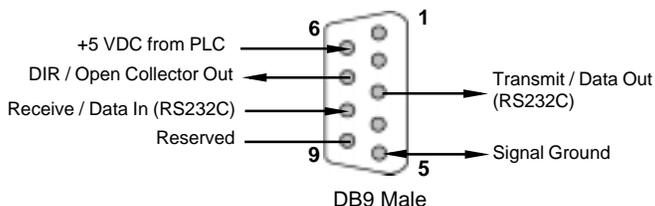
### 2.4 Serial Port

Serial port is used to download the firmware and / or application in to the HG1X unit. HG1X also has serial printout capabilities. This port can be attached to a computer/serial printer using the proper cable. This port is always active. When HG1X is communicating with a PC for programming, PLC operations are suspended. Pin description of the Serial Port as seen on the HG1X unit is given below:



### 2.5 PLC Port

The cable connecting PLC to HG1X is attached to PLC Port. Different cables are required for different PLCs / controllers. Cable details for any particular PLC are given in the Operation Manual for that PLC. Pin description of PLC Port for HG1X models is as given below:



## **Getting Started**

In this chapter....

- Introduction
- Application - Tags, Screens, Keys and Tasks
- PLC communication

### **3.1 Introduction**

HG1X is an Operator Interface for PLCs. It communicates with a PLC over its serial port to get the information required by the operator. Information could be the value of a PLC register or the status of a PLC coil. This information is displayed on the LCD display of HG1X. If required, HG1X can also change the values of PLC registers / coils.

### **3.2 Application - Tags, Screens, Keys and Tasks**

Microsoft Windows® based configuration software, WindMSG, helps user to configure HG1X unit. 'Configuration' means making the HG1X unit work as per the system requirements, Eg. HG1X can be configured to be used with any PLC, display any register data, perform any action using a key. The complete configuration for a unit is termed as 'Application'. Application comprises of Tag Data base, Screens, Key Definitions, Alarms and Tasks.

Each register in the PLC memory has a unique address and can be identified by giving a specific name to it. This information is stored as Tag Data Base in HG1X. Any coil or register to be used in the application must be first defined in the Tag data base.

LCD display on each unit displays the PLC data on a 'Screen'. Screen size varies with HG1X model. PLC data can be arranged on a screen using different objects.

Operator can control the process by actually changing the value of PLC registers. This is possible with the help of the keys. Different tasks can be assigned to keys on the HG1X keypad.

Any register can be constantly monitored if alarms are defined for it. When alarm condition is reached, the respective alarm is displayed on the screen.

Once the application is defined, firmware for the specific unit and PLC is downloaded and then application is downloaded into the unit. HG1X can now communicate with a PLC.

### 3.3 PLC communication

HG1X can communicate with any PLC without any change in the hardware. To communicate with a PLC, HG1X needs:

1. Communication Driver for the PLC
  2. HG1X - PLC communication cable
- 
1. Communication Driver for the PLC:  
Each PLC has a defined protocol for communicating with any device. Communication Driver is downloaded in to HG1X along with the firmware. Communication driver varies from PLC to PLC. This driver enables HG1X to talk to a PLC.
  2. HG1X - PLC Communication Cable:  
Proper HG1X - PLC cable is required for error free communication with any PLC.

## Understanding HG1X Features

In this Chapter...

- ▣ Screens
  - Properties of Screen
  - Screen Objects
  - Animation Properties
  - Alpha-Numeric Objects
- ▣ Keys
  - Double Key Tasks
  - Tasks
- ▣ Alarms
  - Consecutive
  - Discrete
- ▣ Application Task-List

This chapter explains in detail all the features of HG1X. We recommend that you study this chapter before attempting to configure and use the HG1X.

### 4.1 Screens

Operator can view required information on the LCD display of HG1X unit. This information can be arranged in such a way that the operator can very easily interpret the information received. This can be done by using various tools. These tools are the objects. Each screen has some properties:

#### Properties of Screen:

##### 1. Password:

Access levels can be achieved by introducing a password for a screen. Password value can vary between 0 - 9999. Unless user enters the correct password, the screen will not be displayed. Any screen can be password protected.

##### 2. Associated Screens:

Associated screen can be specially useful in cases where one or more objects are common between different screens. The common part is extracted from all the screens, placed in a new screen and this new screen is associated with the other screens. Any screen can be associated to another screen.

Advantages of associated screens:

1. Saves application memory by extracting common part between different screens and forming a new associated screen.
2. Saves time of the application programmer.

*Please note:*

- Only one screen can be associated to any screen.
- No data entry object can be placed in the screen to be associated.

- No PLC tag embedding in the screen to be associated. To embed a PLC tag, In Global Task-List the required PLC tag should be copied to an internal tag. The internal tag should be embedded in the screen to be associated.

### 3. Screen Keys or Local Keys:

HG1X keys have two types of definitions: Global and Local.

1. Global Definitions: Definitions remain same for all the screens. If there is no local definition for a key for the current screen, global definition for the key will be executed.
2. Local Definitions: These definitions can vary with screens. These definitions have priority over Global definitions.

*Please note that for a particular screen, a key can have local and global definitions, local definition has priority over global and the global definition task is not performed in this case.*

Any task can also be performed by pressing two keys simultaneously. The definition can be either local or global. The double keys function can be very useful in HG1X models with less number of keys.

### 4. Screen Task-List

Tasks are operations performed by HG1X when a certain condition is reached. Different tasks can be defined for different screens. Screen Tasks can be assigned for three different conditions:

- Before showing  
These tasks are performed before displaying a particular screen on the display.
- While showing  
Tasks are repeatedly performed while the screen is displayed.
- After Hiding  
Tasks are performed after another screen is called and before displaying a new screen.

*Example: Suppose Screen 1 is currently on the display simultaneously performing 'while showing' task. Now PLC Tag calls for Screen 2. Both the screens have all three types of tasks: Before showing task, While showing task, After hiding task. Tasks will be performed in following sequence:*

1. After hiding task for screen 1 performed while clearing screen no. 1.
2. Before showing task for screen 2 performed.
3. Screen 2 displayed.
4. While showing task list performed repeatedly.
5. When another screen is called after hiding task performed while clearing screen 2.

### Types of ScreenTasks:

1. Goto Screen
2. Goto Next Screen
3. Goto Previous Screen
4. Write Value to a Tag
5. Add a Constant Value to Tag
6. Subtract a Constant Value from Tag
7. Add Tag B to Tag A
8. Subtract Tag B from Tag A
9. Turn Bit On
10. Turn Bit Off
11. Copy Tag B to Tag A
12. Swap Tag A and Tag B
13. Print Data
14. Copy Tag to STR\*
15. Copy Tag to LED
16. Delay
17. Wait till

\* STR: Screen Triggering Register

### 1. Goto Screen:

Current Screen is replaced by the defined screen. This command does not work when a PLC register is used as STR. More information given in Application Task-List Section.

### 2. Goto Next Screen:

This task is useful when two screens are in succession. Screen is changed to display the next screen. *If two screens are not successive, there is a gap between two screens then 'Screen not defined' message will be displayed. This message will stay on the screen till a valid screen is called.* This task does not work when a PLC tag is used as a STR.

### 3. Goto Previous Screen:

This task is useful when two screens are in succession. Screen is changed to display the previous screen. *If two screens are not successive, there is a gap between two screens then 'Screen not defined' message will be displayed. This message will stay on the screen till a valid screen is called.* Again this task does not work when a PLC tag is used as a STR.

### 4. Write Value to a Tag:

A constant value can be downloaded to a tag using this task, provided the tag is not a read-only tag.

### 5. Add a Constant Value to Tag:

A constant can be added to the current value of a tag using this task.

### 6. Subtract a Constant Value from Tag:

This task is used to subtract a constant value from the current value of a tag.

### 7. Add Tag B to Tag A:\*

Tag B can be added to tag A using this task. The result will be stored in tag A.

### 8. Subtract Tag B from Tag A:\*

Tag B is subtracted from tag A using this task. The result will be stored in tag A.

### 9. Turn Bit On:

Any coil or bit can be turned on using this task. The bit/coil should be a read-write coil.

### 10. Turn Bit Off:

Any coil or bit can be turned off using this task. The bit/coil should be a read-write coil.

### 11. Copy Tag B to Tag A:\*

Tag B can be copied to tag A using this task. The value of tag B will be unchanged. Tag A will be same as tag B.

### 12. Swap Tag A and Tag B:\*

Values of two tags can be swapped using this task. Tag A value will be copied to tag B and tag B value will be copied to tag A.

### 13. Print Data:

All the text data will be printed on the serial port. Communication settings will be same as defined in 'Prizm Settings' 'Printer Port Options' window. Graphical objects will not be printed.

### 14. Copy Tag to STR:

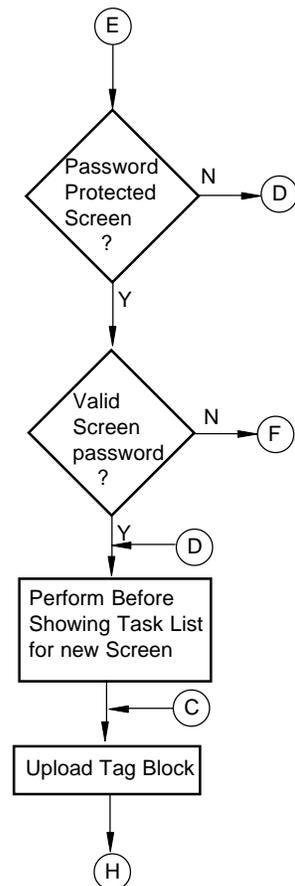
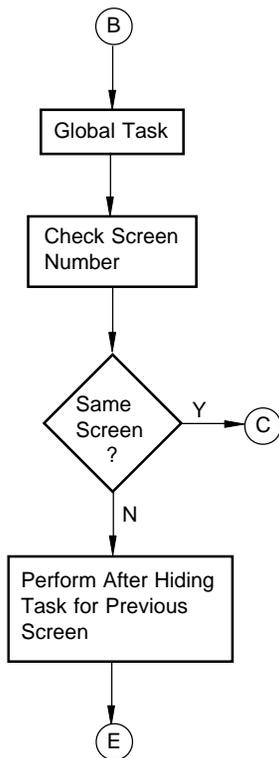
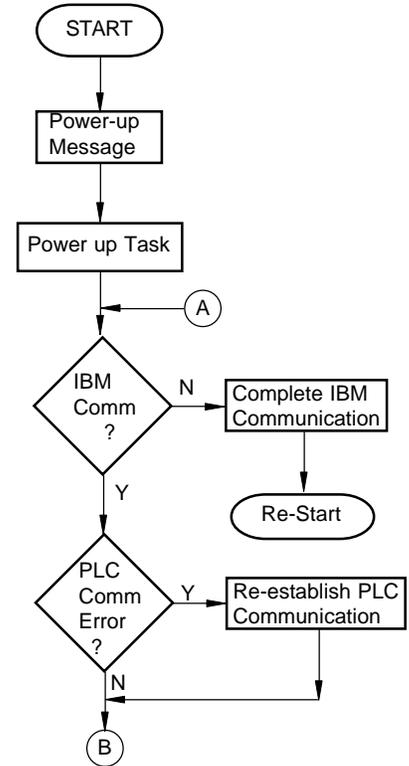
A PLC tag can be copied to STR, Screen Triggerring Register. STR is a system register inside Prizm which decides the screen to be displayed.

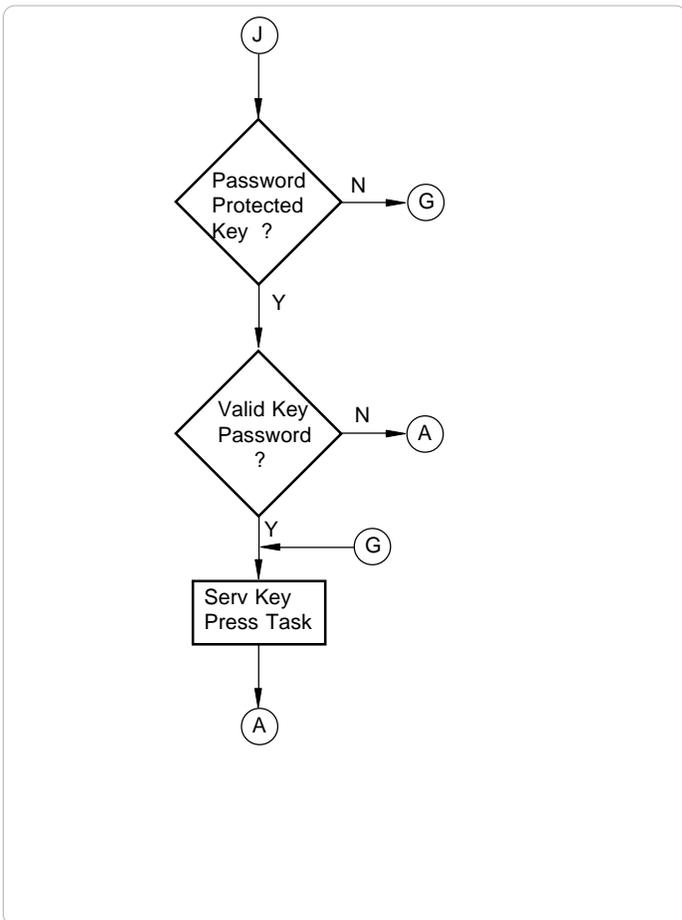
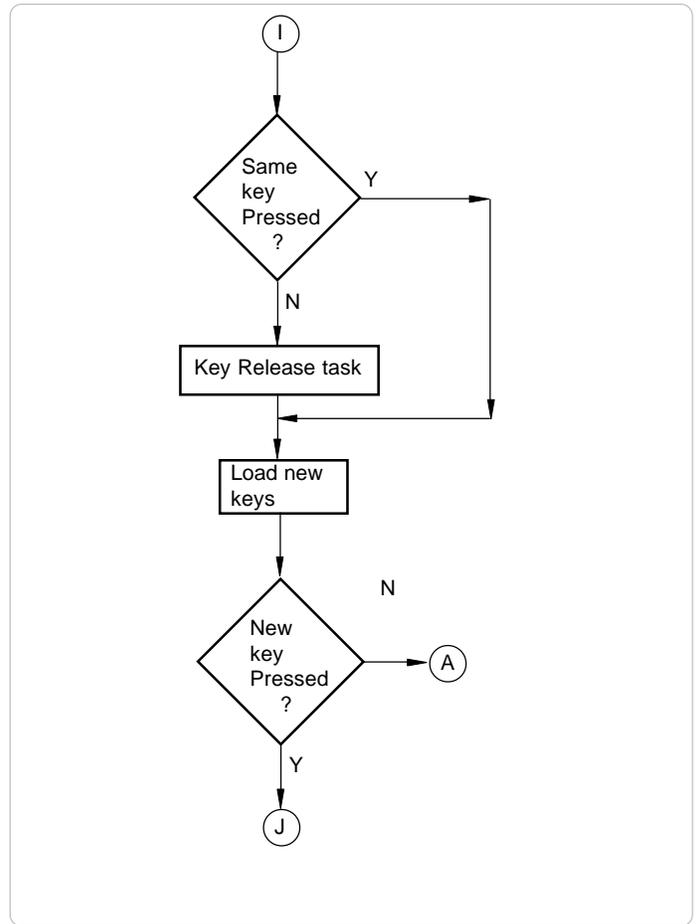
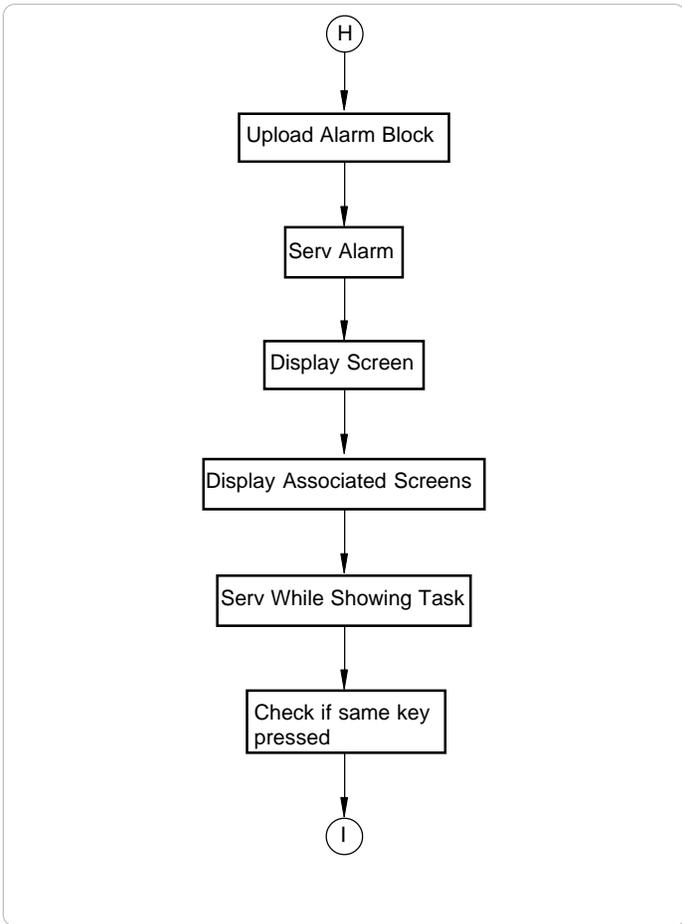
15. Copy Tag to LED:  
LED's on the keypad of each HG1X can be turned on/off depending on the value of a tag. The tag should be copied to LED register and the LEDs will display the tag value.
16. Delay:  
Any task can be delayed using this task. Tags will be updated during this delay.. After the delay is completed the next task will be performed.
17. Wait till:  
This is a conditional delay. Next task will not be performed till the specified condition is false.

*\* While defining double Tag operations, make sure both the tags have same number of bytes. Else the task may lead to erroneous results.*

#### How HG1X works?

All the HG1X models follow a particular sequence for performing the tasks defined by the user in the application. The sequence is as shown below:





Animation Properties:

All the objects (except Register / Coil Data Entry Objects) have Animation Properties. Animation Property is a conditional property of an object which changes with the value of the Tag associated with it. Animation properties are of three types: Show / Hide, Flashing and Percent filling.

1. Show / Hide Animation: Object is displayed only when the condition specified by the user is true.
2. Flashing Animation: An object is flashed when the condition becomes true.

Screen Objects have certain properties, referred as 'Attributes'. Attributes are useful for suggesting the importance of the particular text object. Attributes for are:

- Flash

User can assign flashing to any text object\*. An object can flash at three different speeds: Slow, Medium and Fast. By default no object is assigned flashing attribute. If flashing is defined, slow flashing is selected by default. \* *Data Entry objects (Coil and Register) do not have flash attribute.*

Screen Objects can be further divided into:

1. Plain Text
2. Coil Data Entry
3. Register Data Entry
4. Display Coil Data
5. Display Register Data
6. Register Text
7. Error
8. Alarms
9. Bargraph

1. Plain Text:

Plain text object is useful for displaying any message for the operator. Plain Text Objects do not depend on the PLC. Even if the PLC is not connected, this object will be displayed.

2. Data Entry Objects:

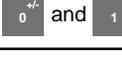
Any register or coil from the PLC Memory, except Read-only registers and coils, can be edited using the HG1X keypad.

Coil Data Entry:

Procedure to a edit coil is as follows:

1. Press a key with definition 'Accept Data Entry' to initiate data entry mode. Data entry mode is indicated by flashing the complete data entry object.
2. Use keys with definition 'Increase Digit by 1' or Numeric keys '0' and '1' to edit data.
3. Press key with definition 'Accept Data Entry' to accept the data entered. When a new application is created each key is assigned a default definition by the software. Default keys required for coil data entry are as shown in Table 4.1.

Table 4.1

Model	Initiate Data Entry	Edit Keys	Accept Data Entry
HG1X-252			
HG1X-452			

Register Data Entry:

Procedure to a edit register is as follows:

1. Press key with definition 'Accept Data Entry' to initiate data entry mode. Data entry mode is indicated by flashing the last digit of the register. Key with definition 'Clear Data Entry' clears the data. Key with definition 'Cancel Data Entry' cancels the data entered and exits data entry mode.
2. For models with numeric keypad, press key with definition 'Sign (+/-) and 0' to enter negative sign. Sign will be automatically adjusted for the other models. For models without numeric keypad, use keys with definition 'Increase Digit by 1' and 'Shift Value to Left' else use Numeric keys '0' through '9' to edit register data.
3. Press key with definition 'Accept Data Entry' to accept the data entered. When a new application is created each key is assigned a default definition by the software. Default register data entry keys are as shown in Table 4.2.

Table 4.2

Model	Initiate Data Entry	Edit Keys	Accept Data Entry
HG1X-252		  	
HG1X-452		  through 	

4. Display Bit Text:

This object displays text depending on the bit status. Bit on and Bit off text is defined by the user while writing the application.

5. Display Register Value:

This object displays the value of a register.

6. Display Register Text:

This object displays text depending value of a register. Text is defined by the user while writing the application.

7. Error Field:

This object displays type of error occurred during PLC communication.

8. Alarms:

This object displays the alarm text when the alarm occurs. First triggered alarm is on top. Alarm condition for alarm should be cleared. Each alarm has to be acknowledged. 'Acknowledge Alarm' key acknowledges the alarm. The alarm text is cleared when the alarm condition is cleared and the alarm is acknowledged.

9. Bargraph:

Bargraphs are PLC register dependent objects which change their bar height / width according to the PLC register. Bargraph does not have flash attribute but can be assigned 'Show-Hide' and 'Flash' animation.

## 4.2 Keys

Keys are needed whenever the operator has to modify some PLC data, acknowledge an alarm or take a control action. HG1X keypad has the ability to perform the above mentioned as well as many more tasks. User can define the task to be performed by each key. Key Tasks are divided into following types depending upon the type of key closure:

- Key Press Tasks  
These tasks are performed at the instance of key closure.
- Key Pressed Tasks  
These tasks are performed while a key is pressed and held down.
- Key Release Tasks  
These tasks are performed when a key is released.

Types of Tasks:

1. Goto Screen
2. Goto Next Screen
3. Goto Previous Screen
4. Write Value to a Tag
5. Add a Constant Value to Tag
6. Subtract a Constant Value from Tag
7. Add Tag B to Tag A
8. Subtract Tag B from Tag A
9. Turn Bit On
10. Turn Bit Off
11. Toggle Bit
12. Copy Tag B to Tag A
13. Swap Tag A and Tag B
14. Print Data
15. Copy Tag to STR
16. Copy Tag to LED
17. Delay
18. Wait till
19. Key Specific Tasks

1. Goto Screen:  
Current Screen is replaced by the defined screen. This command does not work when a PLC register is used as STR. More information given in Application Task-List Section.
2. Goto Next Screen:  
This task is useful when two screens are in succession. Screen is changed to display the next screen. *If two screens are not successive, there is a gap between two screens then 'Screen not defined' message will be displayed. This message will stay on the screen till a valid screen is called.* This task does not work when a PLC tag is used as a STR.
3. Goto Previous Screen:  
This task is useful when two screens are in succession. Screen is changed to display the previous screen. *If two screens are not successive, there is a gap between two screens then 'Screen not defined' message will be displayed. This message will stay on the screen till a valid screen is called.* This task does not work when a PLC tag is used as a STR.
4. Write Value to a Tag:  
A constant value can be downloaded to a tag using this task, provided the tag is not a read-only tag.
5. Add a Constant Value to Tag:  
A constant can be added to the current value of a tag using this task.
6. Subtract a Constant Value from Tag:  
This task is used to subtract a constant value from the current value of a tag.
7. Add Tag B to Tag A:.\*  
Tag B can be added to tag A using this task. The result will be stored in tag A.

8. Subtract Tag B from Tag A:.\*  
Tag B is subtracted from tag A using this task. The result will be stored in tag A.
9. Turn Bit On:  
Any coil or bit can be turned on using this task. The bit/coil should be a read-write coil.
10. Turn Bit Off:  
Any coil or bit can be turned off using this task. The bit/coil should be a read-write coil.
11. Toggle Bit:  
Any bit can be toggled using this task. The bit / coil will be toggled each time the key is pressed.
12. Copy Tag B to Tag A:.\*  
Tag B can be copied to tag A using this task. The value of tag B will be unchanged. Tag A will be same as tag B.
13. Swap Tag B to Tag A:.\*  
Tag A and Tag B values can be swapped using this task.
14. Print Data:  
Text data on the particular screen will be printed.
15. Copy Tag to STR:  
Any specified task will be copied to STR. This STR decides the screen to be displayed.
16. Copy Tag to LED:  
LEDs of the HG1X can be used to reflect the value of a tag. The tag should be copied to LED register for such functionality.

17. Delay:  
An unconditional delay can be added to the task list. All the tasks after this task are delayed by the specified time.
18. Wait till:  
All the tasks after this task are not performed till the condition specified by this task does not become true.
19. Keys Specific Tasks:  
Apart from the above mentioned tasks each key can be assigned a task which can be common to all the tags. Types of key specific tasks:
  1. Clear Data Entry  
Clears Data after data entry is initiated.
  2. Cancel Data Entry  
Cancels the data entered and restores previous data.
  3. Accept Data Entry  
Initiates data entry and accepts data entered.
  4. Switch to next Data Entry  
Next data entry is selected.
  5. Increase Value by 1  
Value of a tag is increased by 1.
  6. Decrease Value by 1  
Value of a tag is decreased by 1.
  7. Increase Digit by 1  
Value of a single digit of a tag is increased by 1.
  8. Decrease Digit by 1  
Value of a single digit of a tag is decreased by 1.
  9. Shift Value to Left  
Value is shifted to left.
  10. Move Cursor to Left  
Cursor is moved to left to edit next digit.
  11. Move Cursor to Right  
Cursor is moved to right to edit next digit.

12. Sign Key (+/-)  
Used for signed data entry.
13. Sign Key (+/-) and 0  
Single key used as a sign key as well as numeric key 0. If this key is pressed immediately after data entry is initiated, key is taken as sign key else it is taken as '0' key.
14. Numeric Key 0  
Enters a '0' after data entry is initiated.
15. Numeric Key 1  
Enters a '1' after data entry is initiated.
16. Numeric Key 2  
Enters a '2' after data entry is initiated.
17. Numeric Key 3  
Enters a '3' after data entry is initiated.
18. Numeric Key 4  
Enters a '4' after data entry is initiated.
19. Numeric Key 5  
Enters a '5' after data entry is initiated.
20. Numeric Key 6  
Enters a '6' after data entry is initiated.
21. Numeric Key 7  
Enters a '7' after data entry is initiated.
22. Numeric Key 8  
Enters a '8' after data entry is initiated.
23. Numeric Key 9  
Enters a '9' after data entry is initiated.
24. Numeric Key A  
Enters a 'A' after data entry is initiated.
25. Numeric Key B  
Enters a 'B' after data entry is initiated.
26. Numeric Key C  
Enters a 'C' after data entry is initiated.
27. Numeric Key D  
Enters a 'D' after data entry is initiated.

28. Numeric Key E  
Enters a 'E' after data entry is initiated.
29. Numeric Key F  
Enters a 'F' after data entry is initiated.
30. Edit Bit On  
A coil is turned on after data entry is initiated.
31. Edit Bit Off  
A coil is turned off after data entry is initiated.
32. Acknowledge Alarm  
Active alarm is acknowledged using this key.
33. Next Alarm  
Next alarm from the container is displayed.
34. Previous Alarm  
Previous alarm from the container is displayed.

*\* While defining double Tag operations, make sure both the tags have same number of bytes. Else the task may lead to erroneous results.*

#### 4.3 Alarms

Any tag can be continuously monitored by defining alarms for each bit of that tag. To display an alarm on the screen as soon as it is triggered, alarm object has to be placed on the screen. If the value of the particular tag becomes nonzero, alarm is displayed in the alarm object. An alarm is triggered for each bit in a tag. Total 256 alarms can be defined in HG1X. HG1X stores the alarm information in an alarm container. Maximum 64 alarms can be stored in the container. First triggered alarm is on the top of the container. New alarm is added from the bottom. Operator has to acknowledge each alarm by using any key with definition 'Acknowledge Alarm'. When alarm condition is cleared **and** the alarm is acknowledged, the alarm is deleted from the container. Alarm can also be printed on the serial port. Printing is performed as soon as the alarm is triggered.

Two types of alarms can be defined in HG1X:

1. Consecutive Alarms
2. Discrete Alarms

##### 1. Consecutive Alarms:

Consecutive alarms can be useful when user wants to monitor 16 consecutive tags. All the 16 consecutive tags should be defined in the tag database. An alarm can be defined for each bit. HG1X uploads all 16 tags in a single block. When any bit of 16 tags is found to be on ('1') corresponding alarm is triggered. Triggered alarm is displayed in the alarm object. Each alarm has to be acknowledged. User should define a key to acknowledge alarms. User can also scroll through the table of alarms using keys defined as 'Next Alarm' and 'Previous Alarm'. Acknowledged and inactive alarm is deleted from the container. New alarm is added from the bottom of the container.

##### 2. Discrete Alarms:

Discrete alarms can be useful when user wants to monitor tags which are not in a sequence, discrete. An alarm is defined for each bit of tag. When any bit of any tags is found to be on ('1') corresponding alarm is triggered. Triggered alarm is displayed in the alarm object. User should define a key to acknowledge alarms. User can also scroll through the table of alarms using keys defined as 'Next Alarm' and 'Previous Alarm'. Acknowledged and inactive alarm is deleted from the container. New alarm is added from the bottom of the container.

#### 4.4 Application Task-List

Application task-list allows user to define tasks to be performed at **power-on** or while **application** is running i.e. Global Task.

Application task-lists are of two types:

1. Power-on tasks:

Power-on tasks are performed after HG1X unit is powered on. These tasks are like a boot sequence for HG1X which are performed only once. Using these tasks user can initialize some registers, goto a particular screen after power up etc. *Please note that user MUST define 'Goto Screen' Task in Power-On task list.*

2. Global tasks:

Global tasks are performed regularly till the application is in progress. These tasks are useful when the user wants to perform some tasks repeatedly. In case the PLC is not connected then PLC related tasks will not be performed.

The tasks supported are as follows:

1. Goto Screen
2. Goto next screen
3. Goto previous screen
4. Write value to tag
5. Add constant value to tag
6. Subtract constant value from tag
7. Add Tag B to Tag A
8. Subtract Tag B from Tag A
9. Turn bit on
10. Turn bit off
11. Toggle bit
12. Copy Tag B to Tag A
13. Swap Tag A and Tag B
14. Print Data
15. Copy Tag to STR
16. Copy Tag to LED
16. Delay
17. Wait till

1. Goto Screen:

Current Screen is replaced by the defined screen. This command does not work when a PLC register is used as STR. More information given in Application Task-List Section.

2. Goto Next Screen:

This task is useful when two screens are in succession. Screen is changed to display the next screen. *If two screens are not successive, there is a gap between two screens then 'Screen not successive' message will be displayed. This message will stay on the screen till a valid screen is called.* This task does not work when a PLC tag is used as a STR.

3. Goto Previous Screen:

This task is useful when two screens are in succession. Screen is changed to display the previous screen. *If two screens are not successive, there is a gap between two screens then 'Screen not defined' message will be displayed. This message will stay on the screen till a valid screen is called.* This task does not work when a PLC tag is used as a STR.

4. Write Value to a Tag:

A constant value can be downloaded to a tag using this task, provided the tag is not a read-only tag.

5. Add a Constant Value to Tag:

A constant can be added to the current value of a tag using this task.

6. Subtract a Constant Value from Tag:

This task is used to subtract a constant value from the current value of a tag.

7. Add Tag B to Tag A:\*

Tag B can be added to tag A using this task. The result will be stored in tag A.

8. Subtract Tag B from Tag A:\*

Tag B is subtracted from tag A using this task. The result will be stored in tag A.

9. Turn Bit On:

Any coil or bit can be turned on using this task. The bit/coil should be a read-write coil.

10. Turn Bit Off:

Any coil or bit can be turned off using this task. The bit/coil should be a read-write coil.

11. Toggle Bit:

Any bit can be toggled using this task. The bit / coil will be toggled each time the key is pressed.

12. Copy Tag B to Tag A:\*

Tag B can be copied to tag A using this task. The value of tag B will be unchanged. Tag A will be same as tag B.

13. Swap Tag B to Tag A:\*

Tag A and Tag B values can be swapped using this task.

14. Print Data:

Text data on the particular screen will be printed.

15. Copy Tag to STR:

Any specified task will be copied to STR. This STR decides the screen to be displayed.

16. Copy Tag to LED:

LEDs of the HG1X can be used to reflect the value of a tag. The tag should be copied to LED register for such functionality.

17. Delay:

An unconditional delay can be added to the task list. All the tasks after this task are delayed by the specified time.

18. Wait till:

All the tasks after this task are not performed till the condition specified by this task does not become true.

*\* While defining double Tag operations, make sure both the tags have same number of bytes. Else the task may lead to erroneous results.*

## Configuration Software

In this Chapter...

- Introduction to HG1X Software
- Installing HG1X Software
- HG1X Software - Basics
- Create a new Application
- Setup Node
- Create Tag Data Base
- Create Screens
- Define Keys
- Define Alarms
- Application Task List
- Download Application

### 5.1 Introduction

WindMSG is Windows based software to configure the HG1X Series Interfaces by IDEC Corporation. WindMSG's tools and easy approach can help you create your applications quickly and easily. By using some of WindMSG's new features, you can be more effective in what you need. Whether you need a small application to monitor data or a bigger application for both monitoring and changing data in your PLC, WindMSG has it all. With WindMSG you can get started quickly to use your HG1X Interfaces.

Developing your applications for any HG1X Series is easy using WindMSG. The common functionality found among many Windows applications can also be found here and will allow you to quickly adapt to WindMSG. Once you are familiar with the many visual clues in WindMSG, creating an application will be a breeze. The idea behind designing WindMSG and the HG1X is to allow you to get where you want to... FAST!

You can use WindMSG to configure any HG1X model, to work with ANY of the drivers supported. WindMSG currently supports over 25 PLCs and the following list of HG1X Models:

HG1X Series HG1X-252, HG1X-452

HG1X communicates with a PLC only after downloading correct driver and application into the unit. HG1X user should follow the given procedure to configure and use HG1X:

1. Create an application for required PLC.
2. Connect IBM cable.
3. Download Firmware i.e. driver for the PLC. HG1X models cannot communicate with PLC till the required driver is downloaded.
4. Download application.
5. Now connect the PLC to the unit using PLC cable.

### 5.2 Installing WindMSG Software

System requirements for installing WindMSG on your PC:

Windows Version	: Microsoft Windows 95 or higher
Processor	: PENTIUM or higher
Hard disk Space	: 5 MB or more
Serial Mouse	: Required
RAM	: 16 MB or more
Display resolution	: 640 x 480 (VGA) or better
Display colors	: 16 colors or more

To install WindMSG software:

1. Open Microsoft Windows. The Start program task button is located at the bottom left portion of your screen.
2. Place the installation CD into your PC's CD drive.
3. Select Run, and a pop-up window appears. Type the path and file name for installing setup (D:\SETUP.EXE). Press OK. Follow the instructions given in the setup software.

### 5.3 WindMSG Software

HG1X unit has to be configured before its use in any system. Complete configuration consists of defining:

- HG1X Settings
- PLC node
- Tag Database
- Screens and / or Screens Task-List.
- Keys
- Alarms
- Global and Power-on Task list

The complete configuration is stored as an Application. This application is downloaded in HG1X.

#### 1. HG1X Settings:

HG1X Settings define following properties of HG1X:

##### a. Hardware Settings

- Application Memory  
*Use this if only you have purchased a nonstandard unit with a different memory option.*

##### b. Keypad options

- Keypad Queue Size  
If task for a key is in progress and another key is pressed, then the second key (latest pressed) is stored in a Key Queue. User can change the queue size using this option.
- Queue full options  
User has a choice to select what should be done if the queue is full and another key is pressed. Either the first or the last key pressed can be ignored.

#### 4. Screens:

Operator views the PLC data on the screen of the HG1X models. Tasks can be defined for a screen. Also, the action for keys when a screen is acting can be defined.

#### 5. HG1X Global Key's Task-List:

All the keys on the HG1X models can have user selectable definitions. Three types of tasks can be defined for each key: 'Press' Task, 'Pressed' Task, 'Released' Task. Two keys can also be defined for performing Tasks. Each key single or double can have password.

#### 6. HG1X Alarms:

Alarms can be defined in the Alarms Window. Alarms are defined on a single bit of any one word tag. All the tags must be defined before defining the Alarms. Alarms can be set on two types of Tags: Consecutive and Discrete. In consecutive type, HG1X will fetch 16 words from the PLC beginning with the defined tag. Each bit in each of these 16 words will be an alarm bit. In discrete type tags need not be consecutive. Again, in this type each bit of each tag is an alarm bit.

#### 7. HG1X Application Task-List

Application Task List is of two types: Power-on Task-List and Global Task-List. Power-On Task-List is performed only once after the unit is powered on. Global Task-List is performed till the unit and PLC are communicating.

#### c. Printer Port Options

HG1X has a Serial Printout Facility. User should connect Serial Printer cable to the Serial Port of the HG1X. Communication parameters for serial printing can be changed using this option. *Please note that this does not affect PC to unit communication while downloading firmware or application.*

- Baud Rate  
Baud Rates available are 300, 600, 1200, 2400, 9600, 19200.
- Number Of Bits  
Data bits can either be 7 or 8.
- Parity  
Parity options are Odd, Even, None.
- Number of Columns  
User can select the column size i.e. length of a line to be printed. After the specified number of characters, HG1X sends a terminating character.
- Terminating Character  
Options for terminating character are None, CR, LF, CR+LF.

#### 2. HG1X Network Configuration:

This setting selects the PLC Model, PLC type, Node number in a system. User can also connect multiple PLCs of the same type (protocol) to a single HG1X. Each PLC must have unique identification number which is termed as NODE ID.

#### 3. HG1X Tags:

Each register in the PLC memory has a unique address and can be identified by giving a specific name to it. This information is stored as Tag Data Base in WindMSG. Any coil or register to be used in the application must be first defined in the Tag data base.

#### 4. Screens:

Operator views the PLC data on the screen of the HG1X models. Tasks can be defined for a screen. Also, the action for keys when a screen is acting can be defined.

#### 5. HG1X Global Key's Task-List:

All the keys on the HG1X models can have user selectable definitions. Three types of tasks can be defined for each key: 'Press' Task, 'Pressed' Task, 'Released' Task. Two keys can also be defined for performing Tasks. Each key single or double can have password.

#### 6. HG1X Alarms:

Alarms can be defined in the Alarms Window. Alarms are defined on a single bit of any one word tag. All the tags must be defined before defining the Alarms. Alarms can be set on two types of Tags: Consecutive and Discrete. In consecutive type, HG1X will fetch 16 words from the PLC beginning with the defined tag. Each bit in each of these 16 words will be an alarm bit. In discrete type tags need not be consecutive. Again, in this type each bit of each tag is an alarm bit.

#### 7. HG1X Application Task-List

Application Task List is of two types: Power-on Task-List and Global Task-List. Power-On Task-List is performed only once after the unit is powered on. Global Task-List is performed till the unit and PLC are communicating.

Run WindMSG.exe. Following splash screen will be displayed.



Main window will be displayed after the splash screen. Main window consists of two main parts: Menu Bar and the Tool Station.

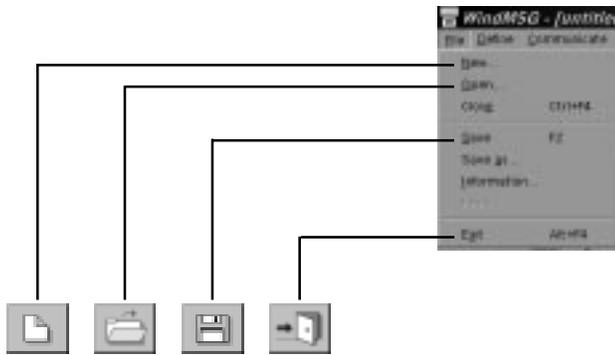
Menu bar operates in the normal manner. Click with mouse or use keys in combination with ALT key just like any other standard Windows based software.

Tool-Station consists of icons. When mouse points to any icon, a tool-tip is displayed. Click on the icon to select the particular menu.



## File Menu

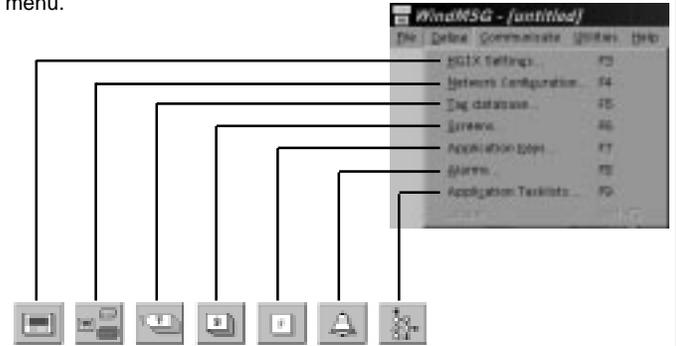
File Menu handles the file related functions.



- New** - Creates a new application.
- Open** - Opens a saved application.
- Close** - Closes currently open application.
- Save** - Saves currently open application.
- Save as** - Saves the current application with a different name.
- Information** - Application related information can be stored here. User can enter his comments here.
- Exit** - Exits WindMSG Software.

## Define Menu

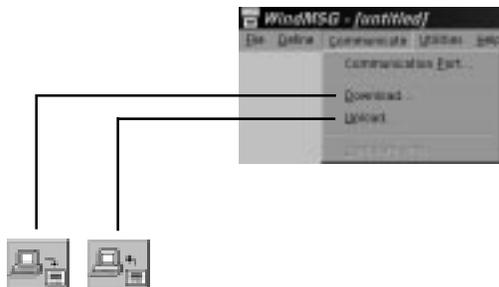
This menu actually defines the application. In the main window of WindMSG software, bottom line of the icons is dedicated for this menu.



- HG1X Settings** - Defines HG1X settings. *User should change HG1X Settings only if he has bought a nonstandard unit.*
- Network Configuration** - Defines PLC node, node ID etc.
- Tag DataBase** - Defines tag to be used in the application.
- Screens** - Defines screens.
- Application Keys** - Defines application keys.
- Alarms** - Defines alarms in the application.
- Application Task-List** - Defines Power-on and Global Task-list.

## Communicate Menu

Communicate Menu Downloads / uploads application to / from HG1X.



- Communication Port** - Sets COM port for communicating with HG1X.
- Download** - Downloads Application to HG1X.
- Upload** - Uploads Application from HG1X.

## Utilities Menu

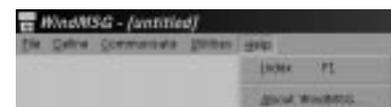
Utilities Menu is basically useful for adding / removing PLCs. It also informs the user about the memory used for the application.



- Add or Remove PLCs** - Adds / removes PLCs to / from the Selected PLCs list.
- WindMSG Memory Configuration** - Displays statistics of the Memory used by the current application.

## Help Menu

Help Menu, as the name suggests, offers help for the user.



- Index** - Lists all the Help topics
- About WindMSG** - Displays the software version number.

## 5.4 Creating new Application

1. Select **New** from **File** menu or click on the **New Application** button.



OR



2. In the dialog presented, select the HG1X Model and press **OK**.



3. Select **HG1X Settings** from **Define** menu or Press **F3** key or click on the **HG1X Settings** button.



OR

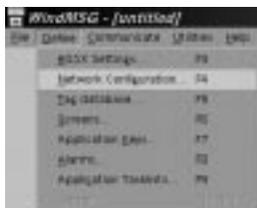


4. In HG1X Settings dialog box, select Application memory, Key Queue Size, Serial printout options. Press **OK** to accept the selections made.



## 5.5 Setup Network / Node

1. Select **Network Configuration** from **Define** menu or Press **F4** key or click on the **Network Configuration** button.



OR



2. In Network Configuration dialog box, Press **Add a Node** button. Now select PLC and PLC Model. Assign a Node Address for the node Press **OK** to accept the selections made. If another node has to be added repeat above steps else press **Close**



## 5.6 Create Tag Database

1. Select **Tag Database..** from **Define** menu or Press **F5** key or click on the **Tags** button.



OR



2. In Tags dialog box select the Node, Tag type, Register, enter Tag name and finally select number of bytes for the Tag. Press **Add** to accept the Tag. After adding all the tags press **Close** button.



## 5.7 Create Screens

1. Select **Screens..** from **Define** menu or Press **F6** key or click on the **Screens** button.



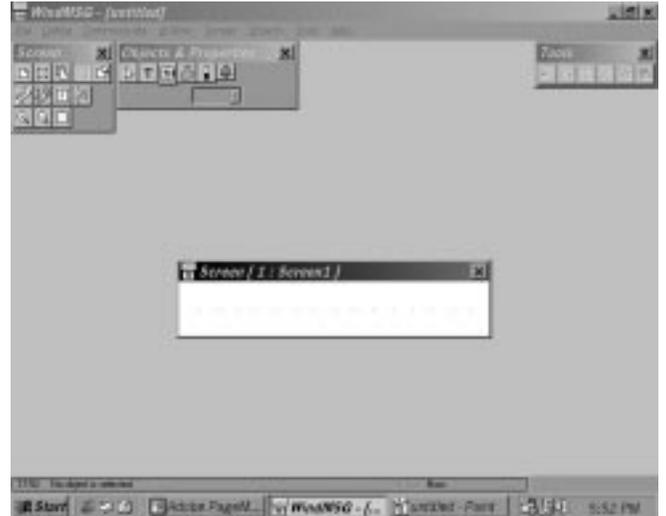
OR



2. In **New Screen** dialog box, enter the Screen number, Screen Name, Password, Screen Name and Screen description information is for programmers reference only. This information is NOT displayed anywhere on the actual HG1X Screen. Associated Screen option is available only when some screens have already been defined. Click **OK** to enter the **Screen Editor**.

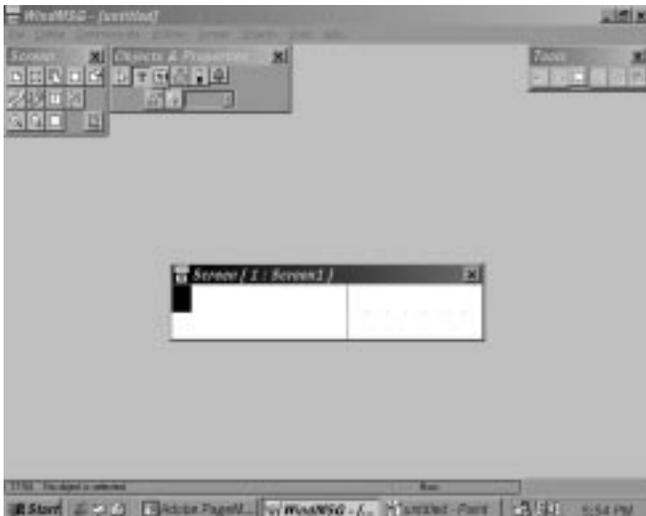


3. In the **Screen Editor** user can define Screen Objects, Screen Keys and Screen Task-List . To place an object click on the respective button in **Objects** window. Pointer will take the shape of the object. Click the mouse at the required location on the screen to place the object. All the tag dependent objects will allow user to access the Tag data base from their dialog box. Clicking on the **Selector** button or another object button deselects the object selected. Standard Windows operations like Copy,Cut, Paste Objects, Redo, Undo are available in **Tools** window. Screens can also be duplicated using the duplicate button. To exit from the **Screen Editor**, click on the **Close** button of **Screen** Window. In the following points Screen is explained in detail.



4. How to define Text Object:

Click on the **Text** button  . The shape of the mouse pointer will change. Now place the mouse pointer at desired location and mark the area of text object while holding the left mouse button. A block cursor will blink at the location inside the text outline. Now enter text. Last character will be overwritten If INSERT Mode (Computer Keyboard) is disabled, else new character will not be accepted.



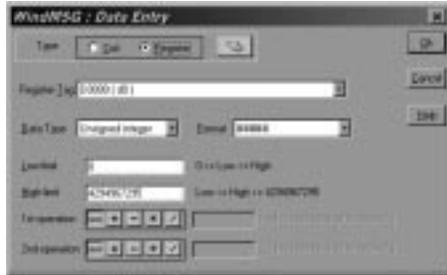
5. How to define Coil Data Entry object:

Click on the **Data Entry** button  . The mouse pointer will change to the tool shape. Now place the mouse pointer at desired location and click the left mouse button. The data entry dialog box will appear. This box will allow user to select between Coil and Register Data entry. If Coil data entry is selected fields to be completed are Coil Tag and on / off text.



6. How to define Register Data Entry Object:

To edit a register in the PLC, select **Register Data Entry** in the Data entry dialog box. Register Data Entry dialog box allows user to select the tag, Data type, data format, low limit, high limit, Math -1st and 2nd operation. In tag selection window, there is the list of Tags available data can be written. You can select the one you want from the list. The list will NOT display any read only registers which can not be modified. Data entered can be limited by assigning Low and High limit for the data entry. Data can be entered in various types viz., Unsigned Integer, Signed Integer, Hexadecimal, BCD, Binary (1 word), Float. Data format can also be selected by the user. Low and High limits restrict the data that can be entered in the register. Two mathematical calculations can be performed on the data be entered.



7. How to define Display HG1X / PLC Data object:

This object can be used to view HG1X / PLC data. To place an  embedding object click on 'Display HG1X / PLC Data' Tool. In the dialog box user can select either **Bit Text** or **Register Value** or **Register Text**. **Bit Text** displays text depending on the state of coil or bit. **Register Value** displays the actual value of the register. **Register Text** displays text depending on the value of a register. To add **Bit Text** object, select **Bit Text** in the **Display HG1X or PLC Data** dialog box. In the window, user can enter text to be displayed depending on the state of the Coil.



To display a register value, select **Register Value** type in **Display HG1X or PLC Data** window. The window will now change to display Register options. Select the register to be displayed. Select the **Data type** and **Format** to display the register. **Leading Zero Blank** option decides whether zeros preceding the value will be displayed or not. If this option is enabled then register value will be displayed without Leading Zeros.



**Register Text Object** is value dependent text object. User can define different text strings for different limits of register values. When the limit is crossed the text changes. First select the register from the **Tags** list. Now enter low limit, high limit and text for that range. Click **Accept** button to accept the entered data. Now click **Add** to enter new limits and corresponding text.



10. How to define Bargraph object:

Bargraph is a graphical representation of the value of any register. Bargraph is available in all the HG1X models. User can also view the bargraph of a particular range of register value. To place a bargraph click on the Bargraph button .



Bargraph can be drawn for a specific range of the register value. The maximum range is 0 to 65535.

11. How to define **Alarm** object:

Alarm object displays alarm immediately after any alarm is triggered. Alarm text is defined in the **Alarms** dialog box. To place an Alarm object, click on the **Alarms** button . Alarms object can be edited by double clicking on the object placed on the screen. **Alarms Dialog box** will enable user to select the fields to be displayed in an **Alarms** object. Sequence and length of each field can also be varied.



14. To assign **Flash** or **Scroll Animation** to any object, select the object with the mouse. Place the mouse on the selected object and click with the right mouse button. From the menu box presented select **Animation Properties** option.



15. In the **Animation Properties** dialog box select the appropriate animation. Only Basic Graphical objects can have Percent filling animation.



5.8 Define Keys

1. To define Global Keys click on **Application Keys** from **Define** menu or press F7 or click on Global Keys Button.



OR



2. In **Global Keys' Task-Lists** dialog box, user can assign tasks to keys by assigning password. All the keys on the HG1X keypad are redefinable. Most of HG1X models have default definitions to keys. *Please note Data Entry objects may not function properly if the required tasks are not assigned to keys.* Tasks can also be assigned to two keys. The task will be performed only when the two keys are pressed simultaneously. Click on **Close** button to close **Global Keys' Task-Lists** dialog box.



5.9 Define Alarms

1. Click on **Alarms** from **Define** menu or press F8 or click on Alarms Button to define Alarms.



OR



2. In **Alarms** dialog box click either **Consecutive** or **Discrete**. For **Consecutive** type select the first tag. Click **Add** to define alarms. Select group of alarms. Enter alarm number and alarm text. Click relevant options for the particular alarm. Click **Accept** to accept the alarm.



### 5.10 Application Task-List

1. Click on **Application Task-List** from **Define** menu or press F9 or click Application Task-List Button to define Application Task-List.



OR



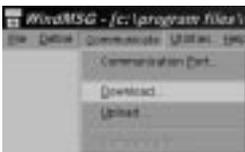
2. In **Application Task-List** user can define global and power-on tasks. Power-on task-List is like a boot sequence for HG1X. User must direct HG1X to display a particular screen in Power-on Task-List. Global task-list depends on the system requirements. User can either use keys to switch between screens or use a PLC tag to trigger different screens.



2. Select the appropriate COM port and click **OK** to set the COM port.



3. Click on **Download..** from **Communicate** menu to download application into the HG1X unit.



OR



4. In **Download** dialog box click on **Application**. Click **OK**.



5. After Application Download is successfully completed, click on **Close** to exit Download dialog box.

### 5.11 Save Application

1. To save the application, click on **Save** from **File** menu or press F2.



OR

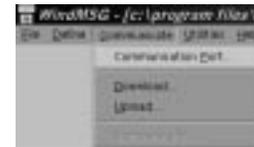


2. Default location to save application is ..\WindMSG\Result\ directory. Extension should be \*.PZM.



### 5.12 Download Application to HG1X

1. Click on **Communication Port** from **Communicate** menu to set the COM port.



## How Do I?

In this Chapter...

□ Frequently asked questions

### 6.1 Frequently asked questions

This chapter answers the questions user normally asks.

#### 1. How can I read PLC data?

To read any PLC data, the required tag should be defined in the **Tag Database**. In a screen the tag should be embedded in the required format.

#### 2. Can I edit PLC data? How?

Any PLC register / coil can be edited except for 'Read only' registers / coils. Generally System registers and Input coils are 'Read only'. 'Read only' registers / coils vary from PLC to PLC. Please refer to PLC manual for details. To edit any PLC data define the tag in Tag Database. Place a 'Data Entry' object in a screen. Make sure to define the required keys. Register and Coil data entry key definitions are given in Table 4.1 and Table 4.2.

#### 3. Can I keep a record of the Process data?

HG1X models can send screen data (Alphanumeric data only) on its serial port. This output can be given to a serial printer and a record of events can be achieved. A screen with 'Print Data' task can print all the alphanumeric objects.

#### 4. Can I change screens using PLC logic?

Any PLC tag can be copied to STR, a system register internal to HG1X, and HG1X will display the corresponding screen. User must define the task 'Copy tag to STR' in Global Application Task-List. Make sure to define screens to all the possible values of the tag to avoid 'Screen not defined' message. Please note that the 'Goto screen', 'Goto next screen' and 'Goto previous screen' tasks will not work in this case. To change the screen the value of the PLC tag should be changed.

#### 5. Can I perform any task continuously?

To perform any task continuously define the task in Global Application Task-List. This task will be performed till the unit is powered.

#### 6. How can I 'Hold' any Bit on or off using a key?

To hold a bit on using a key, define 'Turn bit on' task in 'Key press task-list' and 'Turn bit off' task in 'Release key task-list' for the same key.

#### 7. How do I keep any screen or any key locked?

Any screen or a key can be kept secret using the 'Password' feature of HG1X. Password protected screen will not be displayed till the user enters the correct password. Similarly task for password protected key will not be performed till user enters the correct password.

#### 8. Can I assign scaling factor for any tag?

Value of any tag can be converted in to the required format by performing 'Math Operations' on it. This DOES not change the value of the actual tag. 'Math Operations' can be performed in 'Display HG1X / PLC Data' objects. Data to be written to a tag can also be manipulated by assigning 'Math Operations' in 'Data Entry' object.

#### 9. Can I limit the data to be entered in a tag?

Data entered in any register tag can have high and low limits. This keeps a check on the register limits.

*Refer to 'Configuration software' section for detailed information on how to define an application.*

## Appendix A

### WindMSG Tutorials

Example to create Application for HG1X

#### Tutorial 1: Create an Application for HG1X Model

We will create an application for HG1X-252 unit with internal tags only. Follow the following steps:

1. Run WINDMSG.EXE. 
2. After the main window is displayed, click on the New Application icon 
3. From the New application dialog box, select required unit and click  to accept the selection made.



4. As said earlier, this application is being developed with internal tags only, hence we will not be adding any PLC in the network. If user wants to add PLC in the network, click on the Network Configuration icon 

5. Now we have to define tags required for the application. It is a good practice to define the tags before developing the application. To define Tags click on Tag Database icon . Following dialog box will be displayed. Select required register type and register address, enter your name for the tag.

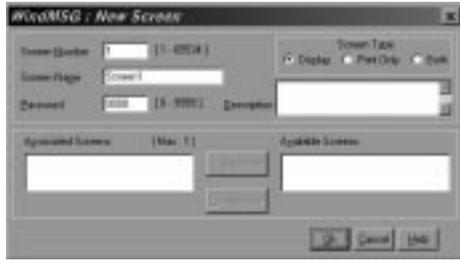


Click on Add button  to accept the tag defined. To define a coil, change the selection Tag-type. Enter coil number, tag name and click  to accept the tag entry.



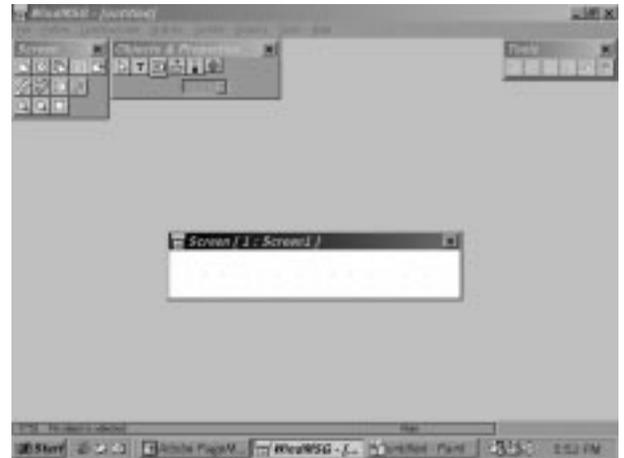
Click on Close button  to close the Tag Database window.

6. Now we will define Screens. Screens form the most important part of any application as it displays the information required by the operator. HG1X has various objects to make a screen operator-friendly. Click on Screens icon  to define screens.



In the dialog box, enter the screen number, name and password. Also select screen type.  
 Display: Screen will be displayed and will perform all tasks.  
 Print Only: Screen will only be printed after it is triggered.  
 Both: Screen will be displayed and printed after it is triggered.  
 Click  to create a new screen.

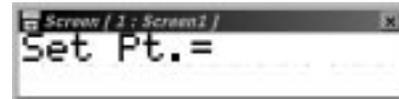
Following Screens window will now appear on the monitor. This window defines all Screen objects, Screen task-list and Screen keys.



Now we have to place plain text object, click on text icon . Place the object at required place on the screen and click. A blinking blob will appear.



Enter Text.



Click on selector icon  to complete text object.

Now we have to place a register data entry with math and limits. To place the object on the screen, click on data entry icon .

Select Type 'Register'.



Select tag from the tag list.



Select data type and format. We select 'Unsigned Integer' and 5 digit format.



Select low and high limit for data entry.

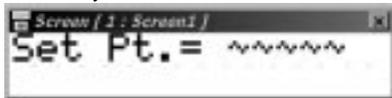


To multiply the tag by 3.5 we should define 1st operation as 'x35' and 2nd operation as '/10'.



Now click  to accept the data entry.

Data entry object will now be placed at required position.



To place 'Display HG1X / PLC data' object click on the icon .

Select 'Bit Text' type.



Select coi from tag list.



Enter Bit on text and Bit off text.



Object will be placed at required location.



To hold the coil on till a key is pressed screen keys should be defined. Click on 'keys for screen' icon .

In the Screen keys dialog box select the key to be defined.



Select Turn bit on task as 'press task' for the key.



Select coil. Click  to accept the task.

Select Turn bit off task as 'released task' for the same key.



Select coil. Click **OK** to accept the task.



We want to display an alarm when bit 0 of tag D5 turns on. An alarm object has to be placed on the screen so as to display alarm condition. But as the space on the screen is limited we will create a new screen, screen 2, with alarm object on it. This screen will be triggered when the bit turns on. So in the While showing task list for the screen no 1, a define 'wait till' task followed by 'goto screen' task. So the screen 1 will be displayed till the alarm bit is off. Immediately after the bit turns on the screen will change and display screen 2.

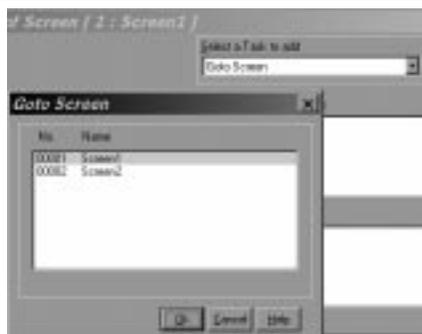
To create a new screen click on New screen icon . Enter essential screen information. In screen 2, click on alarm object icon . Click on the screen. Alarm object will be placed on the screen. Double click the object to edit.



An alarm dialog box will be displayed. This window will enable user to select text to be displayed when alarm is displayed. Select item from 'Select From' list and click **Add**. If any item is to be removed select from 'selected' list and click **Remove**. Sequence of selected items can be adjusted using the **Up** and **Down** buttons.



Now go to screen no 1 using 'select screen' icon . To define while showing task list, click on screen task icon . Select 'While showing Task'. Add 'wait till' and 'goto screen' tasks.



Now click **Done** to add the tasks to screen task list.



Now click **OK** to close screen dialog box.



Now click alarm icon  to define alarms. Alarm dialog box will be displayed.



Click  to add alarms. We want to define only one alarm for tag D5, so we will select 'discrete' Alarms tags. Select Group of alarms, Tag of group, Alarm Number, Alarm Text, Alarm Options.



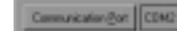
Click  to accept alarms defined.

Click  to define application Task-list for the application. Here we will define the power-up screen and Global Task-list if any. Select task from the task-list.

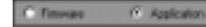


Click  to download application.

Select COM port.



Select Application.



Click  to download application to HG1X - 252 unit.

## **Appendix B**

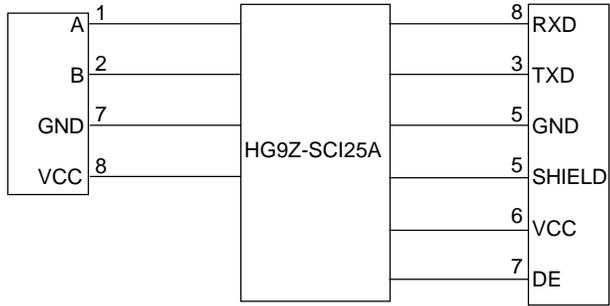
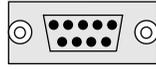
### **Cable Diagrams**

### IDEC Micro<sup>3</sup> to HG1X Cable: Pin Configuration

IDEC Part # HG9Z-SCI25A

Micro<sup>3</sup> PLC End  
8 Pin Minidin

HG1X End  
DB9 Female

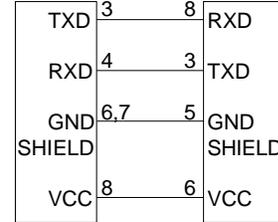
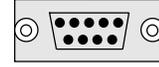


### IDEC Micro Smart to HG1X Cable: Pin Configuration

IDEC Part # HG9Z-SCI25B

Micro Smart PLC End  
8 Pin Minidin

HG1X End  
DB9 Female

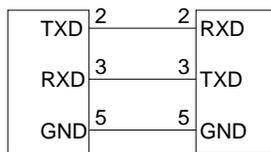
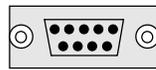
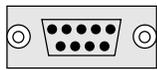


### Programming Cable for HG1X: Pin Configuration

IDEC Part # HG9Z-125A

PC End  
DB9 Female

HG1X End  
DB9 Male



### Koyo DL 205 to HG1X Cable: Pin Configuration

HG1X End  
DB9 Female

DL 205 End  
6 x 6 Modular  
Connector

