MOTOR SYSTE
AUTOMAÇÃO

NOSSO NEGÓCIO É TECNOLOCIA

Manual Micro PLC

Genie

(Control Relay)

Index

CHAPTER 1

What is Genie?

1.1 Introduction

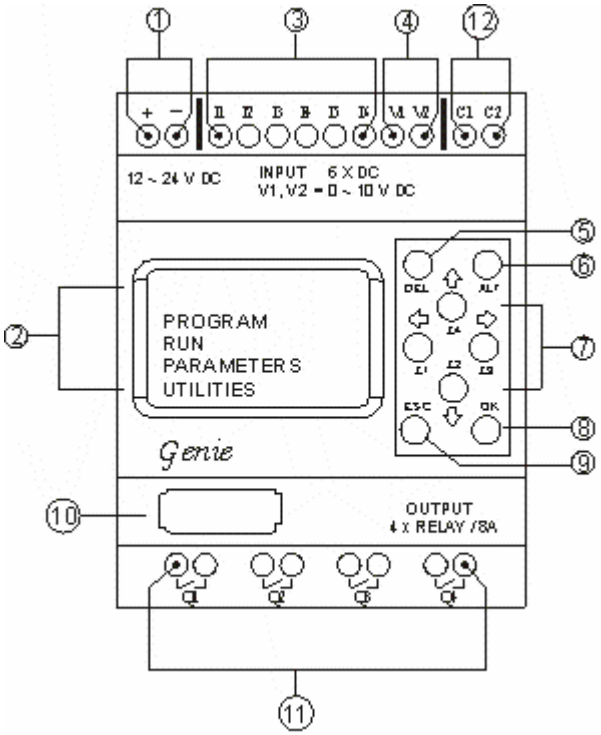
Genie is ideally suitable for a variety of industrial and domestic Automation applications. Genie is a miniature PLC (Programmable Logic Controller) designed to simplify the electrical wiring of intelligent solutions. Genie is very simple to implement, its flexibility and its high performance allow users to save significant amount of time and money.

It is very compact and lightweight. It is mountable on a DIN rail and also can be base mounted by fixing two screws. Input-output and power connections can be made using the easily accessible terminals. A hinged cover is provided to protect keys and the LCD display from dust.

For applications that require more input-outputs than those available on Genie, extension modules are available. Maximum three extension modules can be connected to each Genie.

Genie has a built in serial interface for connecting it to a PC. A memory card is also available for program back up.

Front Facia



1. Power Input
2. Graphical LCD 4 Lines 12 characters
3. Screw Terminal block for Digital inputs.
4. Analog 0-10 Volt inputs (only for G8DDT0)
5. Delete key.
6. ALT key Selection and validation.
7. Arrow keys.
8. OK key:
9. Escape key.
10. Interface for Memory card and PC cable.
11. Relay Outputs.
12. Communication inputs.

1.2 Features and Capabilities

Connections

Digital Inputs, Analog Inputs and Digital outputs can be wired to Genie. Along with the physical connections user can also use soft connections (special functions) like Counter, Timer, Time switch (clock), Auxiliary relays, analog comparators (only for the DC model), and soft text message blocks as a part of the program. All types of automation parameters are provided, so no extra device needs to be connected to Genie. Genie alone is sufficient for most of the automation and control applications.

Enter program

Genie program is nothing but a logical connection of Genie parameters like inputs, outputs, special functions etc. User can enter program with the keypad on Genie or he can make use of G-SOFT, which runs on a PC, and is much easier to use. The programs can be changed as per the application thus it provides more Flexibility, Versatility.

Debugging

While executing (running) the Programs on Genie, the programs and the parameters can be viewed at the run time. Some of the parameters can even be changed during the “run” (provided the run-time lock is not activated). Hence program development speed can be increased.

Transfer

Genie provides facility to transfer the programs in following ways.

- PC>Device
- Device< PC
- Device > Card
- Card > Device

Programs can be transferred to PC or Memory card and saved. Thus no need to enter same program again and again.

LC display

4 X 12 lines LC display is provided on Genie. On LC display, the programs can be viewed and edited. At the run time input output status can be observed which helps in monitoring the application.

Supply flexibility

AC as well as DC models are available which operate on a wide voltage band. Select a proper model by referring to the Technical specifications.

Connecting more number of inputs and outputs

With the extension module number of inputs and outputs can be increased. Maximum three Extension Modules can be used with one Genie. So it is easy to configure the systems that require more I/Os.

1.3 Overview of Genie Contacts

Notation	No. of contacts available in AC Model G7DDT8	No. of contacts available in DC Model G8DDT8	Description
I	8	8	Digital inputs for Genie. Can be used as normally close as well as normally open.
J	8	8	Digital inputs for Extension module A can be used as normally open as well as normally close
K	8	8	Digital inputs for Extension module B can be used as normally open as well as normally close
L	8	8	Digital inputs for Extension module C can be used as normally open as well as normally close
Q	4	4	Potential free output points for Genie.
U	4	4	Potential free output points for Extension module A
V	4	4	Potential free output points for Extension module B
W	4	4	Potential free output points for Extension module C
Z	4	4	Auxiliary input. Used as push buttons. Can be used as manual inputs.
M	32	32	Auxiliary relays. Used to save intermediate results in ladder
T	16	16	Timer function Can be used in four different modes. Trigger, Reset coils can be used for every timer
C	16	16	Counter function Can be used in Up counting as well as down counting mode. Retentive is selectable. Count, Direction, Reset coils can be used for every counter

	16	16	Time switch (clock) function Block can be programmed as required. Cannot be used as coil.
A	0	12	Analog function Analog voltage V1-V8 (whichever is connected) can be used in the equation. Cannot be used as coil.
P	16	16	Compare Function for counters. Can be used to compare values of two counters or a counter value with an absolute value. Cannot be used as coil.
Lines	250	250	Program length

CHAPTER 2

Installation of Genie unit

In order to increase the reliability of the system and extract maximum performance of its functions, this section describes the precautions for installation of the system.

2.1 General Safety Requirements

Danger

- Install a safety circuit external to the PLC that keeps the entire system safe even when there are problems with the external power supply or the PLC module, otherwise, trouble could result from erroneous output or operation.

- Outside the PLC construct mechanical damage preventing interlock circuits such as emergency stop, protective circuits, upper/lower limit switches and interlocking forward/reverse operations

- The output components of the PLC, regardless it is relay, transistor are possible to cause permanent ON or OFF and resulting in serious incident, thus protective additional external circuit or mechanisms are necessary for the output points with major safety consideration.

- Do not touch the PLC‘s conductive parts while power is on. Doing so could result in a shock or malfunctioning of device.

Caution

- Do not bunch the control wires or communication cables with the main circuit or power lines. They should be installed 100 mm (4 inches) or more away from each other. Not doing so could result in noise coupling on communication signals.

- Fluctuations or variations in the mains supply voltage should not exceed the tolerance thresholds stated in the technical characteristics, as they may cause operating failures.

- Communication cable should always be shielded twisted pair cable.

- Serial interface cable and memory card is provided to use only for Genie.

- Power off the device before connecting the communication cable and memory card.

General Precautions during Wiring

The precautions on the connection of power cables are described below.
1) Power Supply Wiring

- When there is lot of noise on the power lines it is advised to connect isolation transformer to the power supply of the PLC. Though sufficient care has been taken within the PLC.

- While using the DC model, run the 24 VDC input line away from the 100 V AC and 200 V AC lines.

2) Wiring of I/O

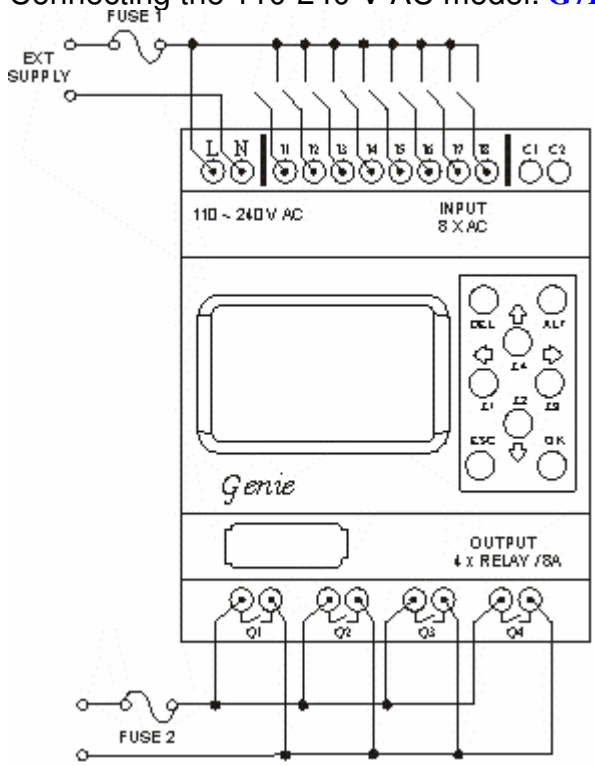
- Run the input lines and output lines away from each other.
- When the output lines cannot be run away from the power supply lines or the input lines use batch-shielded cable and earth it.

Summary of advice on installation

- Power down the device
- Take all necessary measures to avoid unwanted relay triggering.
- Check to ensure that no voltage is present.
- Make the necessary ground and short circuit connections.
- Always follow the instructions stated in this user's guide.
- Remember, only qualified personnel are authorized to implement the Genie.
- Automation and control devices must be installed so that they are protected against any risk of involuntary actuation.
- It is essential to ensure that all control system connections meet applicable. safety standards
- Fluctuations or variations in the mains supply voltage should not exceed the tolerance thresholds stated in the technical characteristics, as they may cause. operating failures and lead to potentially dangerous situations
- Take care to meet the standards that apply to emergency stop systems in order to avoid potentially dangerous situations. Ensure that releasing the emergency stop system does not cause the automated system to suddenly restart.
- Take all necessary measures to ensure that an application interrupted by a drop or a break in the supply voltage can continue correctly and also ensure. that no dangerous states, no matter how brief, may occur.
- If extension module is connected then communication between Base and Extension module should preferably be with shielded twisted pair cable.

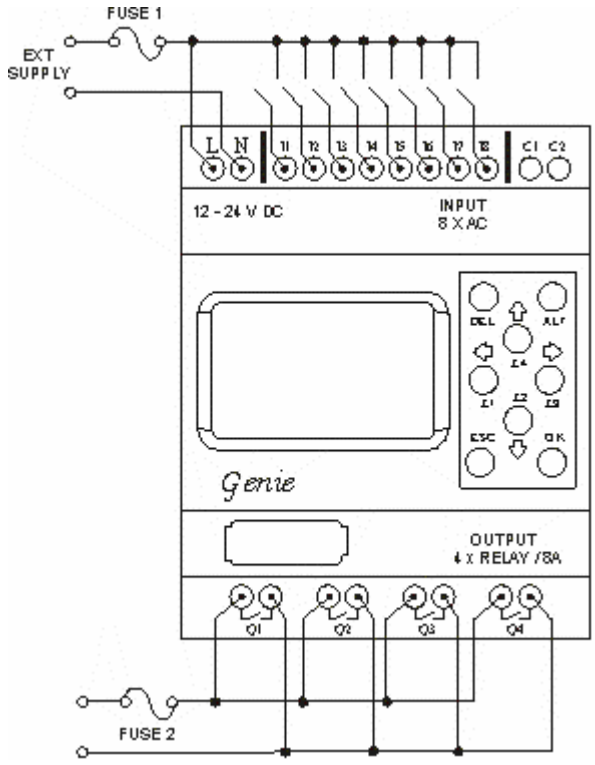
2.2 Electrical connections

Connecting the 110-240 V AC model: **G7DDT8**



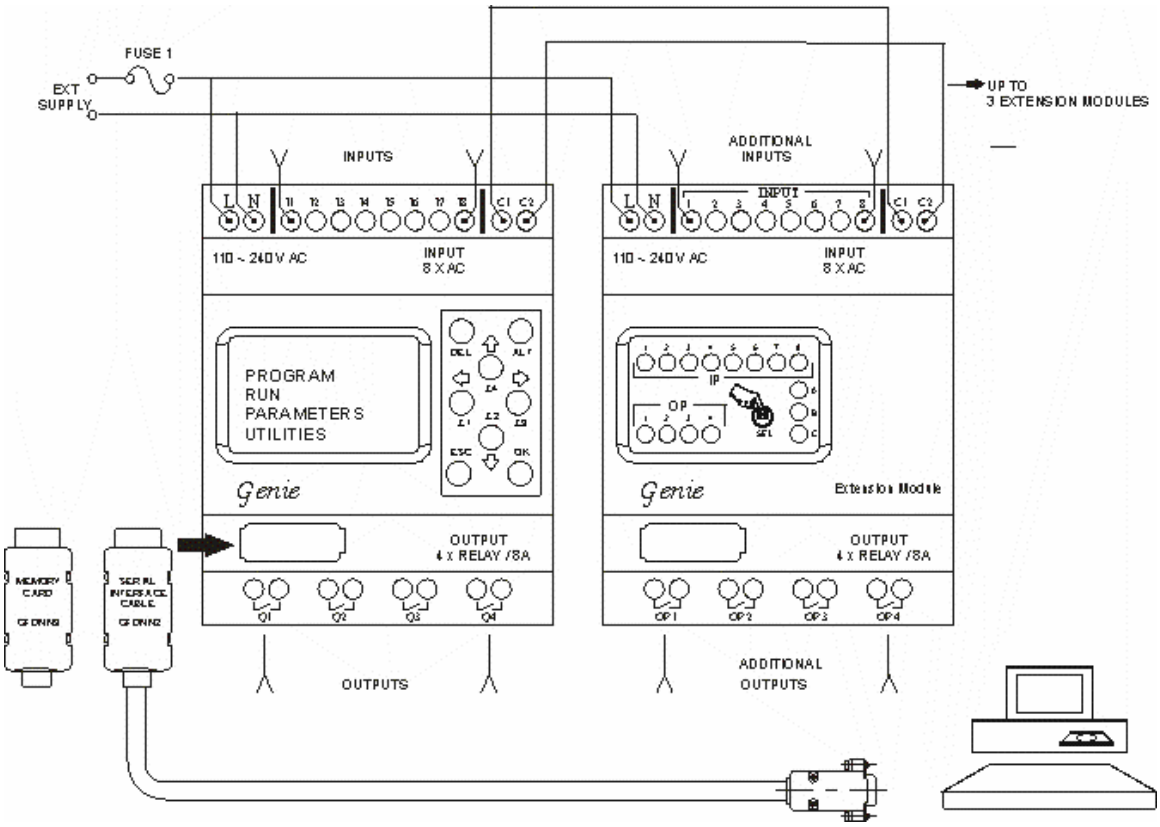
Please Provide
Fuse: 250mA
In Series with the line terminal

Connecting 12-24 V DC Model: G8DDT8



Please Provide
Fuse: 500 mA
In Series with the line terminal

Connecting Extension Modules



CHAPTER 3

G-SOFT

3.1 Introduction

G-SOFT Ver.5.x is one of the accessories of Genie. It has to be installed on a PC and it simplifies the task of program development. Of course, user can enter, debug and run the programs directly on Genie, but G-SOFT will provide an easy way and more flexibility.

G-SOFT 5.x provides following facilities.

- Entering the program in two modes:
- In Full screen mode
- In Genie mode
- Saving programs
- Debugging the Programs.
- Running the programs in Genie mode
- Printing programs
- Simulation: with Genie and only on PC
- Transferring programs.

3.2 Installing GSOFT 5.x on PC

To install G-SOFT, the PC needs to have following configuration:

- Color monitor with minimum resolution 1024 X 768
- Processor: Pentium II and above OR Equivalent
- Free Hard disk: minimum 20 MB
- RAM: 32 MB
- CD Drive for installation of G-SOFT

Installation procedure:

Auto Run facility is provided. Where PC's don't use Auto run

Insert a CD in CD Drive.
Go in the respective directory.
Click on "Set up" on the CD.
Software will get installed automatically. It will also place an icon on the desktop its own.

You can start G-SOFT either from the desktop or from "Start – Programs – G-SOFT Group— G-SOFT 5.x".

For removing G-SOFT from your PC use "Uninstall" from the "Start – Programs – G-SOFT Group-Uninstall".

3.3 Features of G-SOFT

Entering the Program: Ladder Logic is the basis for programming the application. G-SOFT provides a user-friendly interface wherein the user only has to select contact type and contact number and place it at proper place. Most of the time contacts will get connected automatically. User can enter comments for better readability and for reference later.

Saving programs: G-SOFT allows user to save individual programs on the PC.

Debugging: G-SOFT is very powerful in error handling. It displays a variety of errors at the time of program entry itself so that user can make corrections.

Running the programs on PC: User can simulate the program on PC. User can use buttons provided on the screen to simulate the input connections. Scroll bar can be used to simulate Analog input. The actuation/ de-actuation of the relays can be monitored on the screen.

Printing: User can take print outs of programs in two different formats.

Simulation with Genie unit: User can connect Genie unit to PC using a serial cable and program can be run through PC. In this mode the PC acts as a master and the inputs are taken from Genie and outputs are sent to Genie unit (and the extension modules, if connected). This mode is useful in debugging the entire system since the actual I/Os are used.

Transferring program: Programs can be transferred from PC to Device and vice versa using serial cable. This saves the program entering time on Genie.

3.4 Special Functions

In addition to the inputs and outputs Genie has five types of special functions: timers, counters, time switch (clock), compare counters and analog functions. Each special function has a specific notation and is associated with certain preset parameters which user must set at the time of entering the programs.

3.4.1 Timers

The Timer function is used to delay, prolong and control actions after a set period of time. It has a Reset input, a Trigger input and an output that indicates time-out.

Notation

There are 16 timers available in AC and DC models of 250 lines. Timers can be used as contact as well as coil. In Genie T stands for Timer and timer numbers are represented from 1 to 16. Thus T8 represents the eighth timer. We refer the value of the nth timer as Tn.

Timer used as Contact

. Normally open (Tn): In this type of contact TRUE value is valid.
. Normally closed. (tn): In this type of contact FALSE value is valid.

Timer used as Coil

. Trigger Input (TTn): In timer functions trigger is required to start timer operation (Timer cycle).

. Reset Input (RTn): Reset input is used to reset the current Timer value to zero. The Trigger contact is disabled and the block is ready for a new timer cycle.

Note: If Reset and trigger become true simultaneously then the relay is reset and the timer does not run.

Timing

Genie allows different timing ranges.

S - Time value is specified in seconds
Maximum time is 999.9 S
Resolution: 100 ms

M: S - Time value is specified in minutes: seconds
Maximum time is 99.59 M
Resolution: 1s

H: M - Time value is specified in hours: minutes
Maximum time is 99.99 H
Resolution is 1min

Note: If Time value = 0 and Trigger is given then unpredictable operation may take place, this condition is shown as Program Error during program entry.

Locking: Genie provides facility to "Lock" the parameters. This means if a parameter is locked, user cannot change the values at the RUN time.
In Unlocked mode, effect of changing the time value in "RUN" Mode is as follows:

Case 1

Time of timing relay is 000.0, trigger not received, and no reset

Set time: 030.0 s
Enter and store new time value: 020.0 s
Result --- Relay switches at 020.0S after next trigger signal is received.

Case 2

Trigger input is given to Timer; no reset, time is running.
Set time: 030.0 s
Current Time: 010.0 s
Enter and store new time value: 020.0S
Result --- Relay switches at 020.0S

Case 3

Trigger input is given to Timer; time has already elapsed, reset not received.
Set Time: 060.0 s
Current Time: 060.0 s
Enter and store new time value: 080.0 s
Result: Timer output remains active, 080.0 s is used for next timer cycle.

Timer Functions

There are 4 types of Timer functions. Each type triggers a specific kind of operation used to handle all possible cases in an application.

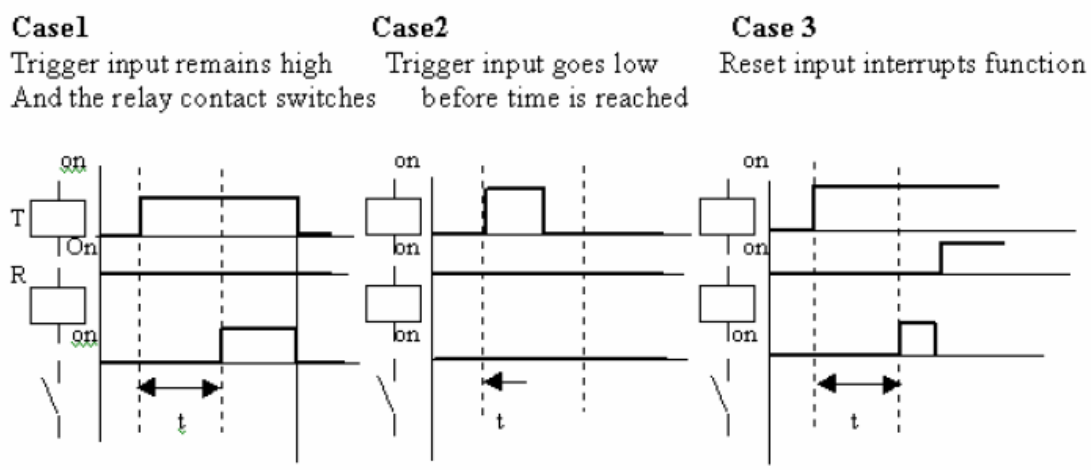
A: On Delay Timer: After receiving the trigger signal, the relay contact operates after delay time (make contact closes / break contact opens after the delay).

B: OFF Delay Timer: After receiving the trigger signal, the relay contact operates immediately (make contact closes / break contact opens). It remains operated as long as the trigger input is present. The timer starts when it detects that the trigger input is removed. The relay contact then switches after the set time has expired (make contact opens / break contact closes).

C: Single Pulse Timer: After receiving the trigger signal, the make contact closes (or break contact opens) for the specified time, independently of trigger present or not.

D: Symmetric/Asymmetric ON/OFF timer: The relay contact opens and closes for the set time duration (pulse generator). The specified time duration value may be symmetric or asymmetric.

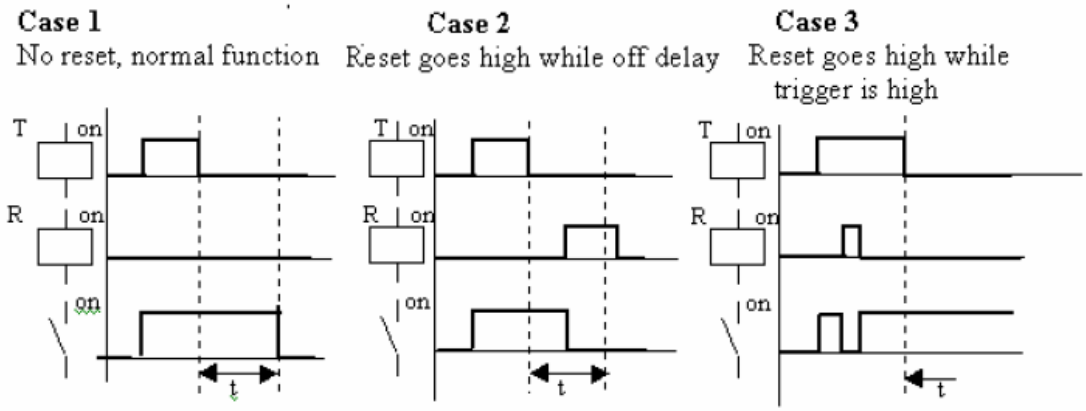
A : On Delay Timer
Timing Diagram



Application:

Delay to start a conveyor belt after a delay to ensure that the sensor is already active before the conveyor belt starts moving.

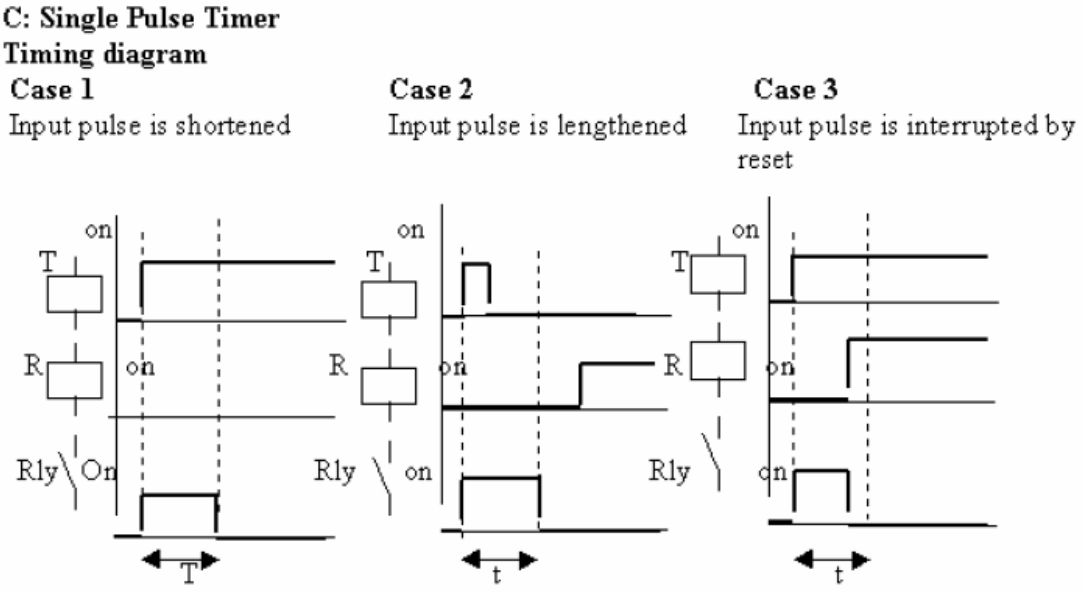
B: OFF Delay Timer
Timing diagrams



Application

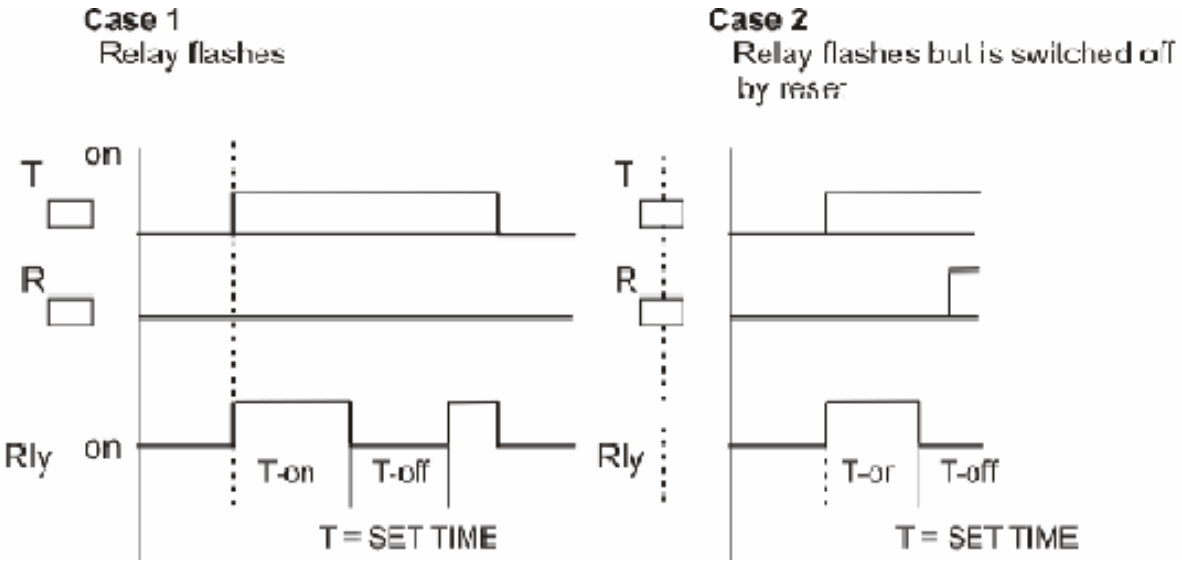
To ensure that motors, conveyor belts or ventilators etc.continue to function for a specified time after switching off the control signal.

C: Single Pulse Timer
Timing diagram



Application:
Ringing School Bell for specified time.

D: Symmetric/Asymmetric timer:



Application:
Flashing of warning lamps, decorative lighting etc.

3.4.2 Counters

The Counter function is used to count pulses. It has one "Count" input that changes the counter value on each change from off-to-on. The "Direction" input is to select the UP / DOWN mode. Reset input to make the counter equal to zero in up counting mode and equal to preset value in down counting mode. Counters can be configured to be Retentive so that count can persist after power supply interruptions.

Notation: There are 16 Counter functions available in both models.
Counters can be used as contact as well as coil. In Genie Cn is written for nth counter. C stands for Counter and n is for counter number. Thus C7 represents seventh counter.

Counter used as Contact:

- Normally open (C1 to C16): The contact is closed when the counter reaches the preset value.
- Normally closed (c1 to c16): The contact is closed until the counter has reached its preset value.

Counter used as Coil:

Count Input (CC1 to CC16): The count input is used for changing the counter value. Each time the coil is triggered, the counter increments or decrements by 1, depending on the counting direction.

Representation example: I1----------CC1.

Direction input (DC1 to DC16): Direction input decides counter mode, Up / Down. If this coil is active, the counter counts down. The counter counts up if this coil is not active or is not used in the program (unconnected).

Representation example: I2----------DC1.

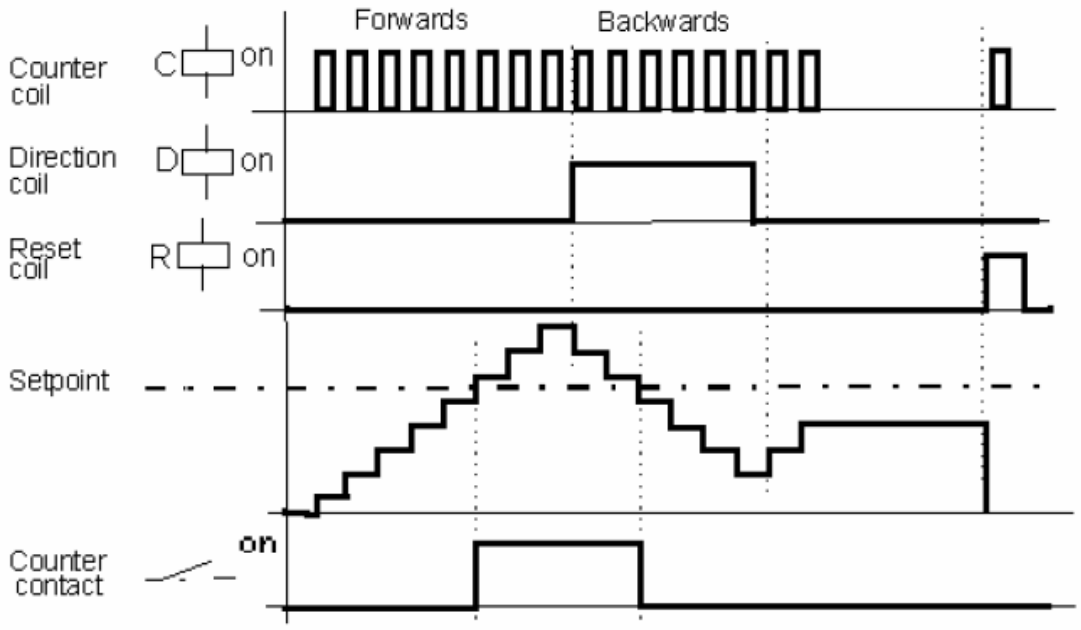
Reset Input (RC1 to RC16): Reset input is used to reset the current counter value to zero in up counting mode and to set the counter to the preset value in the down counting mode.

Representation example: I1----------RC1

Note: Both Count and direction inputs are required for down counting.

Counter value:
Genie allows maximum count value equal to 9999.

Locking: If the parameters are locked then user cannot change the values at **RUN** time. If the counter value is unlocked then user can change the value at **RUN** time.



3.4.3 Time Switch (Clock)

The Time switch (Clock) function block is used to validate time slots during which actions can be performed. It acts just like a programmable weekly timer

Notation: There are 16 Time switch (clock) functions available in both models. Time switch (clock) can be used only as contact. In Genie:
 - is written for nth Time switch (clock).
 stands for Time switch (clock) and n are for number.
 Sixteenth Time switch (clock).

Time switch (clock) used as Contact

1. Normally open (n): The contact is closed when the Clock is in an enabled period.
2. Normally closed. (Lower case n): The contact is closed when the Clock is not in an enabled period.

Time settings:

Start Day - For the range, any valid start day (Sunday to Saturday) can be specified.

End day - For the range, any valid end day (Sunday to Saturday) is specified. If only one day is to be chosen, this field can be left blank.

Start Time - For the range, a start operating time (00:00 to 23:59) is specified.

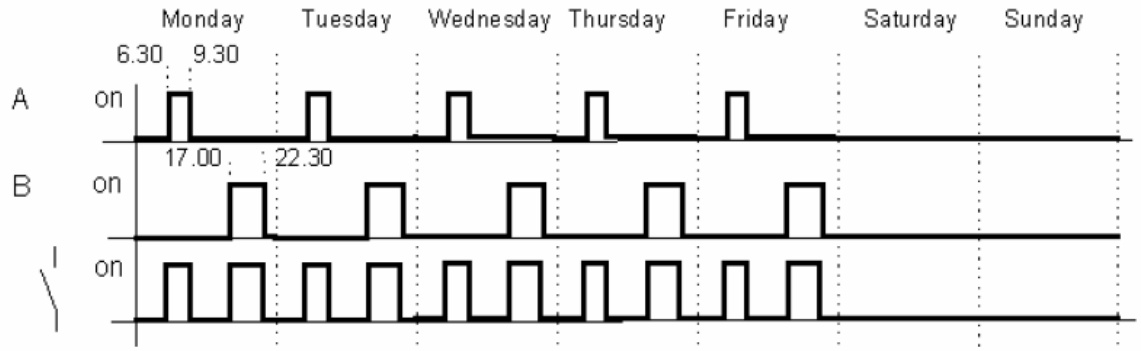
Stop Time - For the range, a stop operating time (00:00 to 23:59) is specified.

Block Number - Sixteen blocks can be used, numbered from 1 to 16. This parameter cannot be changed in the screen shown above. It is chosen when the block is entered in the diagram line.

Locking: If the parameters are locked then user cannot change the values at **RUN** time.

Example 1
Enter timing - Block 1 From Monday to Friday On Time 6:30 Off time 9:30
Block 2 from Monday to Friday On time 17:00 Off time 22:30

Make A (1) B (2)



3.4.4 Analog Compare: (Used only for G8DDT8)

The analog compare blocks can be used only with the following Genie model: G8DDT8. This product works on 12 to 24 V DC supply voltage. There are two analog inputs, marked as V1 and V2.

Notation

There are 12 Analog comparator blocks available. Analog compare can be used as contact only. "An" is referred to as the nth analog compare. The "A" stands for Analog compare and n is for analog-compare number. Thus A12 represents twelfth analog compare.

Analog compare used as Contact

. **Normally open (A1 to A12):** In this type of contact TRUE value is valid.
. **Normally closed (a1 to a12):** In this type of contact FALSE value is valid.

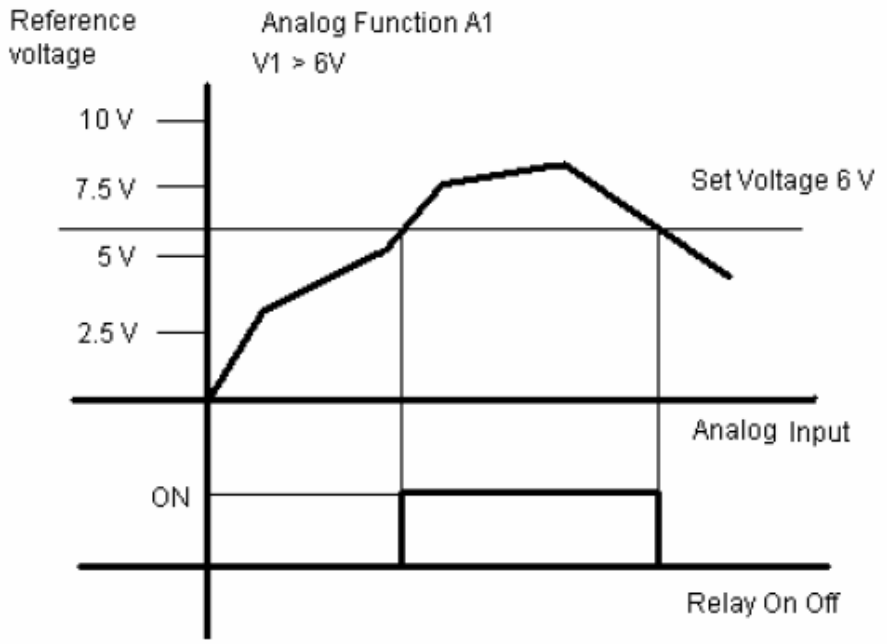
Analog voltage

Analog voltage ranging from 0 to10 V DC can be given to each input: I7 and I8. Analog voltage of one input can be compared with either the voltage of the other input or with a reference voltage.

Locking

Genie provides facility to lock the parameters. If the parameters are locked then user cannot change the values at RUN time.

Example



A1 = V1 > 6V

3.4.5 Compare Counter Block

Compare counter block is provided to compare any counter value with any other counter value or with absolute value.
This block can only be used as input only i.e. its position in the ladder diagram should be in the contact elements rather than coil elements.

This block saves on the memory of the PLC and also helps increase the scan time and helps in utilizing the counter blocks provided more efficiently.

The parameters for this function block can be entered or accessed when entering the contact that represents the compare counter input in the ladder diagram line. Also 'PARAMETER' menu can be used to access or change the preset values of the function block.

Notation: There are 16 Compare Counter functions available in both models. This block can be used as contact. In Genie Pn is written for nth compare block. P stands for Compare Counter and n is for number. Thus P7 represents seventh compare block.

Compare Block used as contact:

- Normally open (P1 to P16): The contact is closed when the compare counter condition is satisfied.

- Normally closed (p1 to p16): The contact is closed when the compare counter condition is not satisfied.

3.4.6. Soft message block:

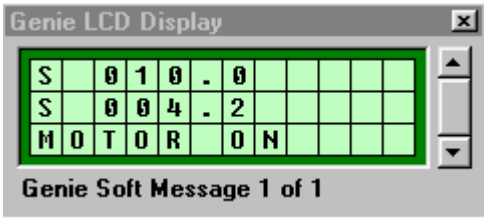
Soft message block is provided so that text message can be displayed in RUN MODE when its input is triggered.
Click on "Properties" menu line from the pop up menu for a soft text message block, then this window will appear. This window allows displaying a text message with the run time property as well the preset value and current value of any of the special function block selected.

With a 0 to 1 transition of the signal at input, the display outputs your configured message text in RUN mode.

If several message text functions were triggered, the message with highest priority is displayed. This also implies that a new message text is only displayed if its priority is higher than that of previously enabled message texts.
You can change between the display in RUN mode and message text by means of arrow buttons.

Simulation Mode

In simulation mode, the message texts are displayed in a small window

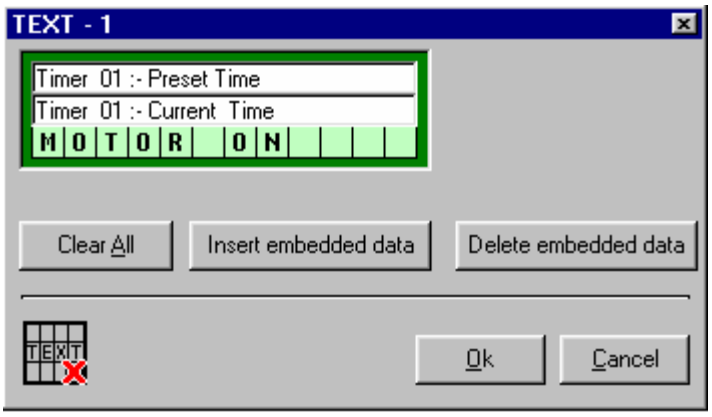


Description of function

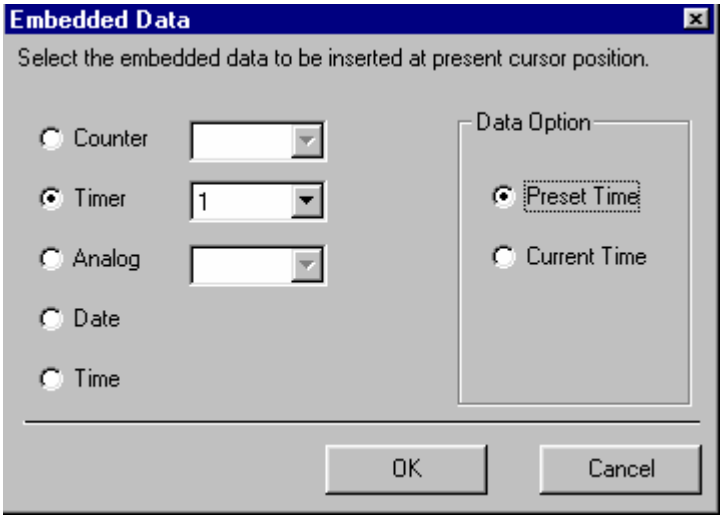
Notation: There are 16 soft messages available in both models
Soft message can be used only as coil.
In Genie “X” stands for soft message box and soft message box nos. are represented from 1 to 16.

Message settings:

When a message block is selected following window appears.



To insert parameters of special function click on Insert embedded data following window appears

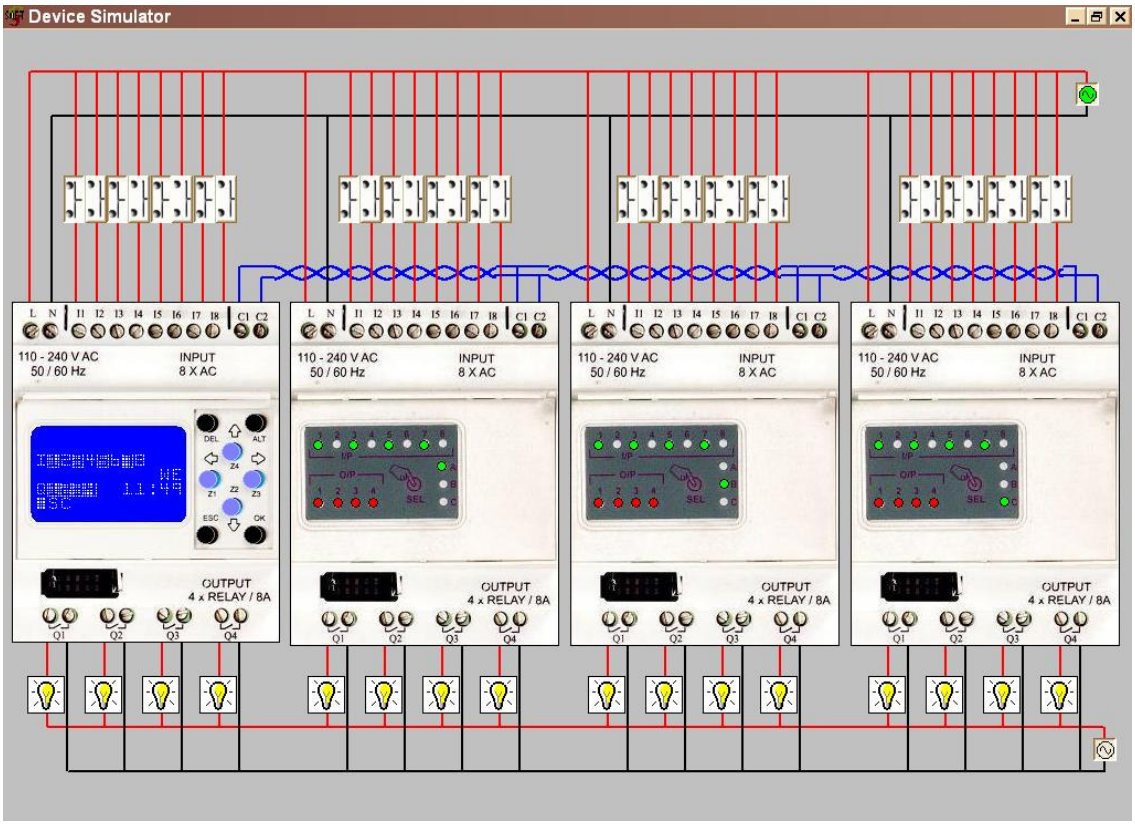


Select the special function block, its no and data option for example timer has preset time & current time as the data option
Press ok, settings will be saved in the soft message block.

Message is displayed when its condition is true.
User can enter upto 36 characters for each message text & messages are assigned priority in the ascending order from X1 to X16.

3.4.7 Device Simulator

This mode of G-SOFT, which can be activated through the options menu on the toolbar and then selecting Device Simulator, is very useful in understanding how the Genie works in stand-alone mode. The user interface of device simulator is as shown in following figure.



The PC depicts the genie layout of LCD display and the keyboard .All menus and commands are very similar to genie unit. In this mode user can perform all tasks like program entry, debug and execution. It does not require a physical connection to genie unit. All inputs and outputs are simulated on the PC.

The device simulator gives the user, the feel of working with the device. This mode helps the user to learn to edit as well as run the program like the device. In this mode the ladder entered in the G-Soft will be picked up and will be shown on the device simulation mode. And vise versa the ladder entered in the device simulator mode can be viewed in the G-Soft.

The program is entered in the same way as it is edited in the device. Editing in the device, sequence of screen as it appears in simulation mode is same as it appears on the device. The keys on the device are operated using the mouse and its function is same as in the device. Inputs can be given and the output status, the parameters as it appears in the device can be seen.

CHAPTER 4

Genie in Full screen Mode

4.1 Overview

Double click on the G-SOFT icon on the desktop, Genie software main screen will appear. Program that was active in the previous session will be displayed on the screen.

G-SOFT displays a variety of information along with the program.

. It displays File name and path on the top.

. It displays the menus provided by Genie software.

. User can select program display mode.
  - . Genie
  - . PLC ladder
  - . Electrical

. User can select program content windows.
  - . Program
  - . Parameter
  - . Comment

. Genie configuration is displayed according to the user selection.

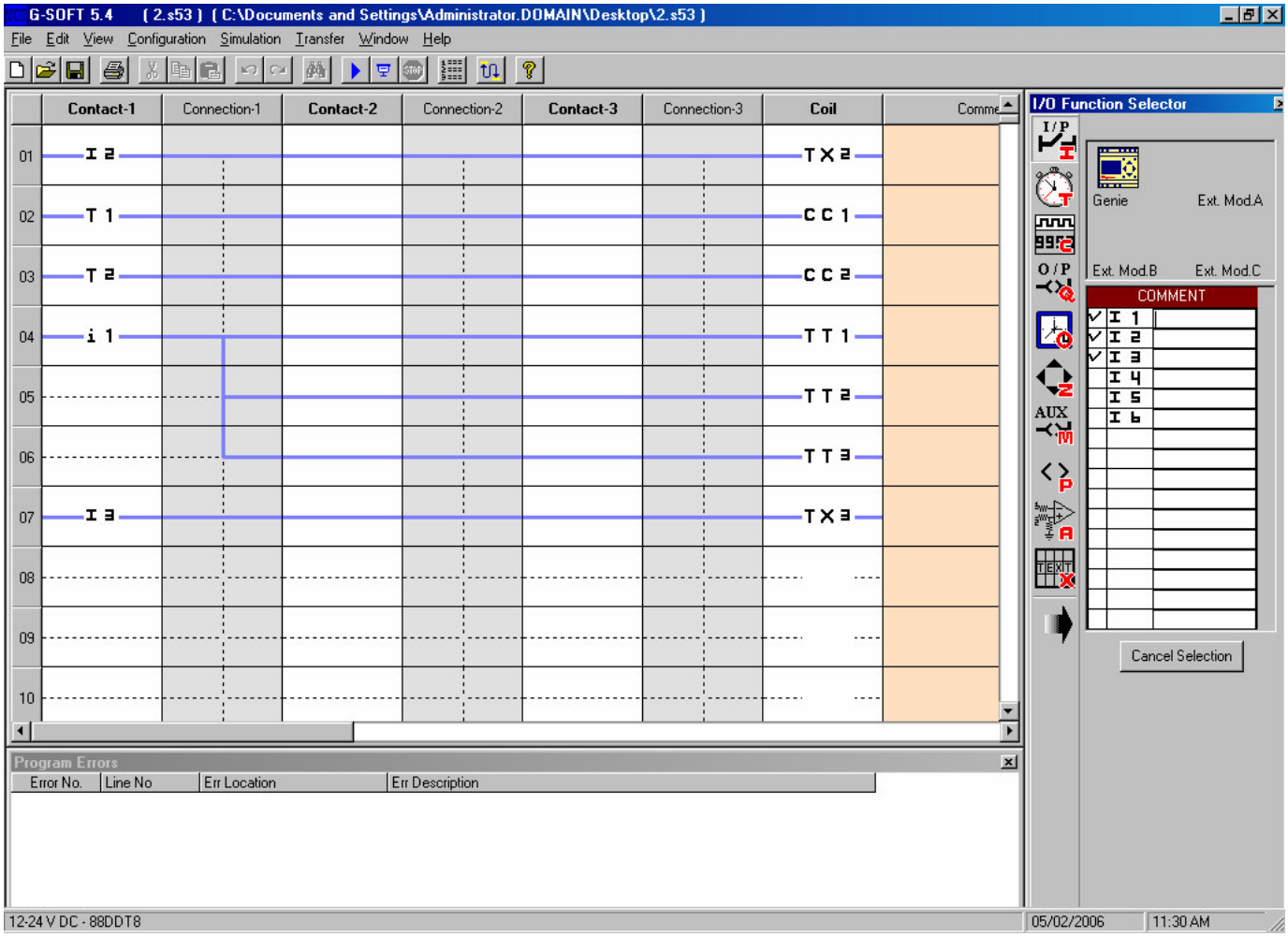
. PC clock is displayed – G-SOFT uses PC clock for functions related to time.

. It shows program with comments.

. I/O Function selector window gives information about Extension module selection. It also shows the available functions. It also shows the number of contacts available for a particular function if clicked on that function icon.

Program errors window displays errors in the program if any.

G-SOFT in Full Screen Mode



4.2 Description of various windows

The “G-SOFT “uses three types of main Windows:

• The Window in which user can view, enter and edit the Program. User can set properties of contacts and of coils by right clicking on the respective box .The electrical connections can be made or removed by simply clicking the mouse on the connections

• The I/O Function Selector window, from which user can choose contact and coil types, numbers, and comments to each contact.

• The Program Errors window shows the errors in the program at the time of editing

The I/O function selector and error windows can be removed or displayed through the "View" menu on the top line.

Other important windows are:

- **Pop up menu window:**

Click right the mouse on any contact or coil in the program. This window will appear near the mouse pointer tip. User can select:

Contact or coil type
Delete / connect contact
Delete / insert line
Properties if applicable

- **Timer properties window:**

Click on "Properties" menu line from the pop up menu window for a timer then this window will appear. This window allows changing the properties of timer function. At the RUN time also, the user can upgrade the properties of timer function if the timer is not locked.

- **Time switch (clock) properties window:**

Right Click on the Time switch (clock) and select "Properties" menu line from the pop up menu. This window will appear. This window allows changing the properties of Time switch (clock) function. At the RUN time also, the user can upgrade the timings if not locked.

- **Counter properties window:**

Click on "Properties" menu line from the pop up menu for a counter, this window will appear. This window allows changing the properties of counter function. At RUN time also, the user can upgrade the settings if the counter is not locked.

- **Compare Counter properties window:**

This window will appear only if G8DDT8 model is selected in the configuration. Click on "Properties" menu line from the pop up menu for the compare counter function. This window allows changing the properties of this function. At RUN time user can upgrade the properties if function is not locked.

- **Analog properties window:**

This window will appear only if G8DDT8 model is selected in the configuration. Click on "Properties" menu line from the pop up menu for an analog function.

This window allows changing the properties of analog function. At RUN time user can upgrade the properties if function is not locked.

- **Edit print footer window:**

From "File" drop down menu select "Edit Print Footer". User can enter information about project name, author, date etc. This will be printed on every page of the program printout.

- **Configuration window:**

Click on "Configuration" in the top line to activate this window. User can select model type and extension modules from this window. Since the input-output configuration depends on the Genie model chosen, it is recommended that proper configuration should be chosen before starting any program entry.

- **Transfer window:**

Click on the "Transfer" menu, this window will appear. It shows serial communication (Com) ports available on your PC for transfer, default baud rate and serial communication settings. User can select direction of data transfer.

- **Input output window:**

Click on the "Simulation - Only on PC" menu or on the "Simulation - with genie unit" get this window. The digital inputs used in Genie are available here as check boxes. Analog voltages are available as scroll bars. Outputs which are activated are shown as red. User can press RUN button to start the simulation. Stop button to halt the simulation and EXIT to stop simulation.

- **Z-Keys window:**

Start simulation by pressing RUN. Then this window will appear. Z1 - Z4 keys represents Auxiliary input in Genie

4.3 Entering programs

Select File -> New menu from the menu bar to create a new program.
A blank screen will appear. Now you can start entering the program. Ensure that you have chosen proper Genie configuration before starting the program entry.

Choose contact type:

Position the cursor at the place where you want to insert the contact by a left click with mouse. The position will get highlighted. Choose the required contact type and contact number from I/O function selector. Click on the required contact

and contact number, which will be highlighted for a few seconds. The selected contact will appear at the position selected in the program. The selected contact number will be shown with a tick mark to indicate that it has been used in the program. You can right click on any of the contact to change its type and properties.

Connecting inputs and outputs

Each circuit connection runs from left to right. Please remember this when you interconnect contacts and relay coils. User can draw a circuit connection horizontally from left to right and vertically between adjacent circuit connections. An intersection of circuit connections represents an electrical connection.

Horizontal connection:

To make a horizontal connection, click on the horizontal dotted line in the connection box of the circuit. Or to make connection in contact box, press right button and select "Joining link". Generally when an output coil is placed in the fourth column, it gets horizontally connected automatically.

Vertical connection:

To make a vertical connection click on the vertical dotted line in the connection box of the circuit. Vertical connection represents OR connection. For deleting a connection just left click on the connection line.

To delete a coil, Press right click on the connection you want to delete, and press Delete contact or delete coil.

Inserting and deleting a whole line in the program

Right click on the row above that you want to insert a line and select "Insert Line". Right click on the row that you want to delete and select "Line Delete".

Specifying parameters:

In the program-editing window, take mouse pointer to the required contact position. Right click of mouse and select "Properties". The properties window will appear in the program

Adding readability to the program

Writing comments adds readability. You can write comments for each program line. You can write a comment for each contact and coil. To do this, click on the connection number from the I/O function selector window and write comment.

Example

Go to the position contact 1, row 1 select the position by left clicking the mouse. Select "I" (input) connection from I/O selector window. A number of "I" type contacts will appear at the bottom. Select I1 by mouse. "I1" will get displayed at the selected Position, which is in the first row, and at contact 1 position. "I1" will get selection mark. Write comment to I1 as 'On switch'.

Now click at the position coil - row 1. Select "Q: from I/O function selection and then select contact number "Q1" by clicking on it. Q1 will get displayed at the selected position and "Q1" will get a selection mark. Add comment to Q1 as 'Lights'

Both coil and connection will get automatically connected. Select "Q1" by a right click of mouse. Select "State change contactor" parameter. It is understood that when 'On switch' is ON Lights will be ON, giving better readability.

4.4 Error Messages

G- SOFT shows errors at the time of editing only.
The errors can be seen in the Program Errors window.
The window shows Err. No, Line no, Err. Location, Err. Description
Errors displayed are listed below.

1. Left connection missing
2. Right connection missing
3. UP Connection open or not required
4. DOWN Connection open or not required
5. Special function block should be defined, since it is used as a contact
6. Coil is assigned more than once
7. Coil is assigned in multiple ways
8. Coil Set/ Reset Improper
9. Counter must have Count input in Coil column
10. Timer must have non-zero Preset Time
11. Timer Trigger is used more than then once
12. Timer Reset is used more than then once
13. Counter - Count Input is used more than then once
14. Counter - Reset is used more than then once
15. Counter - Direction is used more than then once
16. Extension Module should be selected in Configuration
17. Text - Reset is used more than once
18. Improper or missing Connection
19. Analog functions are not permitted in this model
20. The block of Time switch (clock) must have days defined.
21. Preset value of counter must be non-zero.
22. Check the ON-OFF timing of TIME SWITCH (CLOCK)

4.5 Program simulation on PC

In this type of simulation, a Genie unit is not required. The program will run on PC without the actual input-outputs. In this mode all inputs are available as check boxes. One can click on the box and make input ON or OFF. Similarly output can be seen on PC. Whenever output coil is in ON condition, it will show as RED circle.

Run: Press RUN to start simulation.

Stop: Acts to halt the program. One can change the properties in between. If pressed RUN again program will start again.

Exit: When pressed Exit button Simulation will get terminated. To start simulation one has to select “Simulation” again. All states of outputs and special functions will get reset.

If the input check box is checked then:

- It is a TRUE condition for normally open contact.
- It is a FALSE condition for normally closed contact.

If the input check box is not checked then:

- It is a FALSE condition for normally open contact.
- It is a TRUE condition for normally closed contact

Example -

Assume that the program "I1 -- -- -- Q1" already entered.

Select "Simulation - Only on PC" and then press the RUN button to start simulation.

Click on "I1" check box, Q1 will become ON.
Click on "I1" again, Q1 will become OFF.

It indicates that when I1 switch is ON lights will glow. If I1 is OFF lights will be OFF.

4.6 Simulation with Genie unit

For simulation with Genie user has to connect a serial cable from PC to Genie. Input conditions are taken from Genie and shown on PC in the check boxes. Similarly whenever output is in ON or OFF condition as the result of program execution, it is shown on PC as well as relay on Genie will operate. In this mode the program in the Genie unit is ignored, and the one in the G-SOFT on PC will be running. Only the inputs are taken from Genie unit and outputs are directed to the Genie unit.

One can connect physical inputs and outputs to Genie

To simulate the program, Select Simulation->With Device menu or Press Ctrl + F5.

It shows the available serial communication ports (COM ports). Select COM Port to which the Genie unit is connected with the serial cable.

Inputs - outputs window will appear which will show the status of inputs and outputs of Genie.

4.7 Parameters of Special Functions

When entering a Program, the function block parameters must be filled in. To set the function parameters right click with mouse on the contact or coil in the program edit window. The Property windows are displayed for:

1. Timer function block
2. Counter function block
3. Time switch (clock) function block
4. Analog Compare function block
5. Compare Counter function block

Timer function properties

1. Indication whether the timer is used in the program.
2. Timer lock status
3. Preset timing
4. Inputs: Trigger and Reset, whether these are used as coils and will receive a signal.
5. Comment
6. Timer function.
7. You can select any other timer for viewing the properties.

Counter function block

1. Indication whether the counter is used in the program.
2. Counter lock status
3. Preset counter value
4. Inputs: Count, Direction and Reset, if these are used as coils and receive a signal.
5. Retentivity selection.
6. Comment

Time switch (clock) function block

1. Indication whether the Time switch (clock) is used in the program.
2. Time switch (clock) lock status.
3. Preset time.
4. Comment
5. It shows selected time slots graphically.

Analog function block

1. Indication whether the Analog Function is used in the program.
2. Analog lock status.
3. Analog function selection : comparator selection, reference voltage.
4. Comment

Compare Counter function Block

1. Indication whether the Compare Function is used in the program.
2. Compare lock status.
3. Compare function selection: counter comparator input selection.
4. Comment

CHAPTER 5

OTHER FEATURES OF G-SOFT

5.1 Transferring data between PC and Genie unit

Genie allows communication between the PC and "Genie":

PC to Genie

1. Select Transfer->Program menu to display transfer dialog box.
2. It will automatically detect the Serial ports available. You can connect a serial cable to any one port available.
3. Press "PC>Device" button on transfer dialog box.
4. Current program on the screen will get transferred to device.
5. Transfer completion message "Transfer complete" will appear on the PC.

Genie to PC

1. Select Transfer->Program menu to display transfer dialog box.
2. It will automatically detect the Serial ports available. You can connect a serial cable to any one port available.
3. Press "Device>PC" button on transfer dialog box.
4. Transfer completion message "Transfer complete" will appear on the PC.
5. Read program will be shown on main screen.

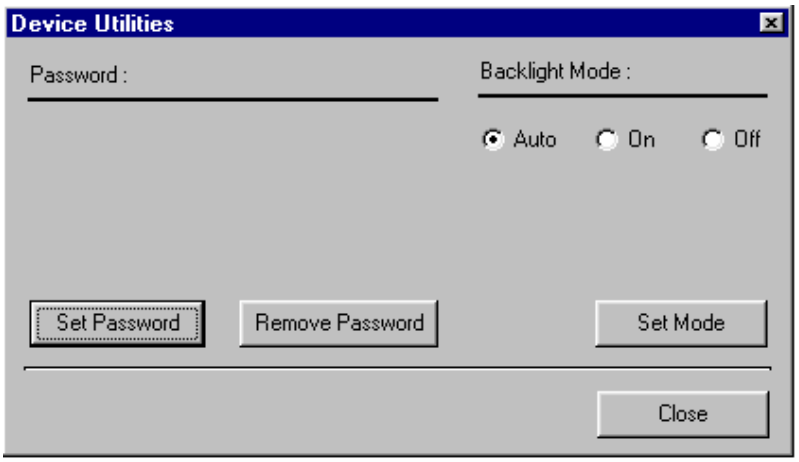
Device clock can also be transferred from "PC>Device", "Device>PC" by just clicking on device clock in transfer menu. Clock settings can be read from device as well as be set.

With the program the extension modules selected is also transferred the PC to Device as well as from Device to PC

When a program is transferred even the extension modules selected are transferred.

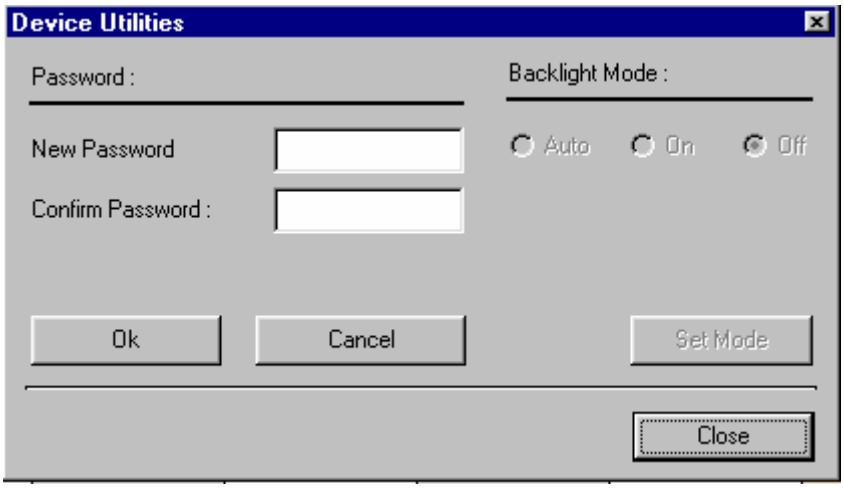
Transfer device utilities:
Through device utilities password as well as backlight mode can be transferred from PC to Device.
To transfer device utilities click on configuration menu on the toolbar & select

Device Utilities, following window will appear.



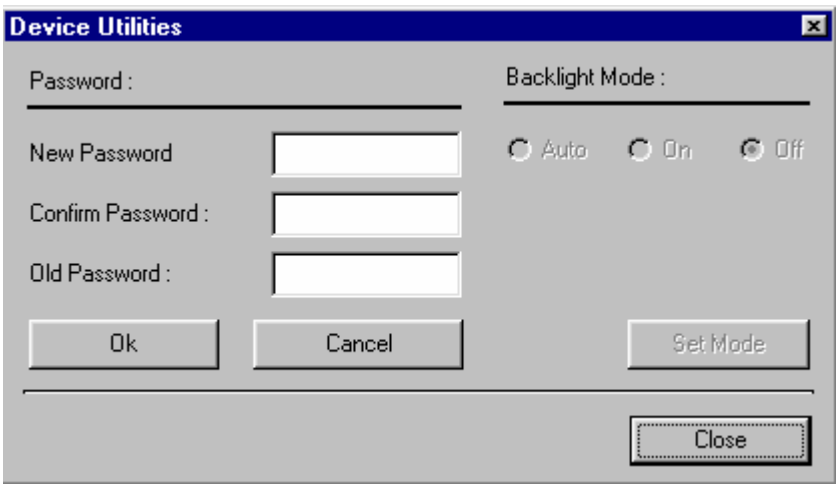
To transfer backlight mode, select the mode Auto, On or Off than click on the set mode button.
“Backlight mode has been set successfully” message will appear on screen.

To transfer password to the device click on set password, if device did not have password than following window will appear



Enter New password , confirm the password again & press ok
“Password has been set successfully” message will appear on the screen.

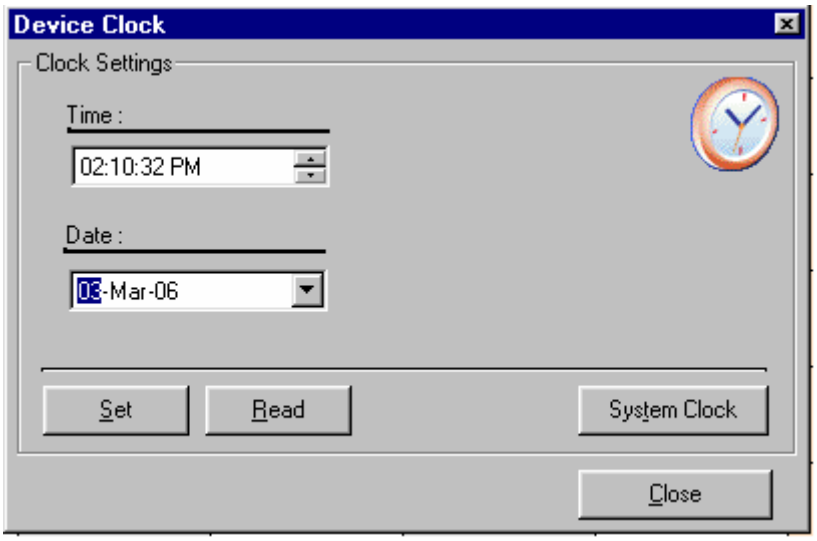
If device already has a password and set password is selected following window will appear.



Enter new password, confirm password and the old password than select ok “Password has been set successfully” message will be shown.

Transfer device clock

Device clock can be set as well as be read from the device



5.2 Select Genie configuration

Configuration allows selection of Genie model and Extension modules. Maximum three extension modules can be connected to one Genie. Extension modules of same type (AC or DC) can be connected. One can set the configuration as per the requirement. Each program can have different configuration. Configuration will get saved along with the program in the file. It will get automatically reloaded when a previously saved file is opened. Note that during "Simulation with Genie

“" the configuration selected in G-Soft must match the actual configuration of Genie.

5.3 Printing the programs

Print outs can be taken using G-SOFT-5.x.
It allows you to print program in details as well as in short.
Click on "File" menu to see the printing options.

Edit Print footer

One can enter the print footer information.
Information about the Project, version etc can be written. A provision is made to enter some additional information. File name and path and the page numbers will be automatically added to the footer.

Print Short

Print Short option prints the program in short. No comments will get displayed. It prints all 250 lines in a single page.

Print Details

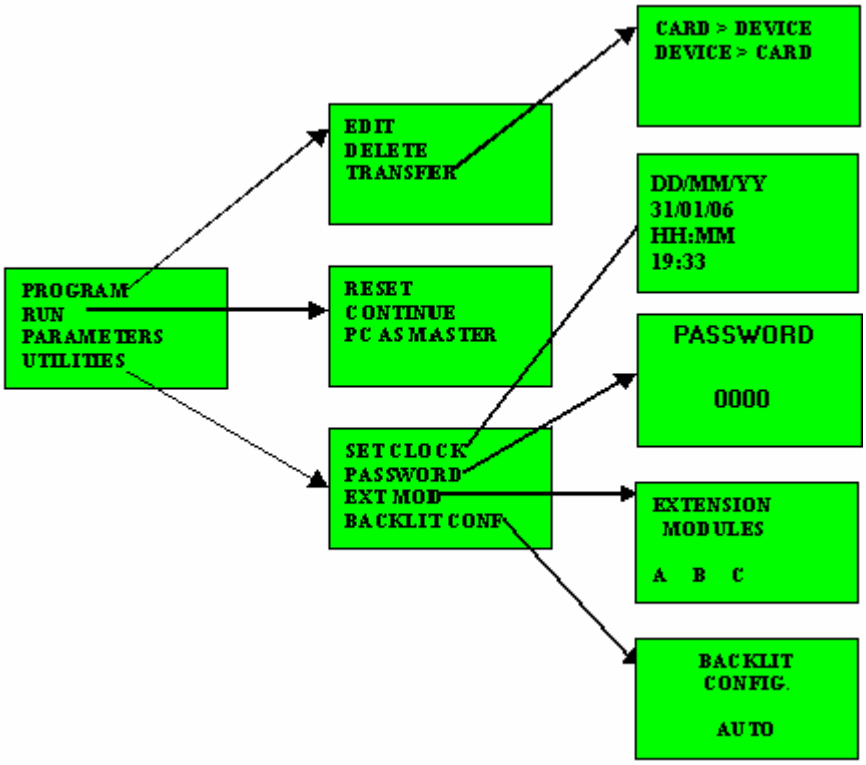
Print details option prints the program in details. All comments will get displayed. 10 lines will get printed on a single page. You will have choice of selecting a particular part of program for printing.

CHAPTER 6

Working With Genie

6.1 Genie Editor Environment

The block diagram below gives idea about the menu management interface and navigation to the functions available in Genie.



Main menu Functions

PROGRAM: Lets the user enter the Program that will make the Genie work. For information on how to enter programs, refer to the next section. This function may be password protected.

RUN: Lets the user start program execution in either the RESET Mode or the CONTINUE Mode.

RESET Mode will reset all the previous states of Inputs/ Outputs, and will clear timer and counter states, and will start afresh.

CONTINUE Mode will not change the previous states of the Inputs/ Outputs and special functions, and will continue the execution of the program.

The PC AS MASTER Mode will be used while simulating the user program with device.

PARAMETERS: This function lets the user display and change parameters of special functions like timer, counter, time switch (clock), compare counters and analog functions used in the program. This may be password protected and may have additional individual lock for each parameter.

UTILITIES: This function lets the user set the clock and activate / deactivate Password facility, select the extension Module (A / B / C) and set the backlit configuration (ON/OFF/AUTO).

SUB FUNCTIONS OF PROGRAM MENU

EDIT: EDIT function allows the user to enter a new program or edit an existing program. If Password is set, this function is accessible only with correct password.

DELETE: This function will clear the entire program stored in the Genie .If password is set, this function will work only with correct password.

TRANSFER: This function will transfer the program.

Card >Device:	Loading from the memory card
Device > Card:	Transfer to the memory card

SUB FUNCTIONS OF UTILITIES

SET CLOCK: This function is used to set the day and time: Day of the week, Hours-Minutes. This function is available only on Genie unit. In G-Soft you do not have this function, and the time/ day can be set on the PC using one of the Windows utilities.

PASSWORD: This function allows setting or removing password. If password is set, certain functions like Program, Parameters are protected and are accessible only when correct password is entered. The Password can be set or removed; the status is indicated by the open or closed lock symbol.

EXT. MOD: This function allows the selection of the Extension Modules (A / B / C). Maximum 3 Extension Modules can be connected to the Genie Main Unit. In the G-Soft on PC, extension modules have to be chosen using the "Configuration" menu.

BACKLIT CONF: This function allows the setting the backlit to either On, Off or be in the Auto mode. In the Auto mode, the backlit comes up only when a key is

pressed on the device and remains for 10 seconds. If the ON or OFF modes are selected the backlit will be permanently ON or OFF respectively.
The modes can be selected by pressing the UP or DOWN arrow keys on the device.
To transfer these utilities from PC refer CHAPTER 5 Other Features of G-SOFT.

6.1.1 Entering programs

If you choose to enter or edit a program directly on Genie unit or in the Genie mode of G-Soft, you can select the "Edit" option from the "Program" submenu.

Description of the keys

The 8 keys located on the front of the Genie are used to configure, program and control the application.
They perform the following actions.

DEL Key: Press this key to delete a program element, or a blank line, if the cursor is located in the 1st (left most) column.

ALT Key: Press this key for selecting/exiting any parameter in the edit mode and to show either the Parameters or Program while the program is running. This feature is useful for debugging.

OK Key: Press this key to insert a program line, when cursor is blinking in the first column. During the parameter entry while editing this key saves the changes and proceeds to next parameter. In RUN mode, this key can be used to select one of the 3 displays. This also selects/deselects links.

ESC Key: Press this key to exit the menu or a selection. During the parameter entry it proceeds to next parameter without saving the changes.

ARROW keys: On the program editor screen, the arrow keys are used to move up, left, down and right. The position on screen is shown by a cursor or respective blinking text.
On the parameter screen, left / right arrow moves the cursor to Next / previous position, and up / down keys increment / decrement the value.

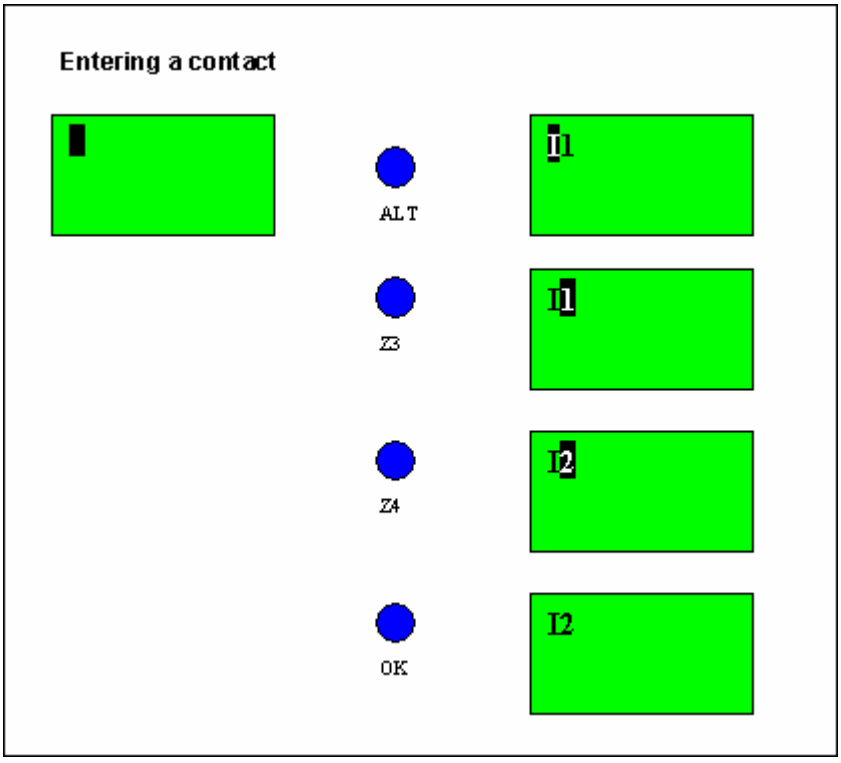
AUXILIARY Keys (Z-Keys): Arrow keys are called auxiliary keys in Run mode. They are used as push buttons to get signals from user. If user goes in PAR (parameter mode) or in PRG (program mode) in RUN mode, then these keys are not available as z-keys. At that time these keys are used as arrow keys.

The format of Program is:

- Maximum 250 lines of program
- Each line will have up to 3 contact elements and one coil element.
- Unless the contact is joined to previous or next line using the vertical joining links, a coil is a must in every line.
- Do not leave blank lines in the program, since this will unnecessarily increase the length of the program but not hamper the execution time.

Entering a contact

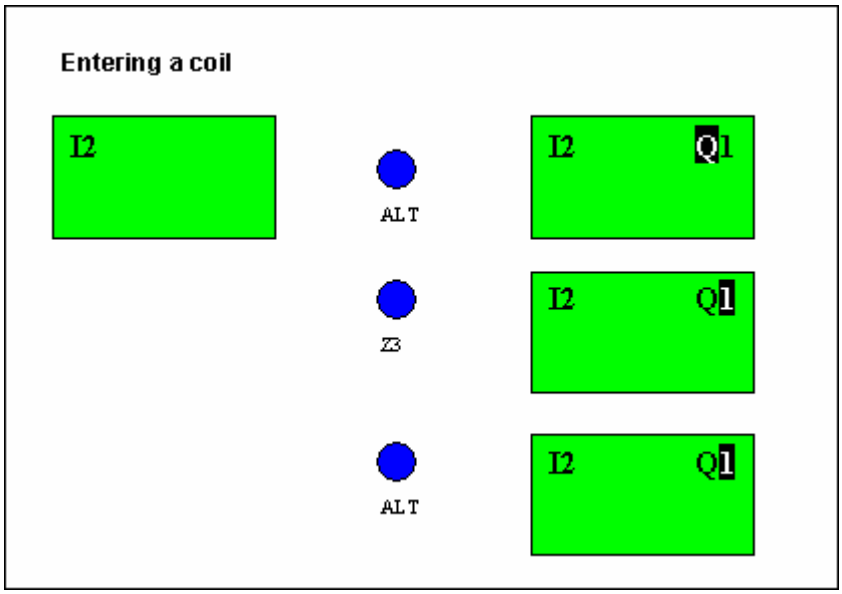
1 - Place the n blinking cursor in the required position.
2 - Press **ALT.**
3 - Choose the required element using the **Up** or **Down** keys.
4 - Use the **Right Arrow** key to move to the number.
5 - Choose the number using **Up** or **Down** keys.
6 - Press **ALT** or **Right Arrow** to accept and to go to next position.



Note: When the contact element is a special function, use ALT key rather than right arrow key to accept it. This will open a parameter display screen where you can enter various preset values.

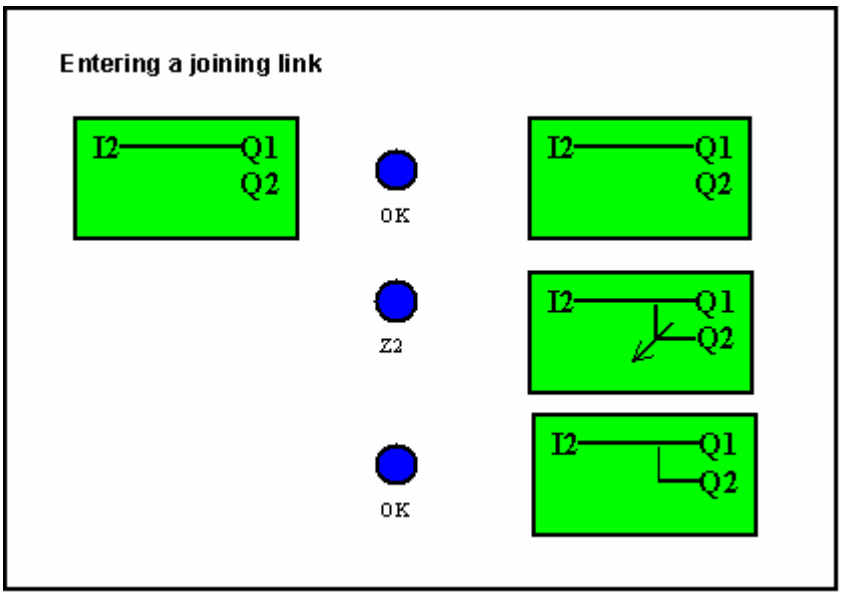
Entering a coil

1 - Place the n blinking cursor in the required position.
2 - Press ALT.
3 - Choose the required element using the Up or Down keys.
4 - Use the Right Arrow key to call-up the number.
5 - Choose the number using Up or Down keys.
6 - Use the Left Arrow key to move to the type of coil.
7 - Choose the type of coil using Up or Down keys.
8 - Press ALT or Right Arrow to accept and to go to next position.



Entering the Joining Links
To enter a link, proceed as follows.

1 - Place the "■ " blinking cursor next to the desired location.
2 - Press OK to start the link ("■ " cursor).
3 - Move the cursor to the desired location using the arrow keys. As the cursor moves, the link is drawn.
4 - Press OK to exit to normal mode.



Repeat this action as many times as necessary to link all the elements together as required.

Replacing a link with a contact

To replace a link with a contact, simply place "■ " cursor at the required location and press **ALT** to enter the contact as described on the previous page.

Entering a new element

In each line there are three possible positions of the blinking cursor ■, where a contact can be placed. A coil can be placed only in the right most column of each line

Changing an element

To change an element in an existing program, simply move to the element to change, press **ALT** and follow the same procedure as when entering a new element.

Deleting an element

To delete an element, simply place the ■ cursor on the required element, and then press **Del.** Generally, the deleted element must be replaced by a link.

Deleting links between elements

To delete a link, simply move the ■ cursor next to the desired position, press the OK key to change the cursor to **-** and press Del. Key. This may delete some of the required connections, which may be restored by the same method as above.

Deleting a program line

Program lines are deleted lines by line. Proceed as follows:

- Move the cursor to the first column of the line, if necessary delete the elements one by one to create blank line.
- Press **Del**. The line is deleted.

Note: It is possible to delete the entire program stored in the Genie. To do this, call up the "DELETE" option in the Program menu and validate the deletion of all program lines.

Inserting a program line

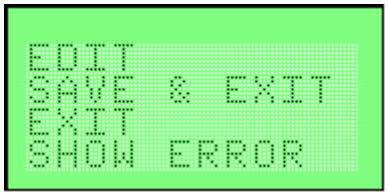
To insert a program line, simply move ■ cursor to the first column of the line immediately above the one to create and press OK.

Example
By following the indications below, the user can enter the two-way switch program.

Note: It is assumed that the password function is disabled.

- On the main screen move the cursor to "Program" and press OK button.
- Move the cursor to "Edit" and Press OK Button to select the editing mode.
- A blank screen appears and a blinking black box (cursor) is displayed. Press ALT
- "I1" shown. **"I"** will blink. Genie prompts the user to select the type of contact.
- Press Right Arrow. **"1"** will blink indicating selection a contact assigned to digital input (I). Genie now prompts you to select the input number.
- Since we require **"I1"** as the first contact, press Right Arrow. The cursor will blink
- The? is moved ready to enter the second contact.
- Press **ALT**. The right hand **"I"** will blink. User prompted to select the type of contact
- Press Up arrow **"i"** will blink. You have just selected the reverse contact of input I1.

- Press Right arrow, the **"1"** will blink. Now to change the input number press Up Arrow. The **"2"** blinks. Now simply validate this selection.
- Press ALT or Right arrow. The cursor blinks. Move to the end of the line ready to enter the coil.
- Press Right arrow. The ■ blinks. Now enter the coil.
- Press ALT. The **"Q"** blinks. Now all that remains is to select the other parameters for this coil.
- Press ALT Key. The **"1"** blinks. Coil **"Q1"** is validated.
- Press ALT Key. The coil is validated. The ■ cursor moves down to next line and the links are displayed automatically.
- Press ALT Key. The **"I"** located on the second line blinks
- Press Up Arrow to change the contact to **"i".**
- Press Right arrow. The **1** located on the second line blinks.
- Press Right Arrow. The cursor ■ blinks
- Press ALT. The **I** on the second line blinks
- Press right arrow. The **1** in the second line blinks.
- Press Up Arrow. The **2** in the second line blinks.
- Press Right arrow. The ■ cursor blinks. Now enter the link between the two lines.
- Press OK. The ■ blinks. It indicates that it is now possible to set the link between the two lines.
- Press Up arrow. The contact point blinks showing a ■ sign. Press OK key to restore normal mode.
- Press ESC. The screen displays the menu as shown. The ■ blinks and the 'SAVE EXIT' option is selected



- Press ESC. The screen displays the main menu.
- Press down Arrow. The Genie points to the RUN mode. The Genie can now be set to RUN
- Press OK. This will show the run-time screen. This screen allows the user to view the inputs; outputs and functioning of the two-way switch (switch action, ON or OFF, light ON or OFF).

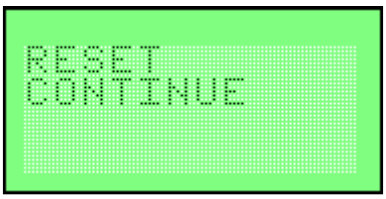
This simple application example demonstrates the user how to enter the program. The following points should be remembered:

When a ■ blinks use the ALT button to add an element (contact or coil). When an element (I, Q, M etc.) blinks, it is possible to use the Up and Down arrow keys on the keypad to change the element. When the ■ blinks, the arrow keys can be used to draw the connecting links. To switch back to normal ■ cursor press OK Key.

6.2 Run Function

To RUN the program press Program -- Run from the main menu.

The display will show:

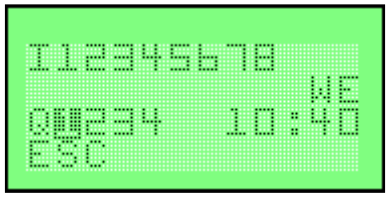


If Reset is selected
Then all status of all outputs and function blocks will get reset.
If Continue is pressed then program execution will proceed without changing either outputs or the current values of the function blocks.

Genie unit has PC as master function in addition to Reset & Continue functions. This function used when Genie unit is used for simulation with G-SOFT. In this mode actual program is RUN from G-SOFT. Input & output conditions are taken from Genie unit. Serial cable needs to be connected between Genie unit & PC.

User can press ALT key to show either the Parameters or Program while the program is running. This feature is useful for debugging.

RUN Mode Display Screen (For G8DDT8)

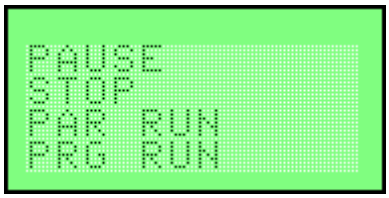


The screen shows:

1. Input status display
2. Output status display
3. Current day and time

Note : When the Parameter or Program is displayed, Z-keys (Auxiliary keys) are not available as auxiliary keys.

Parameter window in RUN mode: Press ESC. User can see the parameters of the special functions at RUN time. User can even change some of the parameter properties if the function is not locked. Arrow-keys are used to change the parameter values if required.



Program window in RUN mode: Press ESC. The above screen will be shown. User can see the program at RUN time. User cannot change the program. If the program elements are activated (the status is True), are shown in black background. Only up and down arrow keys are used to go through the program.

Note: In Run mode extension module identities cannot be changed.

6.3 Parameters of special functions on Genie

When entering a Program, the function block parameters must be filled in. These parameter-setting screens are displayed for:

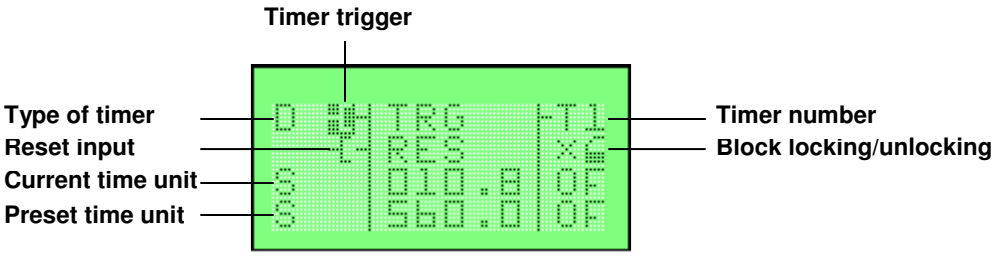
Timer function block,

Counter function block,
Time Switch function block,
Analog function block.
Compare Counter function block.

Regardless which screen is displayed, the parameter setting principle is the same.

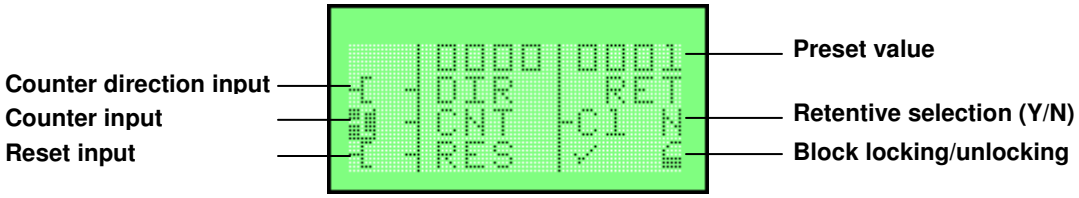
1 - Use the Right and Left arrow keys to move the ■ cursor onto the parameter to be changed.
2 - Place the cursor on the parameter to be changed, press Alt then use Up and Down arrow keys to change the parameter value.
3 - Finish data entry by pressing Esc (without saving the changes) or OK (after saving the changes) then Esc key to return to program entry screen.
4 - The parameters of all function blocks are accessible through the "Parameter" form on the Main Menu also.

Timer function block coils and parameters



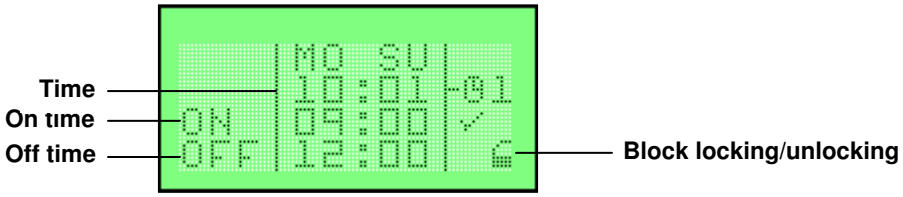
Note: When a "-[" is displayed in this screen, it indicates that the element was used in the program lines. This symbol will appear in the PARAMETER and RUN Menus. Place the cursor on the parameter to be changed, press ALT, and then use UP and DOWN keys to change the parameter values.

Counter function block coils and parameters

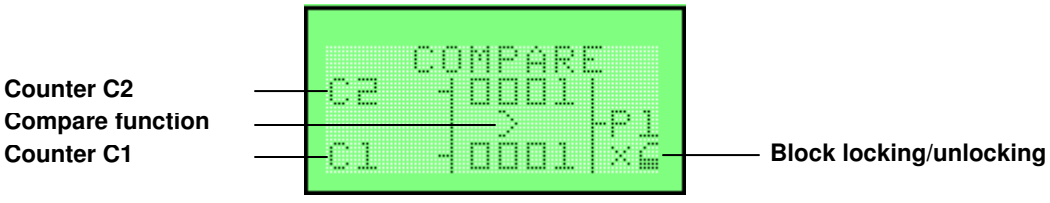


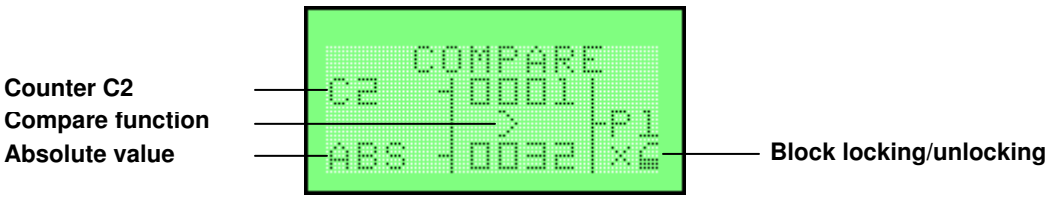
Note: The parameters that can be changed are the preset value, lock and retentivity. Preset value is between 0 and 9999.
When a "-["is displayed in this screen, it indicates that the element was used in the program. This symbol appears in the PARAMETER and RUN Menu.

Time switch (clock) function block parameters



Compare Counter function block parameters

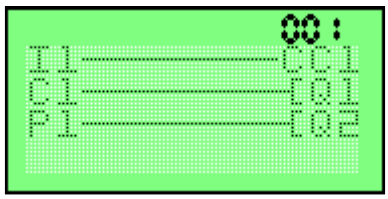




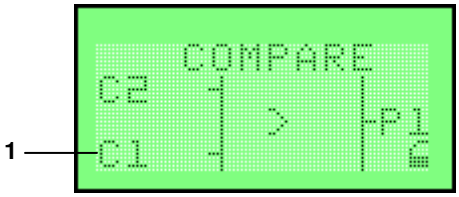
Example:

By following the indication below, the user can select Comparator for comparing counter C1 value with absolute value

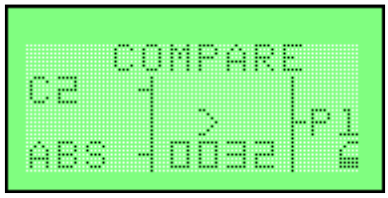
Edit Ladder as shown Below In The Device



Place the ■ cursor on P press ‘ALT’ 1 will blink again press ALT, screen as shown below will appear.



Bring the cursor at marked as 1 above and press ALT, then press Z4 key to select ABS, again press ALT. Bring the cursor at 0 by pressing Z3 key and enter the absolute value. Press ALT then OK to save the changes mode



Analog compare block parameters

6.4 Password

Password purpose

The password secures access to the following main menu options: "PROGRAM-EDIT", "DELETE", "PARAMETERS" and "TRANSFER" The password comprises four numeric digits from 0 to 9. Therefore the password can have any value between 0 and 9999. The Password is entered as follows.

Entering the password

Select Password from UTILITIES menu. The 🔓 means that no password is set yet.
Press Up Arrow. The 1 on the left blinks. Now enter the password
Enter the password using the arrow keys The digit being changed blinks
Press OK The password is activated and the user is returned to the utilities menu
Password shows 🔒 next time

Canceling password protection

To cancel password protection, simply enter the current password (see above). The password is inhibited which is shown by the open lock symbol in the next password screen.

Changing the password

To change the password, simply cancel the former one and enter a new one (refer to the method described above).

6.5 Transferring data to and from memory card

Transferring data to memory card is useful when user wants to load the same program in many Genie units. In this case instead of using PC user can make use of memory card, which is capable of storing one program. This feature is particularly useful on the production line where user is not required to edit and debug the program and a PC is not available.

Card > Genie

This transfer is used to reload an application into the Genie. It avoids the need to re-enter an existing application.

The following method is used:

1. Install the Memory card in the connector after removing the serial cable, if present.

2. Move cursor to the "TRANSFER" function from the "Program" menu.
3. Press the OK key to validate.
4. Select the Card > Device function.
5. Press the OK key to validate.

Note: Before transferring data to the Genie, use the DELETE command in the PROGRAM Menu to clear the contents of internal function blocks of the Genie.

Device > Card

The Genie has an optional EEPROM card. This function lets the user load the application from the Genie into the Memory Card.

The following method is used:
1. Install the Memory card in the connector after removing the serial cable, if present.
2. Select the **"TRANSFER"** function from the "Program" menu.
3. Press the **OK** key to validate.
4. Select the **Device > Card** function.
5. Press the OK key to validate.

Caution: Do not remove the card during the data transfer to and from the card. Similarly avoid using Device>Card and Card>Device commands when a serial cable is connected to the Genie connector.

CHAPTER 7 Extension Module Selection

7.1 Module Terminology

This section describes how extension module is selected.

Select the "EXT.MOD." Option from the "UTILITIES..."menu	EXT.MOD. A ■ B C	The A means that Extension Module "A" is selected and the cursor ■ blinks.
Z3	EXT.MOD. A B ■ C	The ■ moves to positions next to "B" and blinks.
Z2	EXT.MOD. A B ■ C	The Extension Module "B" also gets selected
Z4	EXT.MOD. A B ■ C	The Extension Module "B" selection is removed
OK		

7.2 Extension Module Inputs and Outputs

Extension Module Product Code	Identification on the product	Ladder diagram Representation			Description
		A	B	C	
G8DDT5E	I/P1-I/P6	J1-J6	K1-K6	L1-L6	Digital Inputs for 12-24VDC Extension module
	AN1&AN2	V3-V4	V5-V6	V7-V8	Analog Inputs for 12- 24 VDC Extension module
G7DDT5D	I/P1-1/P8	J1-J8	K1-K8	L1-L8	Digital Inputs for110-240VAC Extension module
	O/P1-O/P4	U1-U4	V1-V4	W1-W4	Digital outputs for 24VDC, 110-240 VAC Extensions

Notes: Analog inputs can also be used as digital inputs.
As per the selection of extension modules, the ladder diagram should be entered for the Inputs and their respective outputs.
In "Run" mode extension module identities cannot be changed.
When two External power supplies are used, observe the connections of the Live and Neutral. They cannot be interchanged.
Wire C1, C2 using twisted pair cable.
In the event of an error in communication between base and extension module due to a noise or physical disconnection the base module will show an error number

Chapter 8

Technical Specification

8.1 Electrical Specifications

	G8DDT8	G7DDT8
Digital Inputs	6(I1 –I6)	8(I1-I8)
Weekly clock	Yes	Yes
Supply Voltage(Ur)	12-24 V DC	110 -240 V AC
Supply Variation	-10% to +10% of Ur	-20% to +10% of Ur
Max Supply current	360 mA	36 mA AT 110 V AC
Digital Input Voltage range	0-4 V DC OFF(“0”) 8-26.4 VDC ON(“1”)	0-40 VAC OFF(“0”) 80-265VAC ON(“1”)
Max. Digital Input Current	0.5 mA	0.5 mA
Relay outputs	4	4
Analog inputs	2(0-10 VDC); could be used digitally	-

8.2 EMI/EMC Specifications

The EMC directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".

Specification	Test item	Test Results
IEC 61000-4-5	Surge	Level IV Common Mode 4 KV Differential Mode 2 KV
IEC 61000-4-4	Fast Transients	Level III 2 KV Rep Freq 5 KHz - 100 KHz
IEC 61000-4-11	Voltage Dips	30% reduction / 10 ms, 60% reduction /100 ms
IEC 55011	Radiated Noise from product	30 MHz – 230 MHz 30 dB V/m Quasi Peak 230 MHz – 1000 MHz 37 dB V/m Quasi Peak. Measured at 30m distance
IEC 55011	Conducted noise from product to power line is measured	0.15 MHz – 0.5 MHz 79 dB V Quasi Peak, 66 dB V Average 0.50 MHz – 30 MHz 73 dB V Quasi Peak, 60 dB V Average

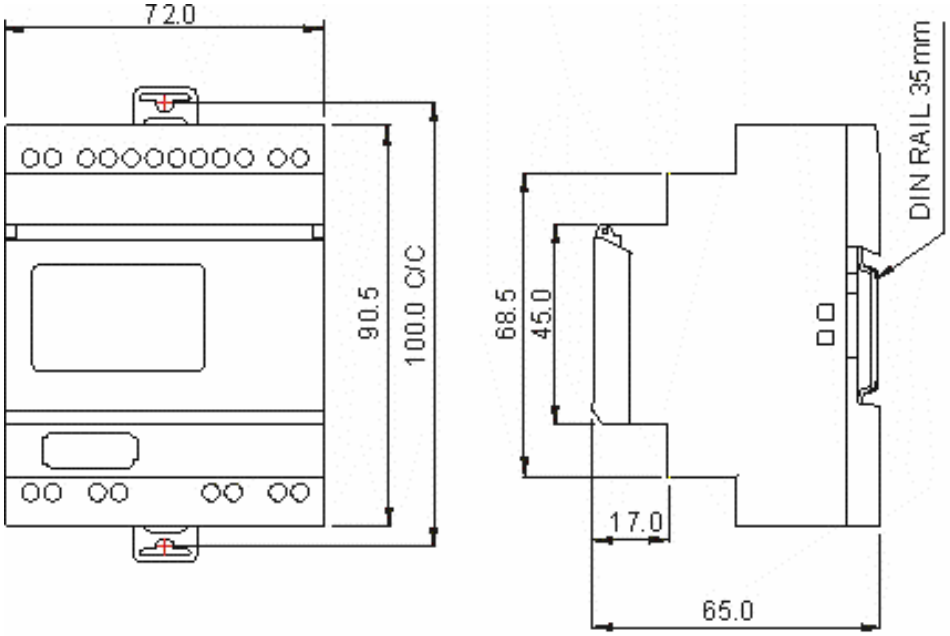
Note: The tests for the above test items were done when PLC was installed in a conductive control panel.

8.3 Genie Parameters Strength

Parameter	G8DDT8	G7DDT8
Digital Inputs	6	8
Analog inputs	2	0
No. of Extension Modules	3	3
Ext. Mod I/p	6	8
Ext. Mod. Analog I/P	2	0
Relay Outputs	4	4
Ext. Mod outputs	4	4
Timers	16	16
Counters	16	16
Time switch (clock)	16	16
Analog Comparators	12	0
Auxiliary Relays	32	32
Program lines	250	250

Note: Analog Inputs can also be used as digital inputs

8.4 Mechanical Dimensions



Sample Programs

Genie sample programs

Example 1	Watering of greenhouse plants
Example 2	Watering of roadside plants
Example 3	Bell system in a factory
Example 4	Roll down shutters
Example 5	Shop lighting
Example 6	Parking lot
Example 7	Cream stirrer in a dairy
Example 8	Exterior and Interior lighting
Example 9	Load Utilization
Example 10	Step switch - ventilator

Note: All programs are stored in directory 'sample programs' on PC.

Example 1

Genie used for **WATERING OF ROADSIDE PLANTS**

Watering requirements

A system is required to control the watering of road side plants such that the pedestrians have an option to walk on either side of road.
Plants need water daily twice.

In the morning from 6:00 to 6:03 side 1 and 6:10 to 6:13 side 2
In the evening from 8:00 to 8:03 side 1 and 8:10 to 8:13 side 2

Genie Solution

Genie to control watering.

I1 - ON Switch
Q1 - Solenoid valve for watering plant on one side
Q2 - Solenoid valve for watering plant on the other side
1- Time switch 1 from Mon. to Sun ON time 6:00 OFF time 6:03
2- Time switch 2 from Mon. to Sun ON time 20:00 OFF time 20:03
3- Time switch 1 from Mon. to Sun ON time 6:10 OFF time 6:13
4- Time switch 2 from Mon. to Sun ON time 20:10 OFF time 20:13

Example 2

Genie used as **WATERING OF GREENHOUSE PLANTS**

Greenhouse requirements

There are two types of plants in green house.
Type 1 - this type of plants need water every morning and evening for 3 minutes
Type 2 - this type of plants need water every alternate evening

Genie Solution

Greenhouse wants Genie to control watering.

Genie uses
I1 - ON Switch
Q1 - Solenoid valve for watering plant type 1
Q2 - Solenoid valve for watering plant type 2
1- Timeswitch 1: From Mon. to Sun ON time 6:00 OFF time 6:02
2- Timeswitch 2: From Mon. to Sun ON time 18:00 OFF time 18:02
3- Timeswitch 3: from Mon. to Sun ON time 8:00 OFF time 8:02

Example 3

Genie used as **BELL SYSTEM** e.g. **IN FACTORY**

Factory activities

From Mon. to Thu. Factory starts at 8:00 and ends at 16:30

On Fri factory starts at 8:00 and ends at 15:30
Breakfast time: Everyday from 9:45 to 10:00
Lunch time: Everyday from 12:45 to 13:30

Genie Solution
Bell should ring 2 minutes each time

Genie uses

I1 - ON Switch
Q1 - Bell
1- Timeswitch 1: from Mon. to Fri. ON time 8:00 OFF time 8:01
2- Timeswitch 2: from Mon. to Fri. ON time 9:45 OFF time 9:46
3- Timeswitch 3: from Mon. to Fri. ON time 10:00 OFF time 10:01
4- Timeswitch 4: from Mon. to Fri. ON time 12:45 OFF time 12:46
5- Timeswitch 5: from Mon to Thu. ON time 13:30 OFF time 13:31
6- Timeswitch 6: from Mon to Thu ON time 16:30 OFF time 16:31
7- Timeswitch 7: from Mon. to Fri ON time 13:30 OFF time 13:31
8- Timeswitch 8: from Mon. to Fri ON time 15:30 OFF time 15:31

Example 4

Genie used as **ROLL DOWN SHUTTERS CONTROLLER**

Requirements

Opening and closing of shutters is to be controlled.
There are two types of operations by which shutters can be controlled.
Type 1 - Manual operation
Type 2 - Automatic operation

Genie Solution

Genie allows shutters to control manually as well as by Genie.
If in manual operation mode, shutter will be opened whenever Shutter open key is pressed and shutter will be closed whenever shutter close key is pressed.
In Automatic operation mode, Shutter will open only for time 7:00 AM to 6:00 PM
Closing of shutters also depends upon photosensitive switch.

Manual node and Automatic mode operation is decided by a switch.

Genie uses

I1 - Photo-Sensitive switch to detect sufficient light
I2 - Manual switch to take shutter UP
I3 - Manual switch to take shutter down

I6 - Operation mode switch to select manual mode or automatic mode
Q1 -Shutter Up
Q2 -Shutter Close
1 - To set timing for Shutter close
Block A from Mon. to Sun. ON time 7:00 OFF time 18:00

Example 5

Genie used for **CONTROLLING SHOP LIGHTING**

Shop activities

Shop is open from Monday to Friday from 8:00 AM to 10:00 evening.
On Saturday from 8:00 to Midnight
On Sunday Midday to 8:00 in the Evening.

When Shop opens Regular lighting is turned ON.
When sunlight is insufficient, additional light is turned ON.
During nighttime when shop is closed minimum light is ON.
To highlight some special items, whenever customer passes from special item window, spotlight turns ON.

Genie Solution

Shop has four types of lights.
1. Lighting during the daytime.
2. Additional lighting in the evening
3. Minimum lighting during night.
4. Spotlights to light particular articles.

Genie uses

I1 - Photosensitive switch to detect additional lighting requirement.
I2 - ON Switch
Z1- Test Switch: .to test all types of lights.
I4 - Motion detector to decide spot light to turn ON
Q1 - Lighting during day time
Q2 - Additional lighting in the evening
Q3 - Lighting during the night
Q4 - Spot lights

1 - Time switch (clock) used to set timing for which shop is open
Same Time switch (clock) is used for timing from Monday to Friday, Saturday and
Sunday.
2 Timeswitch 1: from Mon. to Fri. ON time 8:00 OFF time 10:00

3 Timeswitch 2: from Sat to Sat. ON time 8:00 OFF time 00:00
4 Timeswitch 3: from Sun to Sun ON time 12:00 OFF time 18:00
T1 - Timer is used to set time for which all lights are to be turn ON for testing purpose.
Timer is used in OFF delay mode Z1 is used to trigger the timer.
T2 - Timer is used to set the timing for which spotlight to turn ON.
Timer is used in OFF delay mode. Motion detector is used to trigger the timer.

Example 6

Genie used for controlling parking lot

Requirement

Parking lot is available for certain time.
Vehicles entering and exiting need to count
Lights should be controlled as per he Vehicle entry and the pedestrian's access buttons.
CO2 level in the parking lot should be monitored.
Manual entries are permitted.

Genie Solution

Parking lot timings are from Mon. to Fri 8:30 AM to 5 PM and on Sat 9:30 Am to 12 Noon
Smoke detector is connected to detect CO2 level
Pedestrian's access points are near the elevator so that they can put ON the lights when they come to take out the vehicle.

Genie uses

Genie and Extension module A

I1 - Vehicle entry
I2 - Vehicle Exit
I3 - Pedestrian's access point
I4 - Pedestrian's access point
Q1 - RED light to indicate parking lot Full
Q2 - Green light to indicate parking lot is available
Q3 - Parking lights
Q4 - Exhaust Fan
T1 - Timer used to set time for lights ON
T1 is used in
T2 - Timer used to set time for Fan
C1 - Counter to count number of vehicles.

Z1 - Manual mode
Z2 - Automatic mode
Z3 - Manual Exit
Z4 - Manual entry
A1 - Equation for CO2 level.
1 - Parking lot timing.

Example 7

Genie used to control **CREAM STIRRER IN A DAIRY**

Requirement

In a dairy a Cream Stirrer is continuously need to rotate. To control this, Genie is used.
Genie should allow automatic control as well as direct / continuous operation.

Genie Solution

To select automatic operation or continuous operation a switch is used.
In Continuous operation mode Stirrer runs continuously without interrupt where as in Automatic operating mode stirrer switches ON and OFF.
ON for 15 Seconds and OFF for 10 seconds.
Signal is given in case of any error or fault condition in the system.
In case of fault, a fault indicator and alarm should get activated. Alarm gives sound in continuous on OFF mode unless fault is acknowledged.
Acknowledgement signal is given to Genie.

Genie uses

I1 - Automatic / Continuous mode selector. High - Automatic mode
Low - Continuous mode.
I3 - Fault condition
I4 - Acknowledgement for alarm only
Q1 - Stirrer
Q2 - Fault indicator
Q3 - Alarm
T1 - Timer for Stirrer ON (used in Pulse mode timer 15 Sec)
T2 - Timer for Stirrer OFF (used in OFF delay mode Timer 10 Sec)
T3 - Timer for Alarm beep of time 1 sec ON - OFF (used in Flashing mode)

Example 8

Genie used to **CONTROL EXTERIOR AND INTERIOR LIGHT OF A HOUSE**

Requirement

Lights should be controlled only in the evening. From 7:00 PM TO 5:00 AM in the morning.

Whenever a person comes from any direction, Exterior light in the corresponding direction should become ON for specified time. Time is such that a person should be able to pass from there. Lights should be made ON only in the dark.
For some cases user need to put ON all exterior lights, which is independent of time and darkness.

In case of alarm input signal from buglers alarm system signal, all exterior as well as interior lights are ON along with buzzer.
Buzzer is made continuous ON and OFF.

Genie Solution

Three motion detectors are connected in three directions.
Another detector is connected which will make all exterior lights ON.

Genie uses

I1 - Photosensitive switch to detect darkness.
I2 - Motion detector position 1
I3 - Motion detector position 2
I4 - Motion detector position 3
I5 - Motion detector position 4
I6 - Alarm Contact
Q1 - Exterior lighting 1
Q2 - Exterior lighting 1
Q3 - Exterior lighting 1
Q4 - Interior lighting
T1 - Timer is used to set time for which Lights to be made ON in one direction
Timer use in OFF delay mode. I2 is used as trigger to this timer
T2 - Timer is used to set time for which Lights to be made ON in second direction
Timer use in OFF delay mode. I3 is used as trigger to this timer
T3 - Timer is used to set time for which Lights to be made ON in third direction
Timer use in OFF delay mode. I4 is used as trigger to this timer
T4 - Timer is used to set time for which, all exterior lights to be made ON
T5 - Timer is used to set time for which interior as well as exterior lights to be made ON
1 - To set timing for which the motion detectors are sensed.

Example 9

Genie used for **LOAD UTILIZATION:** Switching a group of three similar loads

Requirement

An application needs two loads in operation. For less wear and tear three loads are used and two of them are to be used at a time so Genie is needed. To ensure equal wear and tear of the loads, they must be alternately switched ON and OFF.
In case of fault condition at any one load, other two are continuously ON.

Genie Solution

Two loads should be ON at a time.
Genie will start with load 1 and 2 then it will switch to 2 and 3 and then 3 and 1.

Genie uses

I1 - Fault at load 1
I2 - Fault at load 2
I3 - Fault at load 3
Q1 - Load 1
Q2 - Load 2
Q3 - Load 3
Q4 - Fault indicator
T1 - Timer is used to set time for which Load 1 and 2 will be in operation
T2 - Timer is used to set time for which Load 2 and 3 will be in operation
T3 - Timer is used to set time for which Load 3 and 1 will be in operation
M4 - Dummy output used to get the start condition.

Example 10

Genie used for **STEP SWITCHING** e.g. **VENTILATORS**

Requirement

Genie used to switch between different levels of a ventilator.
Four doors of a ventilator are to make ON or OFF step by step. The buttons connected decides whether to open the door or to close the door.
While opening the doors, each door should open after certain time even tough button pressed twice at a time.

Genie solution

Button I1 starts the ventilator at level 1. If the button is pressed again, level 2 is opened that is one level up. Similarly, when another button I2 is pressed, ventilator closes the door one level down.

Genie uses

I1 - Button for upward direction
I2 - Button for downward direction
Q1 - Contactor level 1
Q2 - Contactor level 2
Q3 - Contactor level 3
Q4 - Contactor level 4
T1 - Timer is used to set minimum delay between level 1 and 2 opening
T2 - Timer is used to set minimum delay between level 2 and 3 opening
T3 - Timer is used to set minimum delay between level 3 and 4 opening
C1 - Counter used to count number of levels opened before level 1
C2 - Counter used to count number of levels opened before level 2
C3 - Counter used to count number of levels opened before level 3
C4 - Counter used to count number of levels opened before level 4

Example 11

Genie used in **BATCH BOTTLE COUNTING**

Requirement

In bottle counting applications, an indication is required if particular no. of bottles are counted. These indications are to be given at different times when some batch of bottles is completed.

Genie Solution

To count bottles, the sensor input, which counts the bottles, has to be given to Genie.
Once the sensor input is given to Genie, the counting is carried according to the ladder. The counter value increments on every input sensed.
The same counter is used to compare with three other counter values. If user wants to show some lamp indication if counting is over up to 1000, 3000 & 5000, then he just can compare those values in the compare counter block & make the corresponding output ON to show some indications.

Genie uses

I1 - Input for bottle counting.
Q1 - Indication for 1st batch complete.
Q2 - Indication for 2nd batch complete.
Q3 - Indication for 3rd batch complete.
C1 - Counter to count number of bottles.
P1 - Compare Counter block to compare counter value to 1000 (Batch 1 complete indication)
P2 - Compare Counter block to compare counter value to 3000 (Batch 2 complete indication)
P3 - Compare Counter block to compare counter value to 5000 (Batch 3 complete indication)

FAQ

Sr No	Question	Answer
01	Does Genie support both AC and DC inputs?	Separate modules fro AC(110 V to 240V) and DC(12 to 24 V) inputs are available. Select a proper module referring to specification given.
02	How many inputs and outputs can be connected?	You can connect 8 inputs and 4 digital/relay outputs to each of Genie's base and expansion units (3 extensions units at present). So, total 32 inputs and 16 relay outputs altogether.
03	Can I connect analog input to Genie?	Yes, 2 analog inputs for DC operated module. The analog inputs are of voltage type with input range of 0 to 10V.
04	How is the Genie base unit and extension modules connected? How do they communicate?	Connect C1 and C2 terminals of base modules to respective C1 and C2 terminals of extension module/s in a daisy chain fashion. Cable for communication has to be twisted pair.

05	Which special function elements are supported?	At present there are 16 Timers, 16 counters(retentive selectable), 16 Compare counter blocks, 16 Time switch, 12 Analog comparators(with DC model)
06	How can the coil be used as a remote/pulse relay? What are the various usage modes of coil?	The remote/pulse relay switches on the coil when the pulse is received and resets it on the next pulse. Coil can be chosen as remote relay represented by IQ while entering the diagram line. The coil can be used as normal coil. (-[Q1), the remote relay IQ or set/reset SQ/SR coil.
07	What is Auxiliary relay and how can it be used?	Auxiliary relay is a software flag to save or forward a state in the ladder program. The Auxiliary relay (M) can be used as a normal coil (-[M1), a remote relay IM or Set/Reset (SM/SR) coil. 32 Auxiliary relays are provided.
08	Can I use Timers in different modes?	Yes, Timers can be used in 5 different modes viz. On delay OFF delay, Interval/pulse and Cyclic/asymmetric ON/OFF modes.
09	In the Counter and Analog Compare functions how to select one of the inputs to take in absolute value?	In the Parameter Settings screen fro the block press ALT key to select input 1 or input 2 to the absolute mode.
10	Can I use Counters as UP or DOWN Counters? Are they Retentive?	Selection the direction of counter as either UP/DOWN counting. Count can be preset from 1 or inputs 2 to the absolute mode.
11	What is the maximum counting frequency of the counter block?	The counter block can accept inputs with frequency from 1 Hz to 7 Hz
12	How is the Clock function used?	Clock function acts like a programmable weekly timer,1 Clock function block is provided, with 16 programs per output.
13	Is the function blocking possible on Genie?	Yes, each function block can be locked so that the parameters associated with the block cannot be changed in the run mode. Block by default is unlocked and can be locked by moving to the lock symbol and pressing the up/down

		arrow key in the block's parameter setting screen.
14	Can the arrow keys on the genie be used as inputs?	Yes, the four keys (Z1-Z4) can be used as inputs. They can only be used as contacts within the ladder program.
15	How can I make backlit of LCD permanently ON or OFF?	By default the backlit is in Auto off mode. In Auto off mode the backlit will go OFF if no key is pressed in 15 seconds and will come ON if any key is pressed. You may choose the backlit to be either Continuously ON or OFF by navigating to the utilities menu on genie.
16	What care to take while uploading the program from genie into PC or PC to genie.	Refer to the transfer options as explained in the manual Check if the serial cable is connected at the selected COM port in the program and port is not in use by any other application.
17	I have USB ports on my computer, how do I transfer?	A USB to serial conversion cable can also be ordered now.
18	What is the memory card used for? How is it used?	You can save the application logic in the memory card for future use. It is particularly used if user wants to load the same application program on multiple units quickly. Use the Card >Device command on the unit to transfer the program.
19	Can I have a hard copy of the application program I have written?	Use print option G-SOFT to take printout of the ladder logic.
20	What resolutions does the G-SOFT Ver5.x support?	G-SOFT 5.x works well with 800X600 and 1024X 768 resolutions.
21	In G-SOFT Ver5.x I want to simulate my program in PC with genie itself. How do I do it?	Select 'Simulation with device' in the simulation menu in G-SOFT . Now PC acts as master in the RUN menu.
22	How I can get more familiar with genie?	Try yourself the application examples given in the user manual where in we have tried to cover the use of various elements comprehensively.
23	What to do if I find some problem with Genie?	Kindly contact us immediately for solutions. However we recommend you to initially go through the details

		provided in the user manual and the FAQ.

Appendix C Program Error Codes

Error No.	Description
99	Improper Connection in Col. 3 or 6 or 8
50	Insufficient Program for "RUN"
51	Insufficient contacts in Col. 1
12	Error in communication between base and extension modules due to physical disconnection or noise.