

# DCISERVER SYSTEM MANUAL

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Upon receipt of the product and prior to initial operation, read these instructions thoroughly and retain for future reference.

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## MOTOMAN INSTRUCTIONS

MOTOMAN XXXXXX INSTRUCTIONS  
DX100 INSTRUCTIONS  
DX100 OPERATOR'S MANUAL  
DX100 MAINTENANCE MANUAL


The DX100 operator's manual above corresponds to specific usage.  
Be sure to use the appropriate manual.

Part Number: 159529-1CD  
Revision: 0



YASKAWA

MANUAL NO.

159529-1CD 



## MANDATORY

- This system manual provides an overview of the Yaskawa DCIServer. It gives general information about the system, a description of its major components, and the procedures for installation, system operation, and preventive and repair maintenance. Be sure to read and understand this manual thoroughly before installing and operating the DCIServer system.
- General items related to safety are listed in Section 2 of the *DX100 Controller Manual*. To ensure correct and safe operation, carefully read the *DX100 Controller Manual* before reading this manual.



## CAUTION

- Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure that all covers and shields are replaced before operating this product.
- The drawings and photos in this manual are representative examples, and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications.
- If such a modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.

## Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the Yaskawa DCIServer system.

In this manual, the Notes for Safe Operation are classified as "WARNING," "CAUTION," "MANDATORY," or "PROHIBITED."



### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.



### CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.



### MANDATORY

Always be sure to follow explicitly the items listed under this heading.



### PROHIBITED

Must never be performed

Even items described as "CAUTION" may result in a serious accident in some situations. At any rate, be sure to follow these important items.



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as "CAUTION" and "WARNING."



## WARNING

- Before operating the manipulator, check that servo power is turned OFF by pressing the EMERGENCY STOP buttons on the operator station or Programming Pendant (refer to *Figure 1*). When servo power is turned OFF, the SERVO ON LED on the Programming Pendant is turned OFF.

Injury or damage to machinery may result if the Emergency Stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the EMERGENCY STOP buttons do not function.

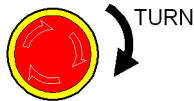
*Figure 1: EMERGENCY STOP Button*



- Release the EMERGENCY STOP button (refer to *Figure 2*). Once this button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

*Figure 2 : Release of EMERGENCY STOP Button*



- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  - View the manipulator from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - Ensure that you have a safe place to retreat to in case of emergency.

Improper or unintended manipulator operation may result in injury.

- Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  - Turning on the power for the DX100 controller.
  - Moving the manipulator with the Programming Pendant.
  - Running the system in the check mode.
  - Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an EMERGENCY STOP button immediately if there is a problem. The EMERGENCY STOP buttons are located on the operator station and on the Programming Pendant.



## CAUTION

- Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately and be sure that all other necessary processing has been performed.
  - Check for problems in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.
- Always return the Programming Pendant to the hook on the cabinet of the DX100 controller after use.

The Programming Pendant can be damaged if it is left in the manipulator's work area, on the floor, or near fixtures.

- Read and understand the Explanation of Warning Labels in the *DX100 Controller Manual* before operating the DCIServer system.

## Definition of Terms Used Often in This Manual

The MOTOMAN manipulator is the YASKAWA industrial robot product.

The manipulator usually consists of the controller, the Programming Pendant, and supply cables.

In this manual, the equipment is designated as follows:

Equipment	Manual Designation
DX100 controller	DX100
DX100 Programming Pendant	Programming Pendant
Cable between the manipulator and the controller	Manipulator cable

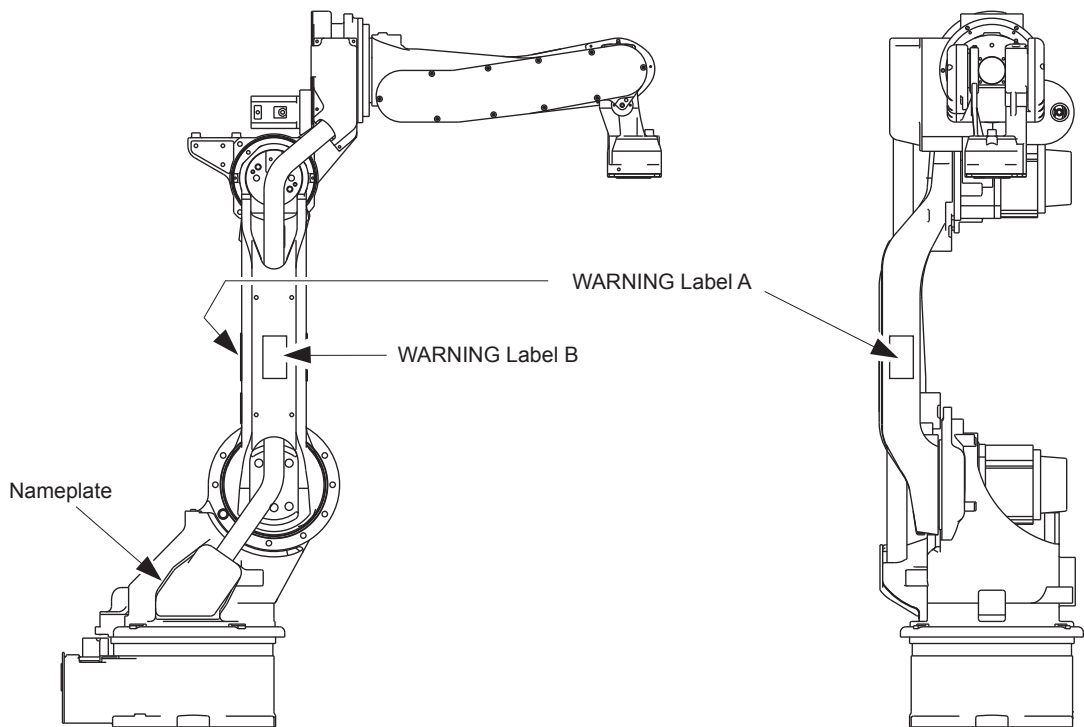
## Explanation of Warning Labels

The following warning labels are attached to the manipulator (refer to *Figure 3*).


Always follow the warnings on the labels.

Also, an identification label with important information is placed on the body of the manipulator. Prior to operating the manipulator, confirm the contents.

*Figure 3: Warning Labels Location*



Nameplate:

MOTOMAN	
TYPE □□□□□	
PAYLOAD □□ kg	MASS □□□ kg
ORDER NO. □□□□□□	DATE □□
SERIAL NO. □□□□□□	
 YASKAWA ELECTRIC CORPORATION JAPAN	

WARNING Label A:



WARNING Label B:



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# 1 Introduction

## 1.1 About This Document

DCIServer is an advanced robot controller communications service. It serves requests for loading and saving job files and variables to and from the robot controller. DCIServer also supports simultaneous communication between the server and multiple controllers. The setup of the controllers is maintained in an ini file. This manual contains the following sections:

### *Section 1 – Introduction*

This section provides general information about the DCIServer function, a list of reference documents, and customer support contact information.

### *Section 2 – Installation*

This section provides a description of the major components of the DCIServer function.

### *Section 3 – Variable Editor*

This section provides installation procedures for the DCIServer function.

### *Section 4 – Operation*

This section provides an overview of DCIServer function operation, including start-up, loading, normal operations, fault recovery, and system shutdown.

### *Section 5 – Programming Tips*

This section provides programming tips for the DCIServer.

## 1.2 System Requirements

- Supported Robot Controllers - NX100, and DX100
- Operating System - Microsoft Windows 2000, XP, or Server 2003
- Ethernet Function

## 1.3 Reference Documentation

For additional information on individual components of the DCIServer system, refer to the following documentation that is included with your system:

- Motoman *DX100 Controller Manual* (P/N 155494-1CD)
- Motoman *NX100 Controller Manual* (P/N 149201-1CD)
- Motoman *Maintenance Manual for DX100* (P/N 155492-1CD)
- Motoman *Operator's Manual for General* (P/N 155507-1CD)
- Motoman *DX100 Concurrent I/O Manual* (P/N 155491-1CD)
- Motoman *NX100 Concurrent I/O Manual* (P/N 149230-1CD)
- Motoman *INFORM User's Manual* (P/N 155493-1CD)
- Motoman *INFORM User's Manual* (P/N 150078-1CD)
- Vendor manuals for system components not manufactured by Yaskawa

	1	Introduction
DCIServer	1.4	Customer Support Information

## 1.4 Customer Support Information

If you need assistance with any aspect of your DCIServer system, please contact Motoman Customer Support at the following 24-hour telephone number:

**(937) 847-3200**

For **routine** technical inquiries, you can also contact Motoman Customer Support at the following e-mail address:

[techsupport@motoman.com](mailto:techsupport@motoman.com)

When using e-mail to contact Motoman Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.



Please use e-mail for **routine** inquiries only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact Motoman Customer Support at the telephone number shown above.

Please have the following information ready before you call:

- |                            |  |
|----------------------------|--|
| • System                   | DCIServer  |
| • Primary Application      | Arc Welding, Handling, etc.  |
| • Controller               | NX100, DX100   |
| • Software Version         | Access this information on the Programming Pendant's LCD display screen by selecting {MAIN MENU} - {SYSTEM INFO} - {VERSION} |
| • Robot Serial Number      | Located on the robot data plate  |
| • Robot Sales Order Number | Located on the controller data plate   |

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	2	Installation
DCIServer	2.1	PC Installation

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## 2 Installation

### 2.1 PC Installation

MotoSoft software is provided on a single DVD-ROM with a browser/installer utility. (Motoman DVD-ROM Browser, P/N 141720-1). You must install DCIServer from the Motoman DVD Browser onto your hard drive; you cannot run the program from the DVD. Please refer to the CD Browser for detailed installation instructions.

By default, DCIServer is installed in c:\Program Files\Yaskawa America Inc\DCIServer\.

**NOTE**

It is necessary to remove all previous installations of DCIServer. To uninstall DCIServer, proceed as follows:

1. Double-click Add/Remove Programs in the Windows Control Panel.
2. Select "DCIServer" from the list and click Add/Remove.
3. Click Yes to confirm deletion of the DCIServer program files.

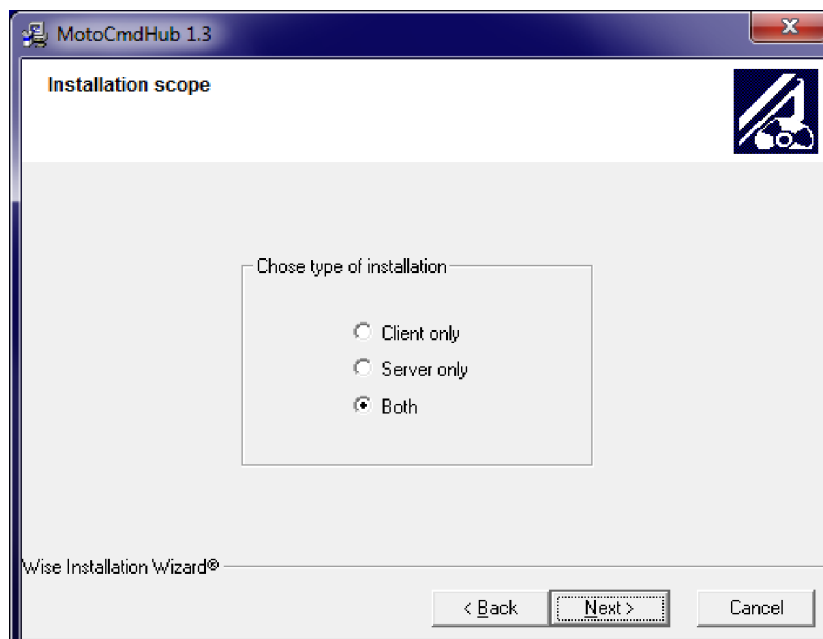
To install DCIServer, proceed as follows:

1. Insert CD Browser into your CD-ROM drive.
2. The setup program starts automatically.

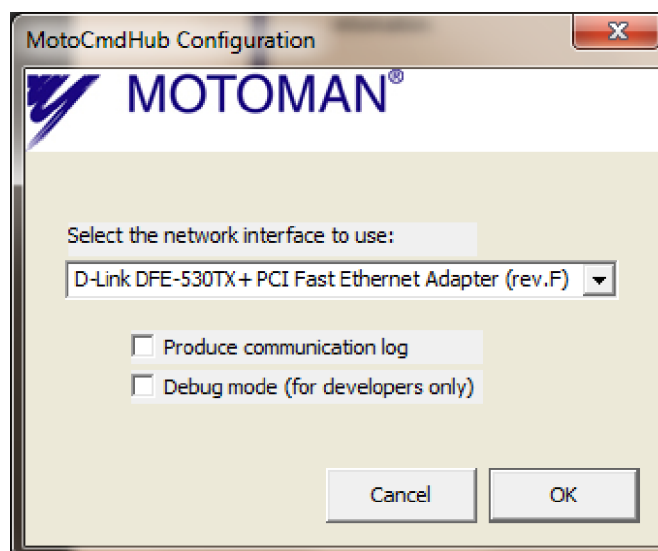
**NOTE**

Setup executes automatically when the DVD is inserted into the DVD-ROM drive unless auto execute has been disabled on your computer. If the setup program fails to auto execute, refer to the directions on the DVD label for more information. You may be required to reboot your PC before continuing with the installation.

3. Click the Communication Software button.
4. Select DCIServer and follow the install wizard instructions as it guides you through the installation process.
5. During installation, MotoCmd Hub is also installed. Select "Both" Client and Server installation.



6. Select the network interface card used to communicate with the robot.



7. The option 'Produce communication log' enables a log file with detailed information about the communication server to be produced. The option 'Debug mode' is used by software developers and should be disabled by default.
8. Click OK to proceed.
9. When installation is complete, click [Finish]. Shortcuts to the DCIServer software are installed on the Desktop as well as in the Programs folder of the Start Menu.

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	2	Installation
DCIServer	2.2	Controller Setup

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### **2.1.1 Hardware Key Installation**

The hardware key supplied with DCIServer must be installed on your computer or DCIServer will not function properly. The hardware key attaches to the computer's USB port. This port is commonly used to connect printers and other peripheral devices to your computer. To attach the hardware key, proceed as follows:

1. Disconnect any device currently connected to your computer's parallel port.
2. Carefully insert the hardware key into the USB port. If the key does not fit, do not force it. The key should fit snugly but does not require significant force to insert.

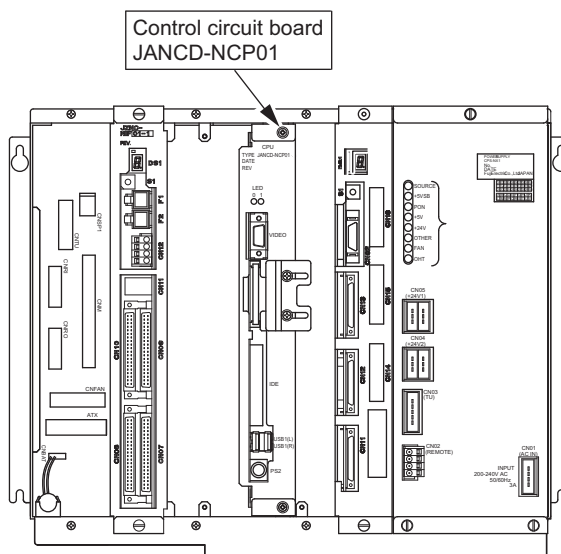
## **2.2 Controller Setup**

Before you can begin using DCIServer, you must establish an ethernet connection between the robot controller and remote PC, and set transmission parameters for your system. To complete setup, complete the appropriate steps for your controller.

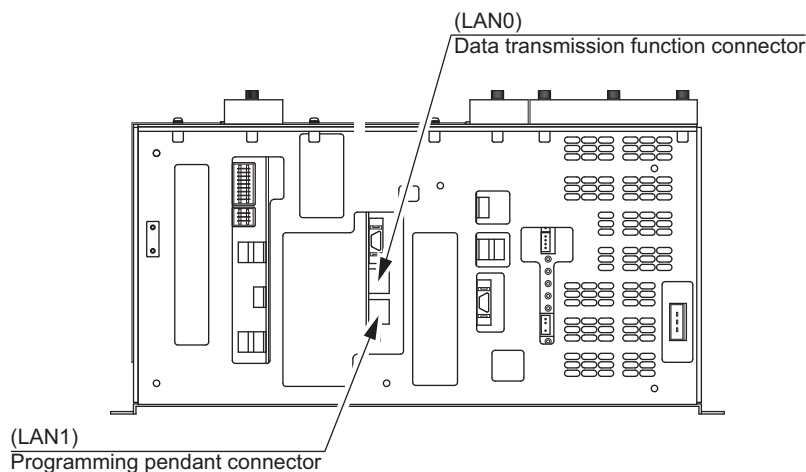
### **2.2.1 NX100 Controller Setup**

DCIServer requires a standard Ethernet cable (category 5 or more) to connect the PC to the NX100 controller. A shielded Ethernet cable is recommended to reduce noise in an industrial environment. If you are not using a switch/router, you may require a crossover Ethernet cable.

Connect the Ethernet cable (shielded cable; category 5 or more) to the RJ-45 transmission connector located on the bottom of the NCP01 board inside the CPU rack.



Front Face (View without Cover)



Bottom Face

### 2.2.2 DX100 Controller Setup

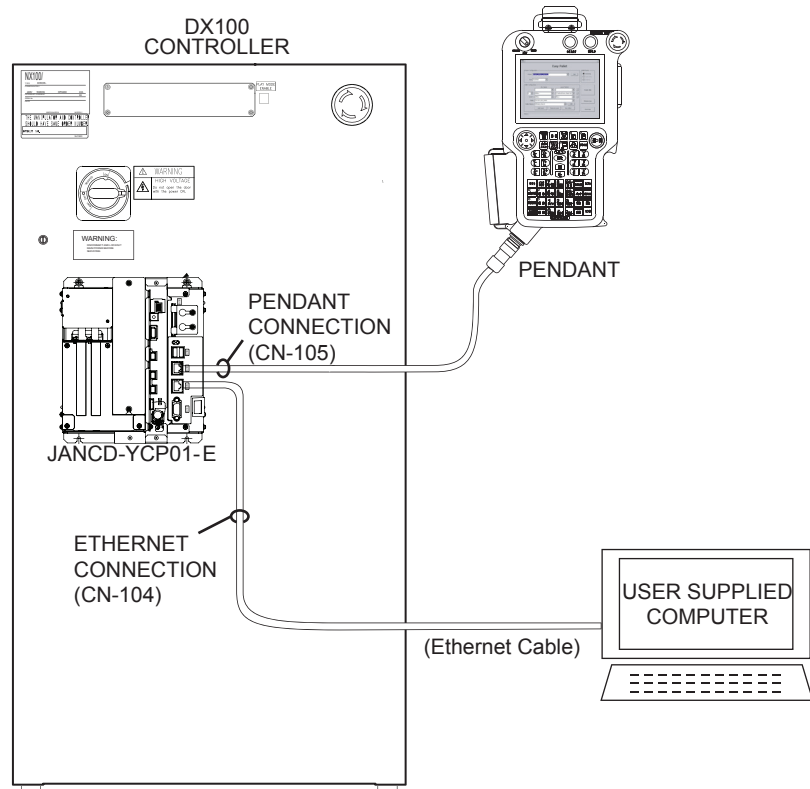
DCIServer requires a standard Ethernet cable (category 5 or more) to connect the PC to the DX100 controller. A shielded Ethernet cable is recommended to reduce noise in an industrial environment. If you are not using a switch/router, you may require a crossover Ethernet cable.

Connect the Ethernet cable (category 5 or more) to the CN104 RJ-45 LAN connector which is located on the front face of the YCP01 board inside the CPU rack.



There are two RJ-45 connectors at the front face of the YCP01 board. CN104 is the bottom one used for the Ethernet function. Do not use the CN105 connection as it is used exclusively for the programming pendant.

*Fig. 2-1: Fig. Ethernet Connection*



Cutouts are available on the sides of the controller cabinet for cable routing.

Refer to Section 3.3 “Ethernet Communication Settings” of the Ethernet Function manual (P/N 157130-1CD) for setup instructions.

## 2.3 DCIServer INI File

Before using DCIServer, there must be a valid INI file installed in the PC installation folder that matches your real work cell configuration. This INI file controls various parameters about the communications between the robot and the PC. The default location is 'C:\Program Files\Motoman\DCIServer'.

The default INI file looks like this...

```
# DCIServer settings
# =====
# General Settings #
# Customer -Name used to identify this instance of DCI Server.
# NbrRobots -Number of robots in use. Valid values range from 1-16.
#
# Robot Specific Settings #
# IP -IP Address in this format: xxx.xxx.xxx.xxx e.g 192.168.255.1
# Name -Name representing each defined robot. This name will be
referenced on the robot button.
# Path -An absolute path to the robot specific service folder.
# BIndex -The B variable to use as the DCI 'Index' variable for SAVEV and
LOADV. Acceptable values are 0-99.
```

---

	2	Installation
DCIServer	2.3	DCIServer INI File

---

# SevenAxis -Used to notify DCI Server that the robot has seven axis.  
Valid values are 0 = six axis, 1 = seven axis.

```
#
[Settings]
Customer=SES
NbrRobots=1
[Robot_1]
IP=192.168.255.1
Name=SES
Path=C:\Temp\SES
BIndex=99
SevenAxis=0
[Robot_2]
IP=
Name=
Path=
BIndex=
SevenAxis=
[Robot_3]
IP=
Name=
Path=
BIndex=
SevenAxis=
```

.....

There are two sections of importance. The parameters under the [Settings] heading are global and effect all robots connected to the DCIServer.

[Settings]

'Customer=' This value is displayed in the title bar of the main DCIServer form.

'NbrRobots=' This parameter controls how many robots are used in the system.

The robot settings are specified individually under a heading for each robot. For example, the settings for robot 1 are listed under the [Robot 1] heading.

[Robot 1]

'IP=' defines the IP Address of the robot controller

'Name=' defines the name that is used for the button and variable XML file.

'Path=' defines the folder path to the location where the jobs and variable XML file reside.

'BIndex=' defines the B variable that is used as the 'index' variable on the robot.

'SevenAxis=' This informs DCIServer if a robot has seven axis. 0 indicates a six axis robot and 1 indicates a seven axis robot.



---

	2	Installation
DCIServer	2.3	DCIServer INI File

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This information is repeated for each active robot up to the system maximum of 16.

If you make changes to the ini settings the computer must be re-started for those changes to take affect.

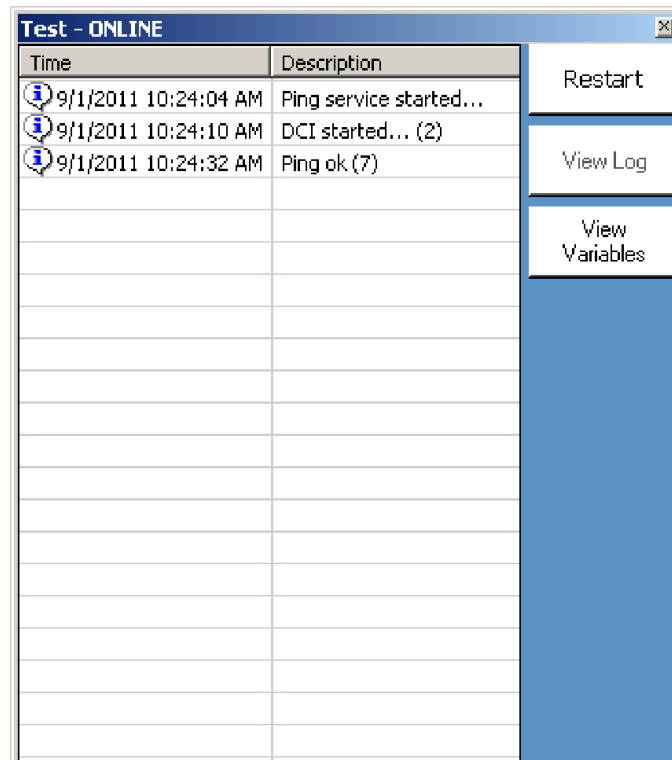
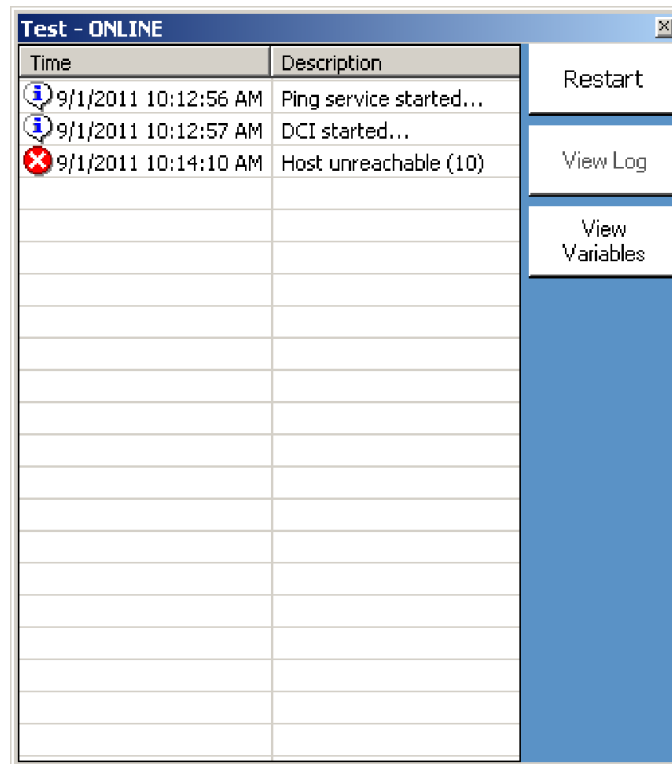
In the main screen a 'Start' button is provided to manually start the communication server. By default, a communication service is installed by the setup program. This service launches automatically upon Windows start up. Manual starting of the service is not necessary but is provided in the event it is required for debugging purposes. When the communication service is running this button text will display 'Stop' and act as a way to stop the communication process. The communications service will continue to run and function even after you close the DCIServer user interface.

Each robot defined in the system INI has a button representing the communication status of that robot as well as launch a detailed screen about that individual robot. This button also changes color to indicate the communications status. The button is gray during normal communication. A warning turns the button yellow and an error turns the button red. There is an automatic ping-service in DCIServer which checks the ability to communicate with each robot at a random interval. If you make changes to the ini settings the computer must be re-started for those changes to take affect. However, the ping service does not guarantee that you have a valid connection to the robot. An exception should be created for the DCIServer application in the Windows fire wall if you are using it on the selected interface card. Please consult the Windows help file for information on how to create an exception. If a robot is unreachable, this be considered an error and the button turns red.



If you click on a button, a controller-specific window appears:

DCIServer	2	Installation
	2.3	DCIServer INI File



This window shows the last 50 logs made for this particular robot. There is a button for manual restart of the communication service for the robot. This can be useful after a breakdown in communication. Another important thing when restarting the communication is to make sure that the robot is set to Teach mode and then back to Play mode before restarting the robot job.

	3	Variable Editor
DCIServer	3.1	Index Variable

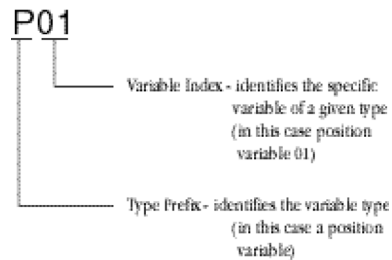
## 3 Variable Editor

This section introduces you to the variable editor. It contains:

- A brief overview of the mechanics of data transfer between controller and DCIServer
- Information on creation and/or modification of required robot program structure
- Detailed instructions for use of variable editor.

### 3.1 Index Variable

The variable names used to identify different variables have two components. A prefix letter identifies the type of variable; B for byte, I for integer, and R for real. The second component of the variable name is a variable index with a value ranging from 00 to 99.



The controller commands LOADV and SAVEV do not send the variable index to the PC. The PC receives only the type of variable (B, I, and R) and its value. As a result, the PC has no way of knowing which of a particular type of variable is being loaded or saved. Before the PC can properly store or retrieve a variable, the controller must upload the variable index to the PC.

In the case of P-variables, all P-variables being used in an application must be uploaded before they can be downloaded. You must use an Index Variable to identify the variable index. Any byte variable can be used as the Index Variable. The default B index variable defined in the ini file is B99. This can be changed to any B variable of your choosing.

In the sample programs listed in this section, B(00) is used as the Index Variable. Every time the controller loads or saves a variable, it must first issue a SET B00 command that specifies the appropriate variable index, followed by a SAVEV B00. This gives the PC the variable index of the variable to be saved or loaded. When the controller next gives a SAVEV or LOADV command for a particular type of variable, the PC recognizes the specific variable identified by the Index Variable, B(00).

DCIServer	3	Variable Editor
	3.2	Saving Variables to the PC



- When stepping through or developing a program, make sure that for each variable you want the program to load or save you first set and save the Index Variable. Otherwise, DCIServer and the controller will run out of synchronization and cause various errors.
- You do not need to specify an Index Variable to load or save jobs. This requirement applies only to variables.
- For additional information on variables and variable types, refer to your Programming or Operator's Manual.

Creating/Modifying the Robot Program Structure DCIServer lets you modify program variables while a robot is in cycle. However, it is the controller that directs the operation of the robot. The controller must issue requests to the PC to download variables to the controller.

NOF

CALL JOB: SAVEV 'Call job to download variables from PC'

\*mainloop 'Identifies start of subroutine'

SET B00 1 'Index=1'

SAVEV B00 'B(01) is the variable being saved or uploaded to the PC'

CALL JOB: DC1 IF B01=1 'These three lines call job based on value of variable B(01)'

CALL JOB: DC2 IF B01=2

CALL JOB: DC3 IF B01=3

JUMP \*mainloop 'Jumps back to beginning of subroutine, can include conditional statement'

END

### 3.2 Saving Variables to the PC

Variables can be saved from the controller to the PC as often as required. The following example shows how to save the desired variables from the controller to the PC. Comments regarding specific program lines appear to the right of the program line. These comments do not appear in the actual program listing.

NOF

SET B00 1 'Index=1'

SAVEV B00 'B(00) is an index counter whose value is the index of the variable being saved - tells the PC which variable is to be loaded'

SAVEV B01 'B(01) is the variable being saved or uploaded to the PC'

SET B00 2 'Index=2'

SAVEV B00 'Upload index value'

SET B02 0 'Set B(02)=0'

SAVEV B02 'Upload B(02) to PC'

SET B00 3 'Index=3'

SAVEV B00 'Upload index value'

---

	3	Variable Editor
DCIServer	3.3	Loading Variables from the PC

---

```
SET B03 0 'Set B(03)=0'  
SAVEV B03 'Upload B(03) to PC'  
SET B00 1 'Index=1'  
SAVEV B00 'Upload index value'  
SAVEV P001 Upload P(001) to PC  
SET B00 0 Index=0  
SAVEV B00 Upload index value  
SAVEV P000 Upload P(001) to PC  
SET B00 1 Index=1  
SAVEV B00 Upload index value  
SET I01 1000 Set I(01)=1000  
SAVEV I01 Upload I(01)  
SET B00 2  
SET D02 2000000  
SAVEV B00  
SAVEV D02  
SET B00 3  
SAVEV B00  
SET R03 300  
SAVEV R03  
SAVEJ JOB: DC3 JBI  
LOADJ JOB: DC3 JBI  
RETURN  
END
```

### 3.3 Loading Variables from the PC

Variables can be downloaded from the PC to the controller as often as required. The following example shows how to download the desired variables from the PC to the controller.

```
NOP  
SET B00 1 Set index variable to 1  
SAVEV B00 Upload index variable to  
PC  
LOADV B01 Download B(01) from  
PC to the controller  
SET B00 1 Set index variable to 1  
SAVEV B00 Upload index variable to  
PC  
LOADV P001 Download P(01) from  
PC to the controller
```

---

	3	Variable Editor
DCIServer	3.4	Loading and Saving Job Files

---

```

SET B00 2 Set index variable to 2
SAVEV B00 Upload index variable to
PC
LOADV B02 Download B(02) from
PC to the controller
SET B00 3
SAVEV B00
LOADV B03
SET B00 0
SAVEV B00
LOADV P000
JUMP *11 IF B03 <>3
LOADJ JOB: DC3.JBI
*11
RET
END

```

### 3.4 Loading and Saving Job Files

The controller can use DCIServer to access the remote PC for off-line storage and retrieval of job files. This capacity helps to conserve online storage. It also allows the user to edit jobs in an ASCII text editor (such as NotePad) while DCIServer runs in background. With an ASCII editor and DCIServer the user can access and edit job files without taking the robot out of cycle.

You can save jobs as either independent or related files. The .JBI and .JBR file extensions identify each of these file types respectively. A job saved as an independent file contains only the instructions for the named job. In a job saved as a related file, the program instructions are searched for internal job calls. Any jobs, frames, and tools called in the program instructions are appended to the end of the file. The resulting file then contains the program instructions for all related jobs.

For example, saving the MAIN job we used above as an independent file would store only the MAIN instructions. However, when we save the same job as a related file, the instructions for SAVEV, DC1, DC2, and DC3 are appended to the end of the MAIN instructions and stored in a single file.

	3	Variable Editor
DCIServer	3.5	Using the Variable Editor

### 3.5 Using the Variable Editor

The DCIServer Variable Editor lets the user save and modify program variables while the robot is in cycle. Variables can be modified and then downloaded back to the controller. To begin using the Variable Editor, proceed as follows:

1. From the Communication portion of the main window, click the Start button. A communications link between the controller and the PC is established.



DCIServer communication must be ON before putting the robot in cycle. DCIServer must remain ON until after the robot is taken out of cycle.

2. At the robot controller, select the master job and place the robot in cycle as follows:
  - a) Press TEACH mode.
  - b) Select the master job.
  - c) Place the controller in AUTO mode.
  - d) Press CYCLE START.

### 3.6 Closing a DCIServer Session

DCIServer must remain ON until after the robot is taken out of cycle. To end a DCIServer session, proceed as follows:

1. From the robot controller, press HOLD or change mode to TEACH or REMOTE. This takes the robot out of cycle.
2. Click the Stop button on the Communication portion of the main window.

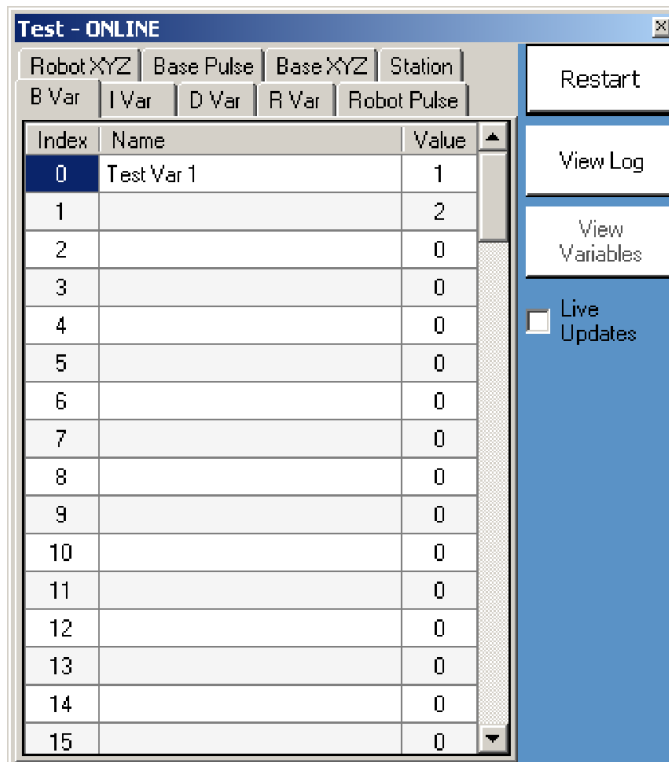


If you assigned variable labels during the current session and have not already saved them, you must save these labels in a configuration file before you close the session. Otherwise, the current label assignments will only apply to the default configuration file.

### 3.7 Variable Transfer

DCIServer gives you the ability to transfer variables to/from the robot.

1. Click the View Variables button on the main window. The Variable Editor window appears.



2. Select the variable type tab you wish to modify.
3. Click in the Name field of the variable number you wish to change and type the new name.
4. Click in the Present Value field and type in the new value.



You may need to use the horizontal scroll bar to view all the Axes, and Var Type values for the P and EX variables.

5. The controller uploads and downloads the new variables as directed by the Master job.

The first time DCIServer is started, a blank XML file with the robot name is created in the robot working directory. This XML file acts as the source and destination for all the variable transfers with the robot.

The XML file can be edited with a text editor or manipulated by an external program depending on what you are trying to accomplish.

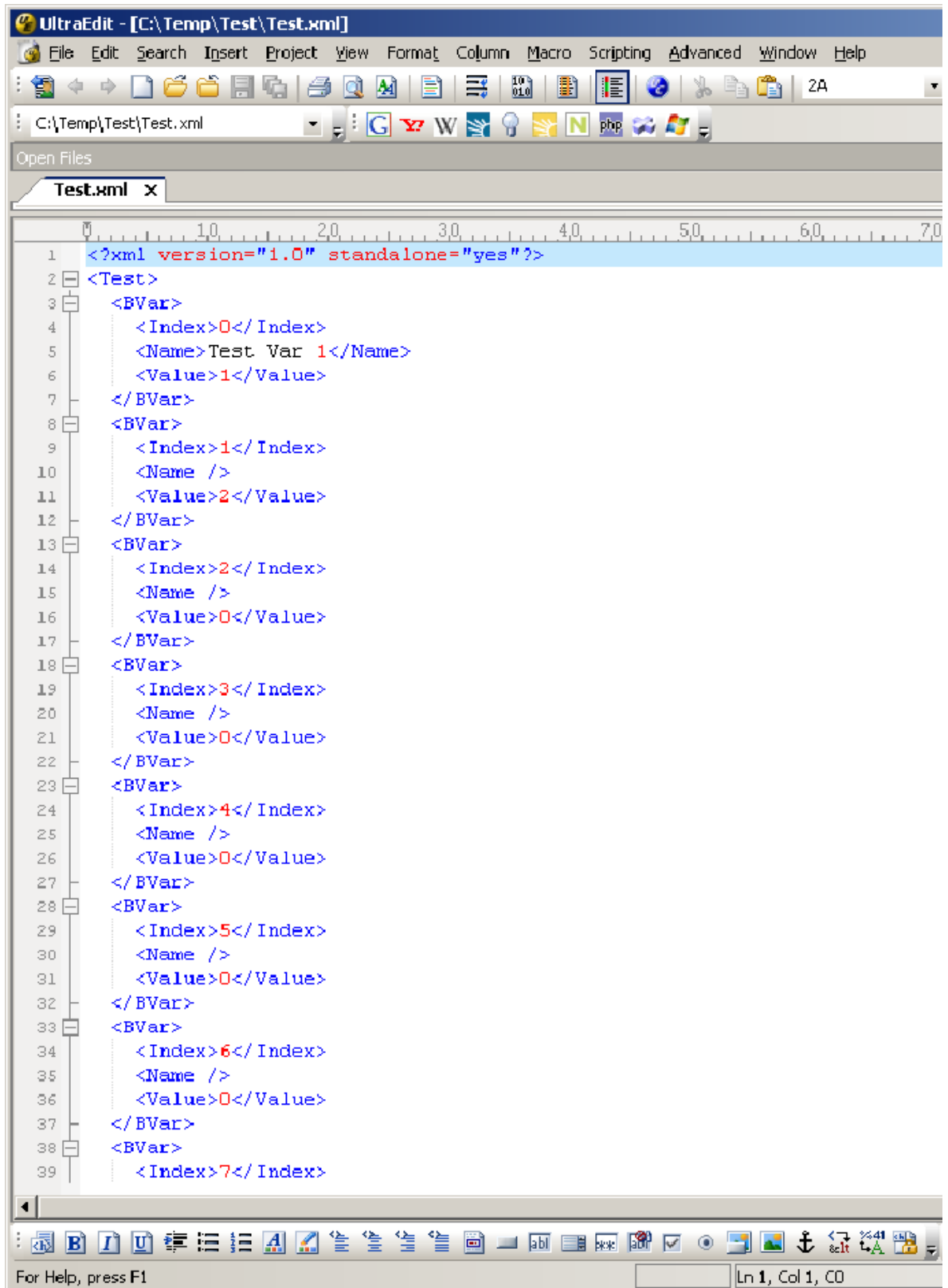
Clicking on the 'Live Update' button continuously updates the variable view but results in a slow down of the data transfer.



---

	3	Variable Editor
DCIServer	3.7	Variable Transfer

---



```
1 <?xml version="1.0" standalone="yes"?>
2 <Test>
3   <BVar>
4     <Index>0</Index>
5     <Name>Test Var 1</Name>
6     <Value>1</Value>
7   </BVar>
8   <BVar>
9     <Index>1</Index>
10    <Name />
11    <Value>2</Value>
12  </BVar>
13  <BVar>
14    <Index>2</Index>
15    <Name />
16    <Value>0</Value>
17  </BVar>
18  <BVar>
19    <Index>3</Index>
20    <Name />
21    <Value>0</Value>
22  </BVar>
23  <BVar>
24    <Index>4</Index>
25    <Name />
26    <Value>0</Value>
27  </BVar>
28  <BVar>
29    <Index>5</Index>
30    <Name />
31    <Value>0</Value>
32  </BVar>
33  <BVar>
34    <Index>6</Index>
35    <Name />
36    <Value>0</Value>
37  </BVar>
38  <BVar>
39    <Index>7</Index>
```

For Help, press F1

Ln 1, Col 1, CD

XML data displayed in a text editor

DCIServer	4	Operation
	4.1	Main Window

## 4 Operation

This chapter provides detailed operation information for DCIServer, including detailed step-by-step instructions. To launch DCIServer, select DCIServer from the Windows Start menu.

DCIServer is located in the Motoman program group unless you specified another group during installation.

### 4.1 Main Window

When you first start DCIServer, the main window appears.



#### ■ Start Button

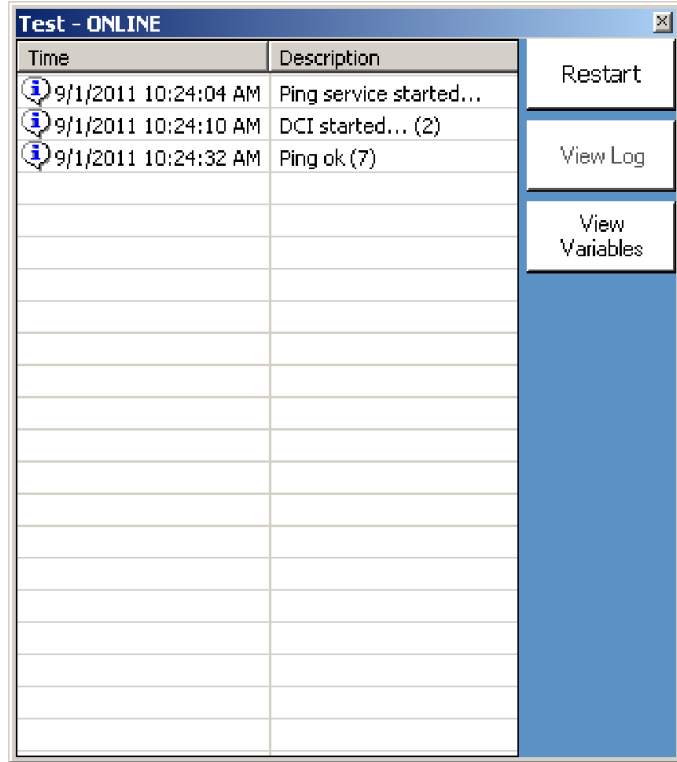
The [Start] button manually starts the communication server. By default, a communication service is installed by the setup program. This service launches automatically upon Windows start up. Manual starting of the service is not necessary but is provided for debugging purposes. When the communication service is running, this button's text will display 'Stop' and act as a way to stop the communication process. The communications service will continue to run and function even after you close the DCIServer user interface.

#### ■ Robot (Test) Button


Each robot defined in the system INI file has a button used to launch a detailed screen for that individual robot. The Robot buttons also change color to indicate the communication status; gray for normal communication, yellow for warning, and red indicates an error. The DCIServer includes an automatic ping-service that checks each robot communication at a random interval. If a robot is unreachable, this be considered an error and the button turns red.

## 4.2 Robot Specific Screen

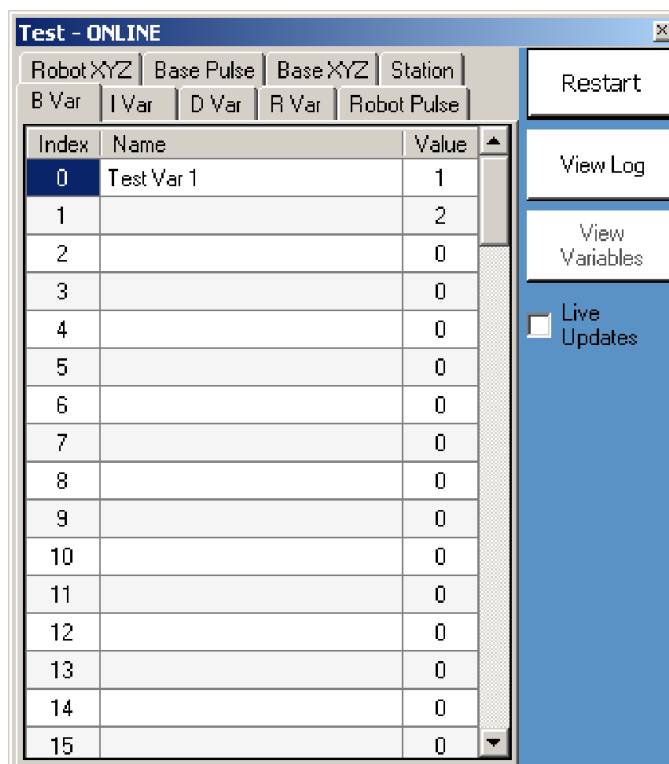
Clicking on a Robot (Test) button from the Main window brings up the control screen for that particular robot.



- **Restart**  
The [Restart] button is used to manually restart the communication service for the robot. This can be useful after a breakdown in communication.

 It is important to cycle the robot between Teach and Play mode before restarting the robot job.

- **View Log**  
The [View Log] button opens the log window. This window shows the last 50 logs made for this particular robot.
- **View Variables**  
The [View Variables] button opens the variable editor window. From this window you can assign variable labels to any or all variables.



## 4.3 Variable Editor

DCIServer allows you to assign variable labels to any variable. Using variable labels does not affect the robot program, DCIServer only uses the labels internally. This makes variables more easily recognizable.

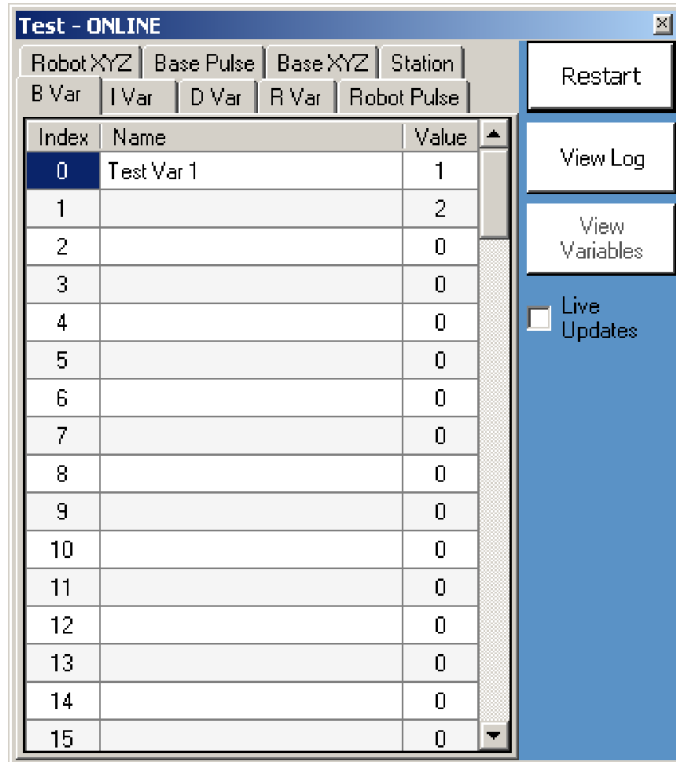
For example, if the value of variable B1 determines which job the robot performs, we might rename this variable "Robot Seq." DCIServer now substitutes any reference to variable B1 with the label "Robot Seq."

DCIServer also lets you save variable label assignments in the configuration .dci files. You can then retrieve the appropriate file for use as required. By doing this, you can maintain a configuration file for each robot program.

### 4.3.1 Assigning Variable Labels

To assign variable labels, proceed as follows:

1. Click the [View Variables] button on the main window. The variable editor window appears.



2. Select the variable type tab you would like to assign labels.
3. Click in the Name field of the variable number you would like to label and simply type in the label you would like to use.

Changes are automatically saved to the default configuration file. However, if you want to keep the assigned labels for use in future sessions, you should save and rename them to a configuration file. Otherwise, label assignments may accidentally be overwritten during future sessions.

#### 4.3.2 Saving Configuration Files

To save variable label assignments to a configuration file, proceed as follows:

1. In the main window, select File > Save as, or use the keyboard shortcut Ctrl+S.
2. Specify the new file name and location and click Save.

#### 4.3.3 Opening a New Configuration File

To create a new configuration file, proceed as follows:

1. In the main window, select File > New, or use the keyboard shortcut Ctrl+N.
2. Specify the file name and location and click Save.

#### 4.3.4 Opening an Existing Configuration File

To open an existing configuration file, proceed as follows:

1. In the main window, select File > Open, or use the keyboard shortcut Ctrl+O.
2. Navigate to the desired dci file and click Open.

DCIServer	4	Operation
	4.4	Setting Communications Parameters

## 4.4 Setting Communications Parameters

In order for the controller and PC to work together, the communications parameters set up on each device must match. Typically, you need to configure DCIServer communications parameters only if:

- Controller parameters are changed.
- DCIServer is connected to a different controller.



DCIServer uses the same default communications parameters as the controller. If these parameters have been changed on the controller or if you want to use a communications port on the PC other than COM 1, follow the instructions below

*Table 4-1: Default Communications Settings*

Baud Rate	9600
Data Length	8
Stop Bits	1
Parity	even
COM Port	1



DCIServer uses the communications settings chosen within DCI. The program ignores any communications settings selected through the Windows Control Panel.

To configure the communication parameters, proceed as follows:

1. In the main window, select Settings > Communication. The Communications Setup window appears.
2. Select the desired values from the pull down menus for each setting.



To restore the port setup to the factory default settings, click the Restore Defaults button.

3. Click OK.

### 4.4.1 Communications Setup Options

Two options are available for DCIServer.

- Open Comm On Startup - This option opens communications automatically on startup.
- Run Minimized - The program loads and immediately reduces to its iconized form.

---

	4	Operation
DCIServer	4.4	Setting Communications Parameters

---

## 5 Programming Tips

In this section we offer some techniques and hints to optimize the operation of DCIServer for your particular applications.

### 5.1 Optimizing for Cycle Time

The techniques listed below can be incorporated into your processes, either singly or in combination, to reduce total cycle time.

- Set up a byte variable that when true indicates that the values of other variables have not changed. Write an instruction sequence in the job program that tests the value of the change variable. In this sequence, jump to a variable download sequence when the change variable tests false. By waiting until changes occur to download variables, you reduce the average number of downloads per cycle to a minimum.

```

SET B00 6 'Set B(00)=6'
SAVEV B00 'Upload index value'
LOADV B06 'B(06) is the change variable'
JUMP IF B06
<>0      insert the variable download instructions here, these will
only execute when the change variable B(06) equals 0
*skipseq
RET
END
  
```

### 5.2 Optimizing for Variable Latency

For some operations the robot needs to update variable values frequently. The techniques listed below help satisfy the requirement to reduce variable latency.

- Include instructions in your job programs to get variables as often as required. If necessary, you could update each variable as it is used in the program. Doing so ensures that the robot always uses the most current value for any given variable.
- Write several different instruction sequences to update specific variables or groups of variables. By attaching each instruction sequence to a different conditional statement, you can update variables only under specific circumstances.
- Call a different sequence to update selected variables as the robot starts each new task. This method updates groups of variables as needed in a specific instruction sequence, rather than downloading all at once.

### 5.3 Optimizing Memory Usage

In some cases, minimizing controller memory overhead may be a concern. The following techniques help to conserve memory.

- Write program instructions tying controller load sequences to conditional statements.
- Save jobs as individual rather than related files. While the use of related files can simplify some operations, the resulting files can be very large. This approach is most effective when the master job contains references to several jobs, but is not likely to use all of them during a specific session.



## 5.4 Troubleshooting

### DCI Stops Functioning Normally

Did you turn off the computer and controller?

If not, turn off both and restart.

Is at least one portion of the program functioning? (Loading or saving certain jobs?)

If Yes, what kind of jobs are working or causing problems?

Are jobs from the same controller/robot?

If jobs are from a different system, the jobs may be incompatible.

Are any of the jobs dependent upon a job not there or currently running?

This may affect the saving of a job from controller to the PC.

Do any of the jobs have position variables?

If a job using any type of position variable is loaded into the controller, the position variable must be defined in the controller. This is true for FDE and VDE as well.

Were any of the jobs created with MotoSim?

If jobs were created for a different robot, CMOS file or all.prm file may affect compatibility.

Are any of these jobs extremely long or for dual robots?

They may be out of memory. DCIServer may also need more time to gather the information. Change parameter RS034 to a value between 30 - 100.

Create small sample jobs using different functions.

Run the jobs separately to isolate any problem caused by a specific function. For example, create jobs that employ:

- Motion only
- Position variables (if you are using them)
- Welding commands only
- Incorrect syntax, etc.

Did you make any changes to the controller or computer?

Try reverting to the original settings to see if that affected DCIServer (other users may have changed settings).

Check cables. Make certain all cables are connected. Check for intermittent connections by disconnecting and reconnecting cables. Replace cables if necessary. Long cables can degrade signal quality. Also check for added equipment such as welding power sources, positioners, etc. Electrical noise from nearby devices can cause malfunction.

Check to see if a cable is damaged by swapping the cable in question with a good cable. If you do not have an extra cable, visually check cable for damage.

Close any other applications you have running.

Certain software can interfere with DCIServer.

Did you encounter an Alarm 5920-1 (Insufficient memory) message?

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DCIServer	5	Programming Tips
	5.4	Troubleshooting

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You may have too many jobs open or several jobs may be too long. Eliminate some jobs, break jobs down into smaller jobs, or download jobs to reduce memory requirements.

Did you encounter an Alarm 5930-22 (Time out)?

The PC is not responding. This typically occur on systems running Windows 3.11.

- Cables are not connected or they do not have a good connection.
- Operator error
- DCIServer turned off

Try setting RS034 to a value between 30 and 100.

The default setting is "30" (30 seconds). Increase the setting to give the controller more time to respond to the PC.

#### ■ **DCIServer Does Not Work After Installation**

Are system parameters set properly?

Refer to Chapter 3 Installation and verify parameter settings for your configuration.

Are the cables connected?

Have you created a fire wall exception in Windows?

Have you edited the ini file properly?

Verify data cable connections between robot controller and PC.

Is the Hardware Key correctly installed on the computer's USB port?

Applications

Download jobs

Jobs with syntax errors will not be loaded.

Download variables

Position variables must be defined before jobs using those position variables can be loaded. This is also true for jobs loaded with FDE or VDE. This has been used to shift to corners of boxes of various sizes.

Memory

When running out of memory, DCI can save the jobs to the computer, delete those jobs from the controller, and load when needed. Another option is to purchase expanded memory.

Modified jobs

The SAVEJ and SAVEV functions will save the current version of the job or variable to the computer. This may be useful if a vision system is used to shift a robots position. It may be used to backup all jobs on the computer on a weekly or routine schedule. To backup the entire system setting, it is highly recommended to use FDE.

Saving variable

May be useful if a database on the computer is used to track schedules.

Activation

Computer Programming

DCIServer can communicate with a maximum of 16 individual robots.

# DCIServer SYSTEM MANUAL

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