For NX100, YASNAC XRC/MRC/ERC for Industrial Robot MOTOMAN

Data Transmission Software for Personal Computer

MOTOCOM32 OPERATION MANUAL

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

承 認　　照 査　　作 成

YASKAWA

General Precautions

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1. INTRODUCTION

1.1 Introduction of This Manual

This operation manual is for the users of the data transmitting function of industrial robot MOTOMAN controller NX100, YASNAC XRC, MRC, MRC Ⅱ, ERC, and ERC Ⅱ.
This operation manual outlines the operation method of the personal computer software MOTOCOM32 for data transmission between the robot controller and a personal computer, and at the same time, the specifications of the supplied data transmission function.
Read this operation manual thoroughly before use.

1.2 Features of Ethernet Communications

The Ethernet I/F board and the "Ethernet" function of the MOTOCOM32 transmit data at higher than normal speeds.

●High speed transmission

In comparison with transmissions using RS232C, higher speed transmissions are possible with the Ethernet.

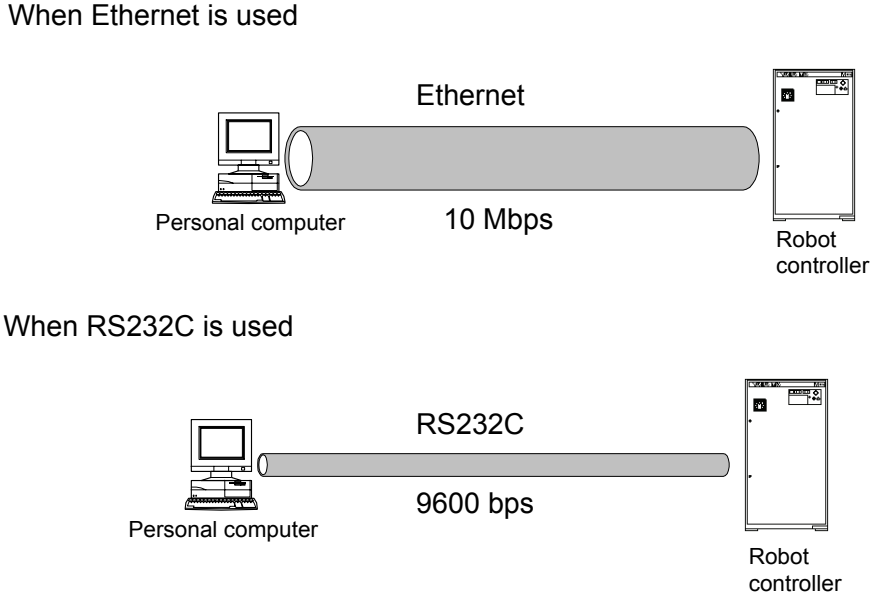


Fig 1.1 Transmission Speed

Note : The above transmission speed is the communication speed between network devices, not including the time used for format check of transmitted data, etc.

●Transmissions between a multiple number of HOSTS

As N:N transmission is possible with an Ethernet cable, the following system configurations can be prepared.

Note: Refer to paragraph 2.3 "Restrictions" with the following Configuration Examples.

【Configuration Example 1】

Since an Ethernet cable can be connected to a multiple number of network devices, the factory operation state and alarm occurrences can be monitored from several places.

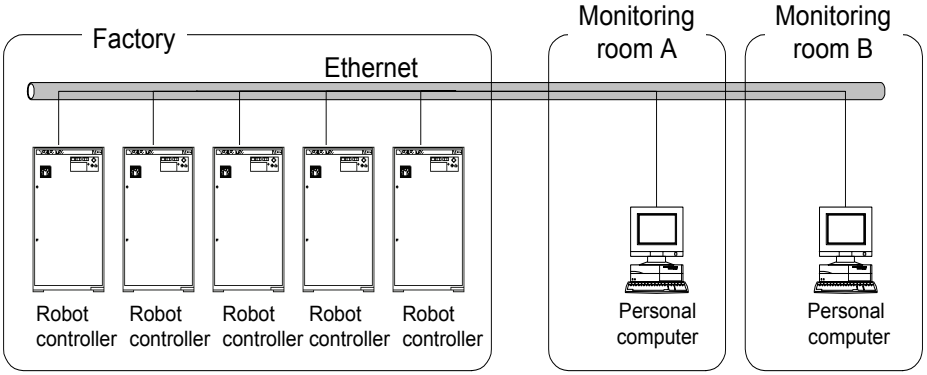


Fig 1.2 Configuration Example 1

【Configuration Example 2】

By connecting the LANs of different factories with one Ethernet cable, transmission in each factory can be executed simultaneously. The transmission between the robot controller and the personal computer in factory A does not interfere with the transmission between the robot controller and the personal computer in factory B. Transmission can also be done between factories. (In both cases, the settings should be correct.)

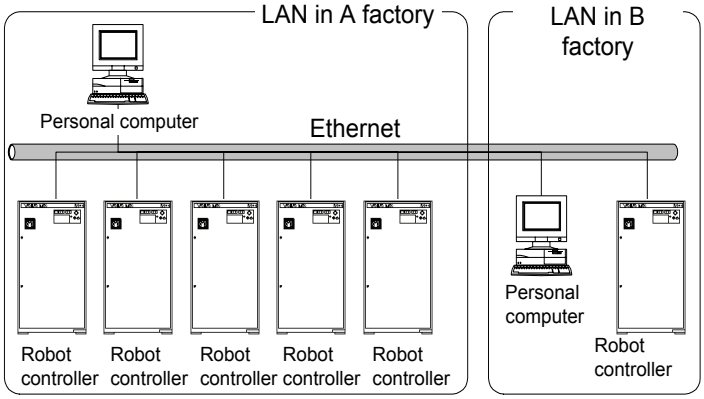


Fig 1.3 Configuration Example 2

【Configuration Example 3】

With the Ethernet cables, the job on a personal computer can be executed on the robot controller by installing a personal computer for each production line and transferring the job from the personal computers to the robot controller. Then, by connecting one personal computer to the Ethernet cables in all the production lines, monitoring of the state of all the production lines and data backup can be executed.

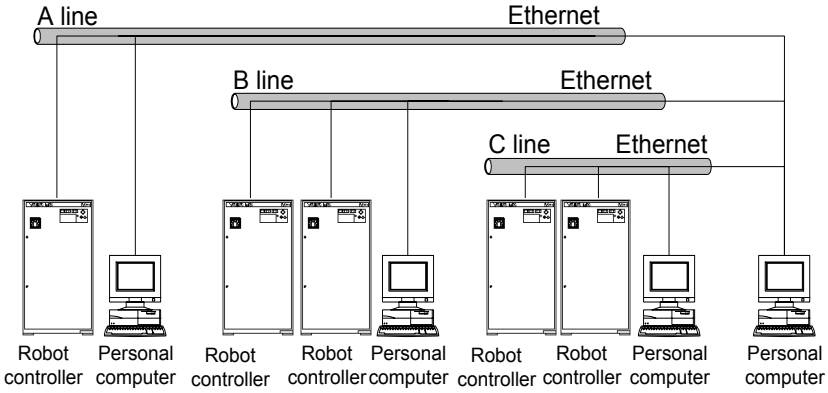


Fig 1.4 Configuration Example 3

1.3 Hardware Requirements for MOTOCOM32

The MOTOCOM 32 operates with the configurations shown in Table 1.

Table 1 Hardware Requirements for MOTOCOM32

OS	Microsoft Windows 95 /98 /NT4.0/2000/XP
CPU	Pentium, or pentium compatible processor
Required Memory	16 Mbyte or more
Hardware Disk Capacity for Installation	13 Mbyte or more
Disk drive	Hard disk and CD-ROM drive
Display	Supported by MS-Windows
Mouse	Supported by MS-Windows
Robot Controller	NX100, YASNAC XRC, MRC, MRC Ⅱ, ERC, and ERC Ⅱ.
Transmission Cable	Ethernet cable or RS232C cable
Hardware Lock Key	Used under single user environment. For details, refer to the following section “Hardware Lock.”

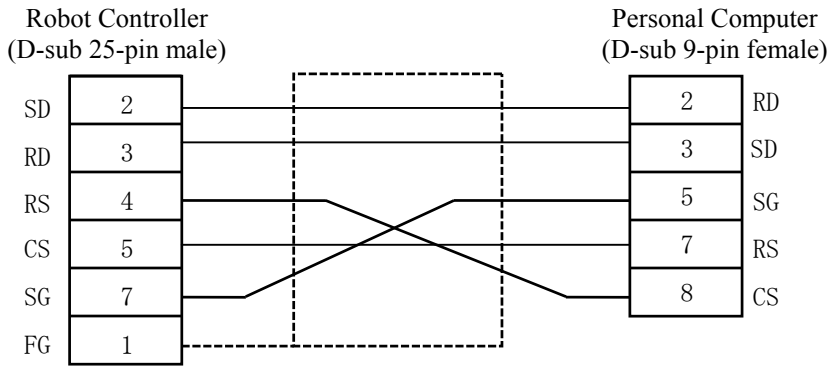
Notes 1: A personal computer and OS are not included with this software.
2: Use either an RS-232C cable or an Ethernet cable for transmission, depending on the data transmission function specifications set in the robot controller manuals. Before starting this software, check the hardware and software specifications of the robot controllers.
3: Ethernet transmission is not available for the YASNAC MRC Ⅱ / ERC / ERC Ⅱ since they do not support the Ethernet function.

For softwares and devices, refer to the robot controller Operator’s Manuals, Data Transmission Operator’s Manual, Ethernet I/F Board Instructions, Manuals for MS-Windows, etc.

The cable connection for communications via RS232C is shown in Fig. 1.6.

Note : When using an Ethernet cable, the RS232C cable is not required.

IBM PC/AT



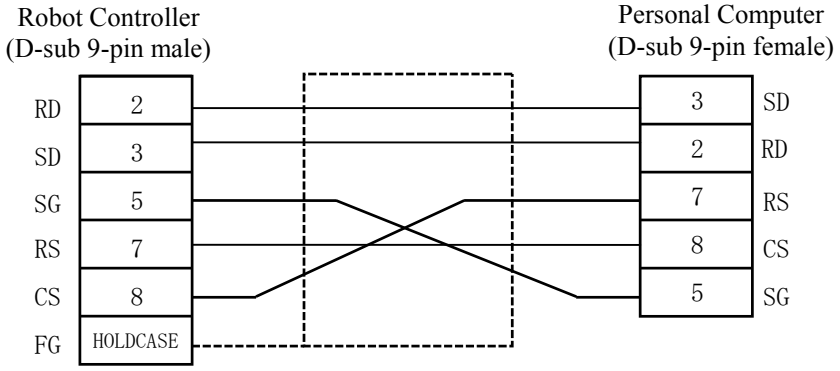


Fig. 1.5 RS232C Cable Connection

1.4 Hardware Lock Key

The software is protected by an hardware lock key. There are two different versions available (USB and SUB-D type). The installation of the hardware lock key driver is included in the program installation. In case of WindowsNT/2000/XP please log in with local administrative rights.

- SUB-D type

Attach the provided key to parallel port (printer port) of your pc. Make sure that it is not a 25pin serial port. The key can also be attached to an existing key. If this makes problems change the order of the keys.

- USB type

Please do not install the usb key before completing the program installation. Otherwise you may be prompted for a driver disk. In this case cancel the operation and unplug the key again. Attach the USB key to a free usb port of your pc. USB ports are only supported by Windows98SE and higher.

If there are problems starting the application check the proper installation of the key driver. Check the Add/Remove Software section of the control panel for an entry named "Sentinel System Driver...".

2. SETUP

2.1 Execution of Setup Program

Set up the MOTOCOM 32 in the following manner.

(1) Turn ON the power to the personal computer and the display.

(2) Start up Windows.

(3) Insert the High Speed JobExchanger installation CD-ROM into the CD-ROM drive.

(4) Click the [Start] button in the task bar and select [Setting]. Double-click the [Add/Remove Programs] icon from [Control Panel]. The [Add/Remove Programs Properties] display appears.

Fig 2.1 [Add/Remove Programs Properties] Display

(5) Click the [Install] button and follow the instructions in the display to set “setup.exe” of the CD-ROM drive. The [Run Installation Program] dialog box appears.

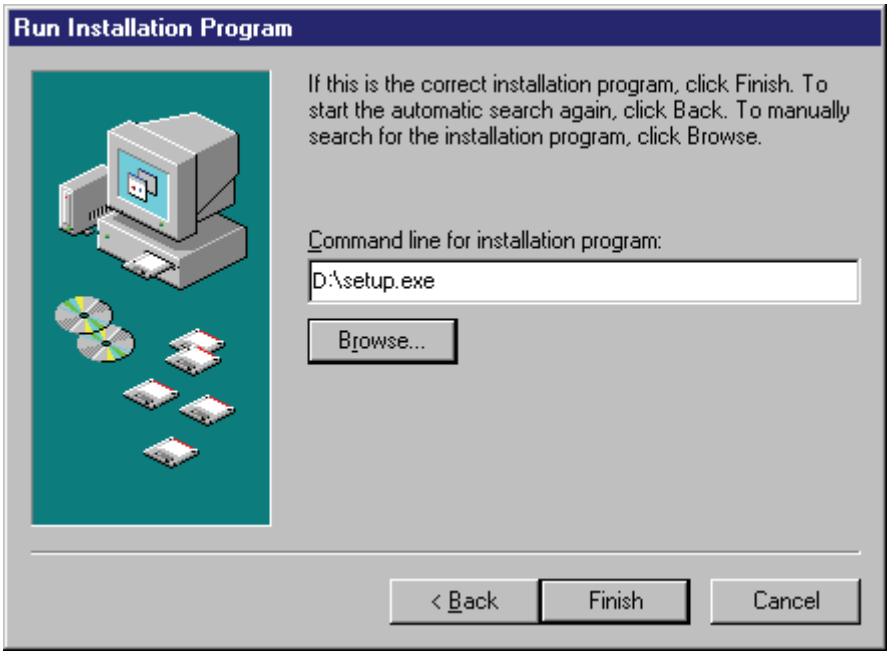


Fig 2.2 [Run Installation Program] Dialog Box

(6) Clicking the [Finish] button calls up the setup program. Follow the instructions in the proceeding display.

(7) When the setup is completed, [High Speed JobExchanger], [Host Control], [Auto Job Changer], [MOTOCOM 32 DLL Functions], [MOTOCOM 32 Help] and [YASNAC Help] are registered under [MOTOCOM 32] folder that appears by clicking the [Start] button in the task bar to select [Program] and then [Motoman].

Note: To re-install the MOTOCOM 32 for some reasons, select [MOTOCOM 32] in the [Add/Remove Program Properties] Display shown in the Fig 2.1 and delete all the MOTOCOM32 application files before starting re-installation.

2.2 Environmental Settings for Use of Ethernet

The following configurations are required for Ethernet transmissions. These settings are not necessary for the RS232C communication. Refer to the “RS232C Condition” in 3.2.2 “Menu Structure.”

2.2.1 MOTOCOM 32 Application Settings

To communicate with the robot controller, set the IP address etc., as a transmission parameter.

2.2.2 Personal Computer Settings

Set the settings related to Ethernet transmissions, to the personal computer with the software installed.

■Hardware settings

Before using the MOTOCOM32, connect the Ethernet board to the personal computer and check if the Ethernet board operates correctly.

For connection methods, refer to the manual for the Ethernet board used.

■Windows Network settings

To communicate via the Ethernet, set the settings related to the Windows network. Click the [Start] button in the task bar and select [Setting]. Double-click the "Network" icon from [Control Panel]. The [Select Network Component Type] Dialog box appears.

(The example below is based on Windows95.)

(1) Click the [Add] button. The [Select Network Component Type] dialog box appears.
(2) Select [Adapter] from the list and click the [Add] button to set the Ethernet board for adapter. Choose the network adapter that is added to the personal computer as mentioned in "Hardware setting."

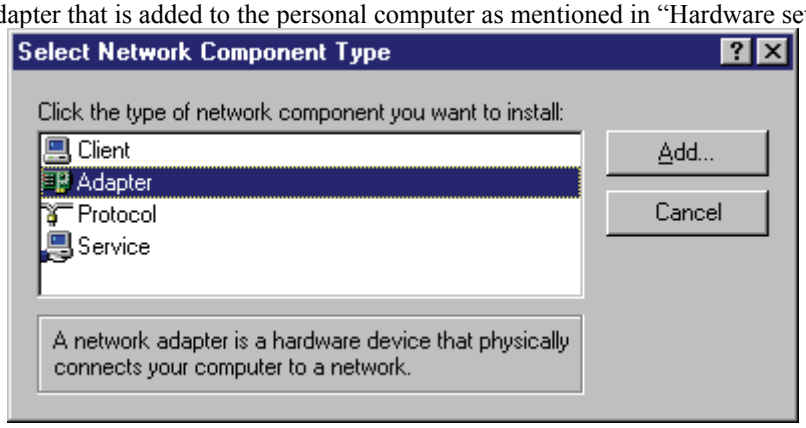


Fig 2.3 Selecting Adapter

(3) Select the [Protocol] from the list and click the [Add] button, to set protocol.

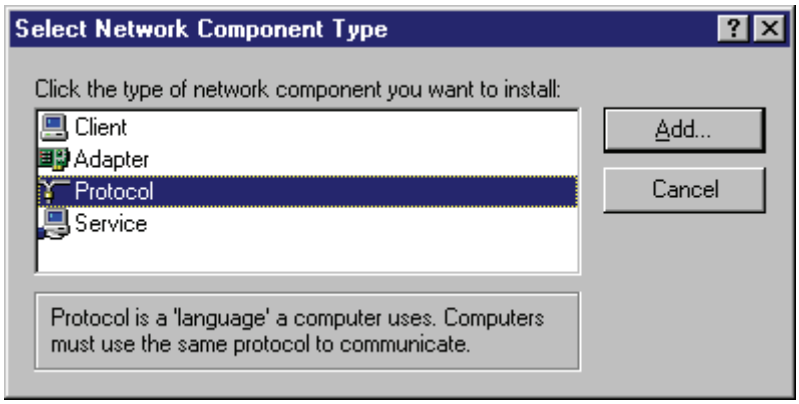


Fig 2.4 Selecting Protocol

The [Select Network Protocol] dialog box appears.

(4) Select [Microsoft] as manufacturers and [TCP/IP] as Network Protocol and click the [OK] button.

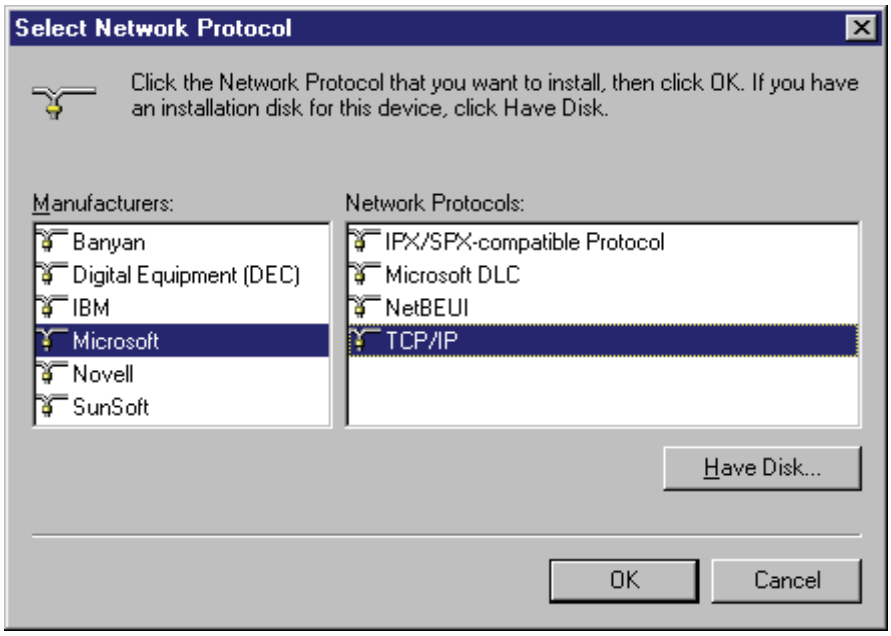


Fig 2.5 [Select Network Protocol] Dialog Box

The [Network] dialog box appears.

(5) To set the IP address and subnet mask for the personal computer, select [TCP/IP] protocol from the list and click the [Properties] button.

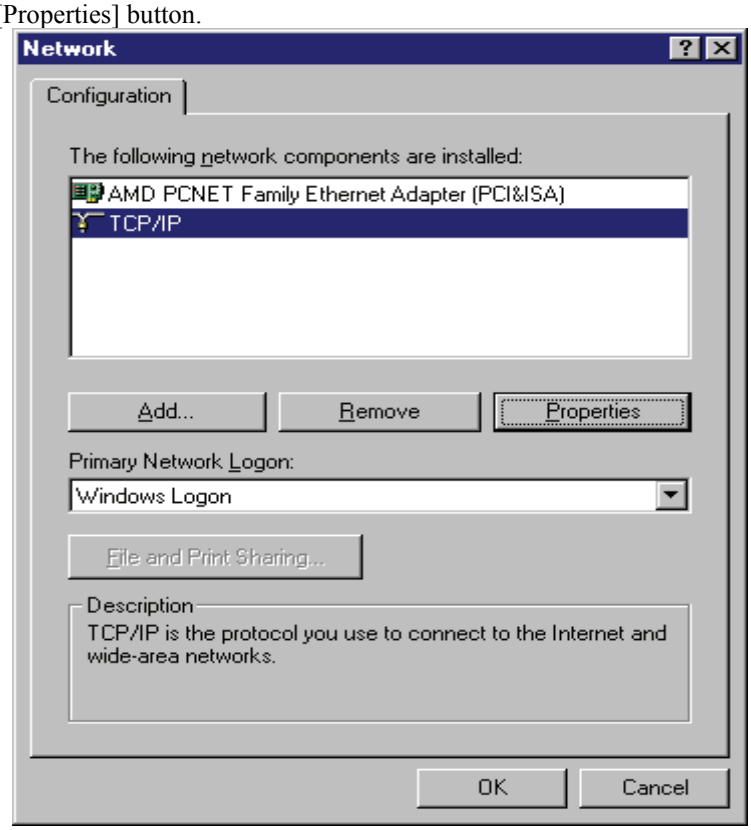


Fig 2.6 [Network] Dialog Box

The [TCP/IP Properties] dialog box appears.

(6) Input the value for the [IP address] and [Subnet Mask] of the personal computer. For details of the settings of Gateway and DNS, refer to a Windows manual, to make proper settings for the application.

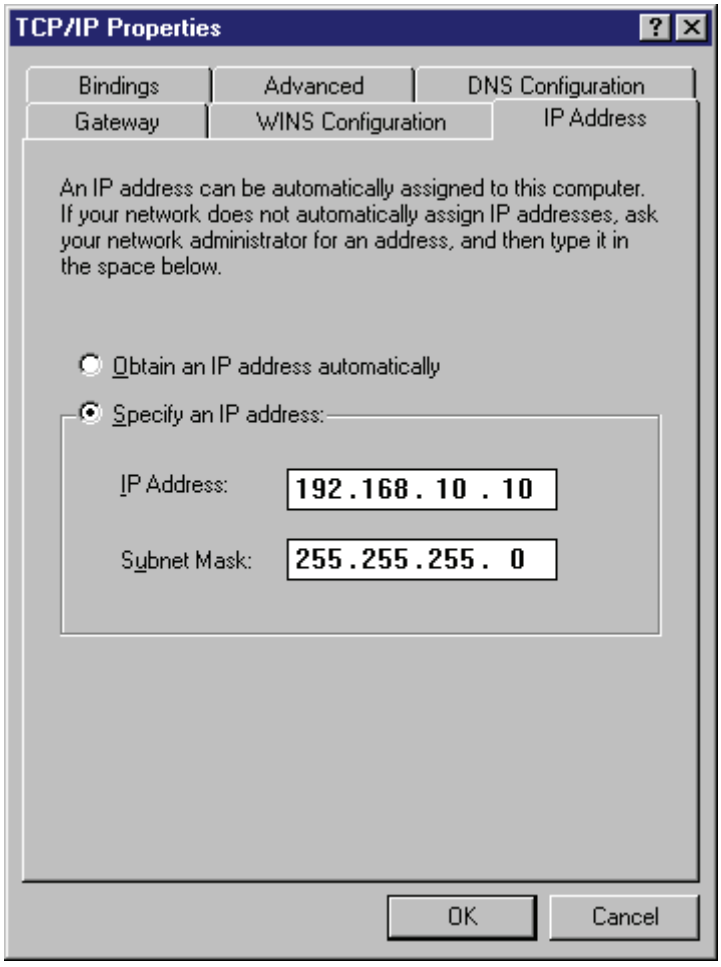


Fig 2.7 [TCP/IP Properties] Dialog Box

Note : The above values are examples only. When setting the IP address and subnet mask, input the correct numbers as advised by the network manager.
An incorrect setting such as assigning the same IP address to different personal computers may cause problems in communication.

2.2.3 Robot Controller Setting

■Hardware settings

To communicate using TCP/IP protocol, an Erthernet I/F board for NX100, YASNAC XRC/MRC is required. Insert the board, and set the IP address and subnet mask.

To setup the Ethernet I/F board, refer to the "NX100, YASNAC XRC/MRC Ethernet I/F Board Instructions."

■Parameter settings

To establish communication between the robot controller and the personal computer, set the following parameters of the robot controller.

- **Transmission protocol designation**

RS000 = (*) Protocol designation for Std. port #1

RS001 = (*) Protocol designation for Std. port #2

(*) Settings for parameter RS000 / RS001 :

0 : Not used

1 : System reserved

2 : BSC LIKE protocol (used for data transmission)

3 : FC1 protocol

These parameters are used to designate the transmission protocol for Std port #1, port #2 or the Ethernet board for the robot controller. If the Ethernet communication function is not to be used, RS000 and RS001 correspond to the Std port #1 and port #2 respectively as the above.

When the Ethernet communication function plus either Std port #1 or port #2 are used, parameters according to this port number must be set. Any other parameters can be used for Ethernet communication.

To use the MOTOCOM 32, set RS000 or RS001 to the value "2."

For example, if port #1 is already used for FC1 or FC2 and its parameter RS000 is set to the value "3," RS001 is required to be set to the value "2" to use the MOTOCOM 32.

Note : RS000/001 parameters cannot have the same setting.

Ethernet communication function only supports the BSC LIKE protocol.

Some parameters have to be set in "Maintenance mode" using the programming pendant.

・Customer options

I/O ＝ Not used

Command mode = Used (This must be always set to “Used.”)

PP/PBOX (programming pendant / playback box)＝ Not used

・Ethernet

Ethernet ＝ Used

IP ADDRESS ＝ 192.168.10.10*

SUBNET MASK ＝ 255.255.255.0*

DEFAULT GATEWAY ＝ 192.168.10.1*

SERVER ADDRESS ＝ 0.0.0.0*

* The above values are examples only. Input the suitable values according to your network environment.

When the MOTOCOM 32 is used, there is no need to set the SERVER ADDRESS. It is used for DCI or stand-alone function. For details, refer to the “NX100, YASNAC XRC/MRC Ethernet I/F Board Instructions.”

2.2.4 Network Setting

To communicate with the robot controller using the MOTOCOM 32, the network must be set up correctly.

For details on how to setup the network, refer to “NX100, YASNAC XRC/MRC Ethernet I/F Board Instructions.”

2.3 Restrictions

When using the MOTOCOM 32, pay attention to the following restrictions.

2.3.1 NX100, YASNAC XRC/MRC and Personal Computer Restrictions

■ The port used for TCP/IP

The MOTOCOM 32 uses TCP/IP for the communication protocol. To communicate in TCP/IP, the service identification numbers called “Port No” are used internally, while MOTOCOM 32 uses the port numbers from 10000 to 10008 for the data transmission.

When these numbers overlap with the numbers used for other network devices, correct communication cannot be performed.

To use the MOTCOM 32, be sure in advance that any network device in the same network does not use the above explained port numbers.

2.3.2 Personal Computer Restrictions

■Same file access

The same file in the personal computer cannot be accessed from different robot controllers simultaneously.

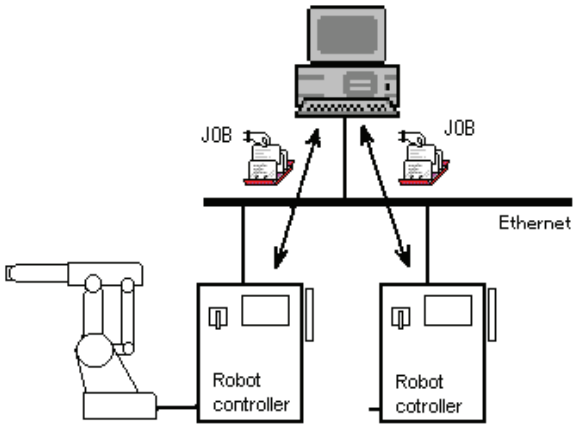


Fig 2.8 Access to the Same File by Multiple Robot controllers not Possible

2.3.3 YASNAC Robot Controller Restrictions

■ Multiple personal computer access

BSC-Protocol

With the MOTOCOM32, one personal computer can communicate with one robot controller. Simultaneous communication with a multiple number of personal computers is not possible.

(On the contrary, the simultaneous comunication between one personal computer and a multiple number of robot controllers is possible.)

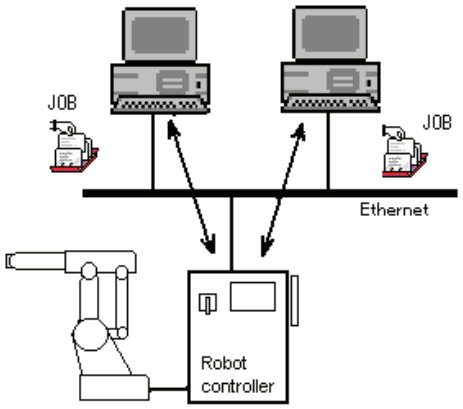


Fig.2.9 Access from a Multiple Personal Computers not Possible

EServer Protocol

By using EServer protocol multiple PC's can communicate with one robot controller.

■CMOS batch storage

The BSC LIKE protocol and the FC1 protocol are available for the MOTOCOM 32 to communicate with external devices. The MOTOCOM 32 uses the BSC LIKE protocol for transmission. As the CMOS batch storage uses the FC1 protocol, CMOS batch storage is not available in the MOTOCOM 32. For CMOS batch storage, use the YASNAC FC1/FC2.

6. CREATING A TRANSMISSION APPLICATION

This paragraph describes how to create an application so that the user can easily create a transmission application between the robot and the personal computer. This help explains how to create an application using the sample program (MS-Windows application development tool with BASIC language as the base "Visual Basic" and "Visual C++") which employs a data transmission function (MS-Windows DLL file type: **file name: MOTOCOM32.DLL**).

When "MOTOCOM32 Help" is opened, the following list of help topics appears.

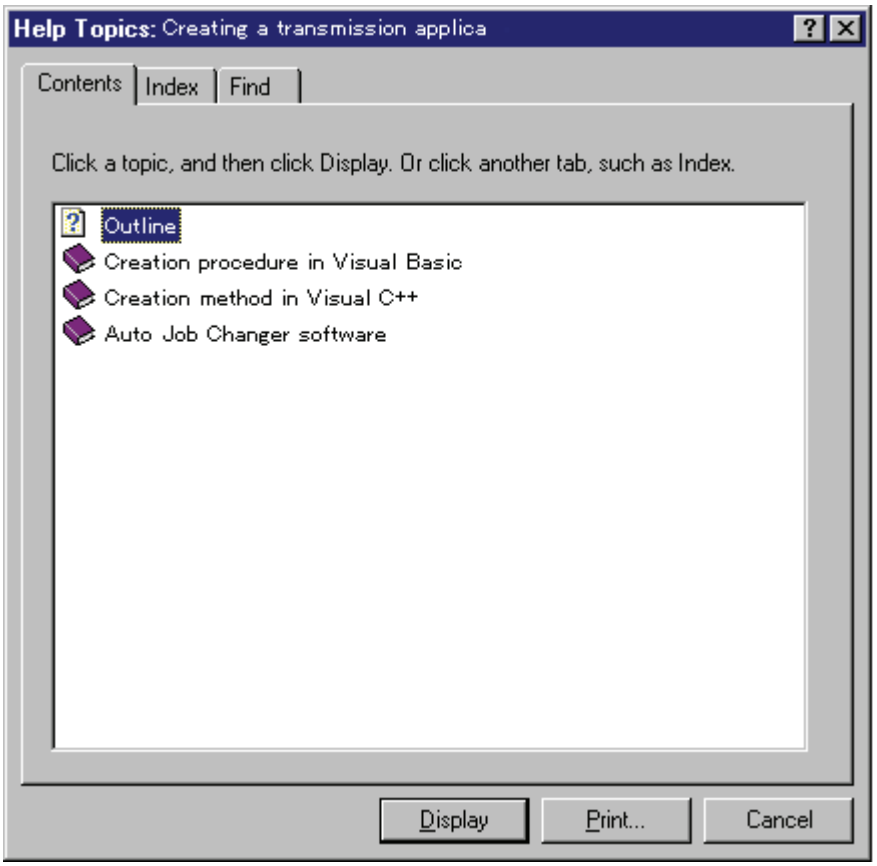


Fig. 6.1 List of Help Topics to Explain How to Create a Transmission Application

Click a topic, "Outline," "Creation procedure in Visual Basic," "Creation method in Visual C++," and "Auto Job Changer software" to view information about that specific item. (After reading each description, click the [Contents] button to return to the help contents display.)

6.1 Outline

This on-line Help describes how to create a transmission application using the 32-bit YASNAC transmission library “MOTOCOM 32 DLL.”
This Help also describes how to create an application with Visual Basic and Visual C++. Other languages can also be used.

6.2 Using Visual Basic

6.2.1 Preparation

To create a transmission application, the following systems must be installed in the personal computer in advance.
① Microsoft Windows95/98/NT4.0/2000/XP*1
② Visual Basic Ver5.0 or more*2
*1 MS Windows 95/98/NT4.0/2000/XP is a registered trademark of Microsoft Corporation, U.S.A.
*2 Visual Basic is a registered trademark of Microsoft Corporation, U.S.A.

6.2.2 How to Create a transmission application

This paragraph explains a simple program, as an example, which sends/receives a job that was input to the text box to/from the controller.

6.2.2.1 Creation of Code Module

In order to call up “Motocom32. DLL” from Visual Basic, declaration of the Motocom 32. DLL I/F functions to be used is needed. The following two methods are available.

① Write the declaration of the DLL functions yourself.

② Use the definition file attached to the Motocom 32 package.

---

① Write the declaration of the DLL functions yourself.

Add the code module and write the following declaration in the declaration area.

```
Declare Function BscOpen Lib "MotoCom32" Alias "_BscOpen@8" _
        (ByVal Path As String, ByVal mode As Integer) As Integer
Declare Function BscClose Lib "MotoCom32" Alias "_BscClose@4" _
        (ByVal nCid As Integer) As Integer
Declare Function BscSetCom Lib "MotoCom32" Alias "_BscSetCom@24" _
        (ByVal nCid As Integer, ByVal Port As Integer, ByVal Baud As Long, ByVal
        Parity As Integer, ByVal clen As Integer, ByVal stp As Integer) As Integer
Declare Function BscConnect Lib "MotoCom32" Alias "_BscConnect@4" _
        (ByVal nCid As Integer) As Integer
Declare Function BscDisConnect Lib "MotoCom32" Alias "_BscDisConnect@4" _
        (ByVal nCid As Integer) As Integer
Declare Function BscDownLoad Lib "motocom32.dll" Alias "_BscDownLoad@8" _
        (ByVal nCid As Integer, ByVal fName As String) As Integer
Declare Function BscUpLoad Lib "motocom32.dll" Alias "_BscUpLoad@8" _
        (ByVal nCid As Integer, ByVal fName As String) As Integer
```

Define the followings as the parameters for BscOpen() to select the type of connection line.

```
        Public Const PACKETCOM = (1)
        Public Const PACKETETHERNET = (16)
```

---

② Use the definition file attached to the Motocom32 package.

The "Motocom32.DLL" package includes a "Motocom32.BAS" file that defines the DLL I/F functions. Add this file to the Visual Basic project.

(1) Copy the "Motocom32.BAS" file to the source directory of the application to be created.

(2) Click "Project" and specify the "Motocom 32.BAS" from the "File" menu to add it to the project.

Create a sub-module to open/close the following ports.
Function Ms_BscOpenComm(mode%)
Function Ms_BscCloseComm()

Select "Creation procedure in Visual Basic," "Create code module," and then "Function Ms_BscOpencomm()" to select the data part (program list) of the above function. The selected section will be highlighted. Use "Partial Copy" to copy this section to Ms_BscOpenComm () function. Repeat for Ms_BscCloseComm. and CmExit.

6.2.2.2 Creation of Form Module

Create the following module.

1) Form to be program display

On this form, create the following controls.

2) Text Box to input the job name (control name: "TxtJobName", text name: 0.JBI")
3) Send button (control name:"CmdDownLoad", caption name: "Send")
4) Receive button (control name: "CmUpLoad", caption name: "Receive")
5) Exit button (control name: "CmdExit", caption name: "Exit")

When the control is created, describe the event procedure for each button.

Sub CmdDownload_Click ()
Sub CmdUpLoad_Click ()
Sub CmdExit_Click ()

Select "Creation procedure in Visual Basic," "Create from module," and then "Sub CmdDownload_Click()" to select the data part (program list) of the above function. The selected section will be highlighted. Use "Partial Copy" to copy this section to Ms_BscOpenComm () function. Repeat for CmdUpLoad and CmExit.

6.2.2.3 Creation and Execution of EXE File

Select "EXE file creation" from the Visual Basic file menu to create an execution enabled module. By putting this module in the same directory as the job to be sent or received and executing it, the job can be sent or received.

Note: The MOTOCOM installation directory contains data transmission functions (Windows DLL file type, **file name: Motocom32.DLL and Motolk.DLL, Motolkr.Dll**). When executing an application, copy the functions to the directory where the module to be executed is created. For transmission via Ethernet, copy **Vrp32.DLL, HxlSrv32.exe** to the same directory as Motocom32.DLL.

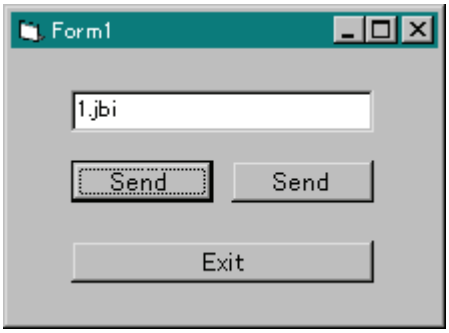


Fig. 6.2 EXE File Execution Display

6.3 Using Visual C++

6.3.1 Preparation

To create a transmission application, the following systems must be installed in the personal computer in advance.

③ Microsoft Windows95/98/NT4.0/2000/XP [*1]

④ Visual C++ Ver5.0 or more[*2]

*1 MS Windows 95/98/NT4.0/2000/XP is a registered trademark of Microsoft Corporation, U.S.A.

*2 Visual C++ is a registered trademark of, Microsoft Corporation U.S.A.

6.3.2 How to Create a transmission application

This paragraph explains a simple program, as an example, which sends/receives a job that was input to the text box to/from the controller.

6.3.2.1 Creation of Skelton

Create a skelton using Visual C++ Ver.5.0 with the following procedure.

① Start up the Microsoft Development Studio and select "New" from the "File" menu to display the "New" display. Then click "Project Work Space" and then the [OK] button.

② Select the "Project" tab and then "MFC AppWizard (exe)."

③ Enter the project name (in this example, input Test), and specify the folder where the project is to be created. Then click the [OK] button.

④ Select "dialog base" as the type of the application to be created in "step 1," and click the [EXIT] button.

A source code to display a dialog box where only [OK] and [CANCEL] pushbuttons exist is created.

6.3.2.2 Definition of DLL Call

① Include "motocom.h" attached to the MOTOCOM32 application using the dialog class source file (TestDig.cpp). Also include the header file, "direct.h," as the sample source as shown below.

```
#include "stdafx.h"
#include "Test.h"
#include "TestDlg.h"
#include <direct.h>          <------Add this line.
#include "motocom.h"         <------Add this line.
```

② Copy the "motocom32.lib" file, the "motocom.h" file and the data transmission function (Windows DLL file type, file name: Motocom32.DLL and Motolk.DLL, Motolkr.Dll) to the directory where the project exists.

③ Click the "Build" and then the "Setting" buttons, and open the "link" tab in the "Set Project" dialog box. Specify the "motocom32.lib" file in the "Object/Library Module" setting column, and click the [OK] button.

The MOTOCOM32 functions can be used in the file where "motocom.h" is included.

Note: The library file (file name: Motocom32.Lib) and the included file (file name: Motocom.h) are in the MOTOCOM32 installation directory.

6.3.2.3 Editing with a Dialog Box

Edit the following with the created dialog box. Open the IDD_TEST_DIALOG dialog box.

① Delete the [CANCEL] pushbutton which was created by default.

② Change the caption of the [OK] pushbutton to "Exit."

③ Create an edit control to input the job name, and name the ID “IDC_JOBNAME.”

④ Create a pushbutton for sending, and name the caption “Send” and the ID “IDC_DOWNLOAD.”

⑤ Create a pushbutton for receiving, and name the caption “Receive” and the ID “IDC_UPLOAD.”

6.3.2.4 Addition of Functions and Variables

① Open the TestDLg.h file to add the following function declaration.

```
short TestOpenComm( int mode );
short TestCloseComm( short ncid );
```

② Create a function “CTestDlg::TestOpenComm” to open the communications port.

③ Create a function “CTestDlg::TestCloseComm” to close the communicatinos port.

④ Create a function “CTestDlg::OnDownload” for BN_CLICKED message in Class Wizard using the [Send] pushbutton (IDC_DOWNLOAD).

⑤ Create a function “CTestDl::OnUpload” for BN_CLICKED message in Class Wizard using the [Receive] pushbutton (IDC_UPLOAD).

⑥Add variable “m_jobname” in Class Wizard by Cedit type for inputting characters of the job name edit control (IDC_JOBNAME).

After adding the functions, write the code in each function.

CTestDlg::TestOpenComm function

CTestDlg::TestCloseComm function

CTestDlg::OnDownload function

CTestDlg::OnUpload function

In the transmission application creation procedure Help, select “Creation procedure in Visual C++,” “Addition of functions and variables,” and then “CTestDlg::TestOpenComm function” to select the data part (program list) of the above function. Use “Partial Copy” to copy this section to CTestDlg::TestOpenComm() function. Repeat for CTestDlg::TestCloseComm, CTestDlg::OnDownload, and CTestDlg::OnUpload.

6.3.2.5 Creation and Execution of EXE File

Execute "Build" in the Visual C++ Build menu to create a execution enabled module. By putting this module in the same directory as the job to be sent or received and executing it, the job can be sent or received.

Note: The MOTOCOM installation directory contains data transmission functions (Windows DLL file type, **file name: Motocom32.DLL and Motolk.DLL, Motolkr.Dll**). When executing an application, copy the functions to the directory where the module to be executed is created. For transmission via Ethernet, copy **Vrp32.DLL, HxlSrv32.exe** to the same directory as Motocom32.DLL.

6.4 Explanation of Auto Job Changer Software Creation Procedure

Procedure (procedure name: Sub DciOnline) to be called when "automatic operation" button is pressed will be described as follows.

Since the Auto Job Changer software is created in Visual Basic, the following description is given in the Visual Basic. However, Visual C++ or any other language can also be used.

Processing is divided into the following 5 major parts.

1) Opening of transmission port [Function name: Ms_BscOpenComm( )]
2) Receiving of job number [Function name: DciGetJobNo( )]
3) Preparation for sending job [Function name: GetJobnameByNo( ), JobCopy( )]
4) Sending of job [Function name: DciLoadSave( )]
5) Closing of transmission port [Function name: Ms_BscCloseComm( )]

The following describes the list of each processing.

Sub DciOnline

```
Sub DciOnline (ProfileCom As String, CvtName As String, lst As Control, LogFile As String)
'input      ProfileCom    Communication profile character string ("COM1:96,E,8,1".etc.)
'          CvtName       Job name to be copied
'          Lst           List name for message output
'          LogFile       Log file name
'output     None
    Dim nCid As Integer
    Dim JobNo As Integer
    Dim JobName As String
    Dim rc As Integer
    Dim Cycle As Long

    Cycle = 0
    'Get of communication handler
    nCid = Ms_BscOpenComm() (mode) ’ mode=0 or 1
    If nCid <> -1 Then
    'Work No. receiving and job sending are repeated until Cancel button is pressed (F_QUIT flag becomes true).
        Do While Not F_QUIT
        DispLogMsg lst, "***** Waiting for work No.*****", ""
            'Receiving work No.
            If Not DciGetJobNo(nCid, JobNo, lst, LogFile) Then Exit Do
            DispLogMsg lst, "Work No. (" + Format$(JobNo) + ") reveived", LogFile
            'Fetching job name corresponding to work No.
            JobName = GetJobNameByNo(JobNo)
            If JobName = "" Then
                MsgBox "No corresponding job is registered."
                Exit Do
```

```
            End If
            'Copying corresponding job to name for sending.
            If Not JobCopy(JobName, CvtName) Then
                MsgBox "Job copy disabled..  (" + JobName + ")"
                Exit Do
            End If
            DispLogMsg lst, JobName + "copied to " + CvtName + ".", LogFile
            DispLogMsg lst, "***** Waiting for request for job transmission.*****", ""
            'Sending job due to instruction from YASNAC.
            If Not DciLoadSave(nCid, lst, LogFile) Then Exit Do
            Cycle = Cycle + 1
            DispLogMsg lst, "Job has been sent.(" + Format$(Cycle) + "Circulating).", LogFile
        Loop
        'No. of communication handlers.
        rc = Ms_BscCloseComm(nCid)
        If rc <> 0 Then
            MsgBox "BscCloseComm terminates in fail." + "(" + Format$(rc) + ")."
        End If
    Else
        MsgBox "Cannot open." + ProfileCom
    End If
End Sub
```

Note: Double underline indicates transmission functions belonging to the MOTOCOM32, single underline indicates functions of which program lists are described below, and dotted underline indicates the functions which are described below.

Function Ms_BscOpenComm (mode%)

```
'mode:   0...RS-232C     1...Ethernet
Function Ms_BscOpenComm( mode% ) as Integer
    Dim ncid As Integer
    Dim rc As Integer
    Dim IPAddrress As string
   Ms_BscOpenComm = -1
   if mode=0 then
      'Open the port.
      ncid = BscOpen(CurDir$, 1)
      If ncid < 0 Then GoTo Ms_BscOpenComm_Exit

      'Set serial communications parameters.
      rc = BscSetCom(ncid, 1, 9600, 2, 8, 0)
   else
      'Open the Ethernet line.
      ncid = BscOpen(CurDir$, PACKETETHERNET)
      If ncid < 0 Then GoTo Ms_BscOpenComm_Exit

      'Set Ethernet communications parameters.
      IPAddrress = "999.999.99.99"    '<---Specify any IP address.
      rc = BscSetEther( ncid , IPAddrress , 0, frmMain.hWnd )
   end if
   If rc <> 1 Then
```

```
            rc = BscClose(ncid)
            ncid = -1
            GoTo Ms_BscOpenComm_Exit
        End If

        'Connect communications line.
        rc = BscConnect(ncid)
        If rc <> 1 Then
            rc = BscClose(ncid)
            ncid = -1
            GoTo Ms_BscOpenComm_Exit
        End If

Ms_BscOpenComm_Exit:
    Ms_BscOpenComm = ncid

End Function
```

This function opens the COM port or the Ethernet line. After the connection is finished, the handle values are sent back as return values. The following operation for the Motocom32.DLL is performed using these handle values.

Note: Double underline indicates transmission functions belonging to the MOTOCOM32, single underline indicates functions of which program lists are described below, and dotted underline indicates the functions which are described below.

Function Ms_BscCloseComm

```
Function Ms_BscCloseComm(ncid as integer) as Integer
    Dim rc As Integer

    'Cut the communications line.
    rc = BscDisConnect(ncid)

      'Close the port.
    rc = BscClose(ncid)

    Ms_BscCloseComm = rc

End Sub
```

Note: Double underline indicates transmission functions belonging to the MOTOCOM32, single underline indicates functions of which program lists are described below, and dotted underline indicates the functions which are described below.

Function DciGetJobNo

```
Function DciGetJobNo (nCid As Integer, JobNo As Integer, lst As Control, LogFile As String) As
Integer
'input      nCid            Communication handler
'           Lst             List name for message output
```

```
'                LogFile          Log file name
'output          JobNo            Received job No.
'return value TRUE                Completion of sending
'                 FALSE            Cancel or error occurrence
    Dim rc As Integer
    Dim rc0 As Integer
    'Declaring return value of BscDciGetPos.
    ReDim axis6(5) As Double
    Dim datatype As Integer
    Dim RConf As Integer
    rc = False
    rc0 = -1
    'Request for receiving is repeated until Cancel button is pressed (F_QUIT flag becomes true) or
   work      No. is received.
    Do While Not F_QUIT
        rc0 = BscDCIGetPos(nCid, datatype, RConf, axis6(0))
        If rc0 >= 0 Then Exit Do    'Work No. received.
    Loop
    If Not F_QUIT Then
        If datatype <= 2 Then 'Only byte or integer type accepted.
            'Received work No. set.
            JobNo = axis6(0)
            rc = True
        Else
            DispLogMsg lst, "Unexpected data type received. (" + Str$(datatype) + ")", LogFile
        End If
    Else
        DispLogMsg lst, "Canceled.", ""
    End If
    DciGetJobNo = rc
End Function
```

Note: Double underline indicates transmission functions belonging to the MOTOCOM-H, single underline indicates functions of which program lists are described below, and dotted underline indicates the functions which are described below.

Function DciLoadSave

```
Function DciLoadSave (nCid As Integer, lst As Control, LogFile As String) As Integer
'input           nCid              Communication handler
'                lst               List name for message output
'                LogFile           Log file name
'output          None
'return value TRUE                Completion of sending
'                 FALSE            Cancel or error occurrence
    Dim rc As Integer
    Dim rc0 As Integer
    rc = False
    'Repeated until Cancel button is pressed (F_QUIT flag becomes true) or sending is completed.
    Do While Not F_QUIT
        rc0 = BscDCILoadSave(nCid, 1)
        If rc0 > 0 Then 'Sending completed.
            rc = True
            Exit Do
        ElseIf rc0 = 0 Then  'No request for receiving from YASNAC. Waiting for request for
receiving again
```

```
            Else    'Job transmission error occurs.
                MsgBox "Job transmission error occurs. (" + Format$(rc0) + ")"
                Exit Do
            End If
        Loop
        If F_QUIT = True Then
            DispLogMsg lst, "Canceled.", ""
        End If
        DciLoadSave = rc
End Function
```

Note: Double underline indicates transmission functions belonging to the MOTOCOM-H, single underline indicates functions of which program lists are described below, and dotted underline indicates the functions which are described below.

Other Functions

Function name	Contents
DispLogMsg()	Outputs a message to the list box and log file.
GetJobNameByNo()	Returns the number corresponding to the work number.
MsgBox()	Displays a message in the dialog box and waits for the button to be pressed.
JobCopy()	Copies a job to a specified file.

7. COMMUNICATION TRANSMISSION

When [MOTOCOM32. DLL function] is opened, the following list of help topics appears.

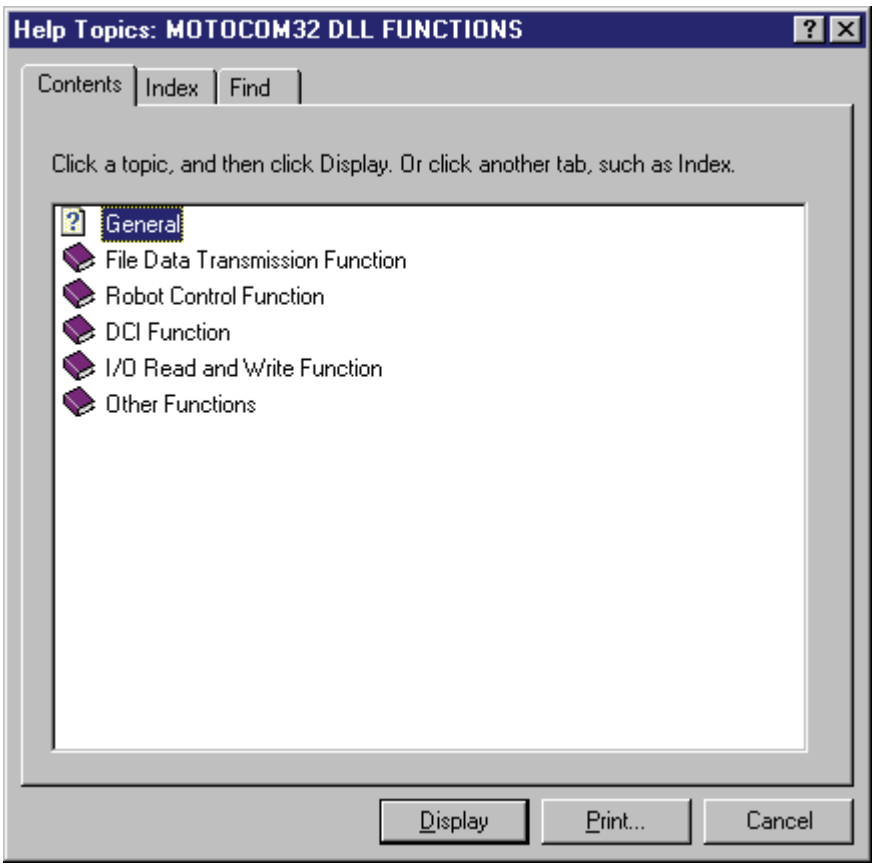


Fig. 7.1 List of Help Topics to Explain Transmission Functions

Clicking “File Data Transmission Function,” “Robot Control Function,” “DCI Function,” “I/O Read and Write Function,” or “Other Functions,” the items related to the detailed contents are displayed. (After reading each description, click the “Contents” button to return to the Help Contents Display.)

7.1 Outline

MOTOCOM32.DLL is a transmission library that controls the data transmission function of the NX100, the YASNAC XRC, MRC, ERC, and ERC Ⅱ on a personal computer. This library is composed in the form of Windows DLL (Dynamic Link Library).

Note: MOTOCOM32.DLL is located below the MOTOCOM32 installation directory. When a transmission application is created, copy this file to the same directory as the application. MOTOCOM.H and MOTOCOM32.LIB files are provided in the MOTOCOM32 installation directory. Use these files when a transmission application is created in C-language.

Transmission library has the following functions.

- File data transmission function
- Robot control function
- DCI function
- I/O signal read/write function
- Other functions

7.2 File Data Transmission Function

Loads and saves the files containing job, condition data, system information, etc.
The following functions are available.

BscDownload
BscUpload
BscDownLoadEx
BscUploadEx

BscDownLoad

FUNCTION: Sends a specified file to the robot controller.

FORMAT: _declspec(dllexport) short APIENTRY BscDownLoad(short nCid,char*fname);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*fname	File name to be sent

OUT(Return)

None

Return Value

0:Normal completion
Others:Transmission error

BscUpLoad

FUNCTION: Receives a specified file from the robot controller.

FORMAT: _declspec(dllexport) short APIENTRY BscUpLoad(short nCid, char *fname);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*fname	File name to be received

OUT(Return)

None

Return Value

0:Normal completion
Others:Receiving error

BscDownLoadEx

FUNCTION: **Sends a specified file to the robot controller. A directory where the sending file exists can be specified.**

FORMAT: **_declspec(dllexport) short APIENTRY BscDownLoadEx(short nCid,char *fname, char*path, BOOL nFlg);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number	
*fname	File name to be sent	
*path	Diretory path of sending source data	
nFlg	TRUE	: Changes the directory temporarily and restores it at the end.
	FALSE	: Changes the directory and completes the processing.

OUT(Return)

None

Return Value

0:Normal completion
Others:Transmission error

BscUpLoadEx

FUNCTION: Receives a specified file from the robot controller. The directory where the file is send to can be specified.

FORMAT: _declspec(dllexport) short APIENTRY BscUpLoadEx(short nCid,char *fname, char*path, BOOL nFlg);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number	
*fname	File name to be received	
*path	Diretory path of sending source data	
nFlg	TRUE	: Changes the directory temporarily and restores it at the end.
	FALSE	: Changes the directory and completes the processing.

OUT(Return)

None

Return Value

0 : Normal completion
Others : Receiving error

7.3 Robot Control Function

Reads the robot status (current position, alarm, error, servo status, etc.) and controls the system (start, hold, job call, etc.)
The following functions are available.

Status Read

BscFindFirst
BscFindFirstMaster
BscFindNext
BscFindNextMaster
BscGetCtrlGroup
BscGetCtrlGroupXrc
BscDownLoad
BscDownLoadEx
BscGetError
BscGetError2
BscGetFirstAlarm
BscGetFirstAlarmS
BscGetNextAlarm
BscGetNextAlarmS
BscGetStatus
BscGetUFrame
BscGetVarData
BscGetVarData2
BscHostGetVarData
BscHostGetVarDataM
BscIsAlarm
BscIsCtrlGroup
BscIsCtrlGroupXrc
BscIsCycle
BscIsError
BscIsErrorCode
BscIsHold
BscIsJobLine
BscIsJobName
BscIsJobStep
BscIsLoc
BscIsPlayMode
BscIsRemoteMode
BscIsRobotPos
BscIsServo
BscIsTaskInf
BscIsTaskInfXrc
BscIsTeachMode
BscJobWait
BscReadAlarmS

System Control

BscCancel
BscChangeTask
BscContinueJob
BscConvertJobP2R
BscConvertJobR2P
BscDeleteJob
BscHoldOff
BscHoldOn
BscHostPutVarData
BscHostPutVarDataM
BscImov
BscMDSP
BscMov
BscMovj
BscMovl
BscOPLock
BscOPUnLock
BscPMov
BscPMovj
BscPMovl
BscPutUFrame
BscPutVarData
BscPutVarData2
BscStartJob
BscSelectJob
BscSelectMode
BscSelLoopCycle
BscSelOneCycle
BscSelStepCycle
BscSetLineNumber
BscSetMasterJob
BscReset
BscSetCtrlGroup
BscSetCtrlGroupXrc
BscServoOff
BscServoOn
BscUpload
BscUploadEx

BscFindFirst

FUNCTION: **Reads the first job name from the all job list registered at the present time.**

FORMAT: **_declspec(dllexport) short APIENTRY BscFindFirst(short nCid,char*fname,short size);**

ARGUMENTS: **IN（Transfer）**

nCid	Communication handler ID number
*fname	First job name storage pointer
size	Job name storage area size

OUT（Return）

*fname	First job name storage pointer

Return Value

－1：No job
－2：Internal error (memory allocation error)
－3：Internal error (memory lock error)
－4：Other errors
0：Job found

BscFindFirstMaster

FUNCTION: Reads the first job name from the job list that belongs to the master job.

FORMAT: _declspec(dllexport) short APIENTRY BscFindfirstMaster(short nCid,char *fname,short size);

ARGUMENTS: IN（Transfer）

nCid	Communication handler ID number
*fname	First job name storage pointer
size	Job name storage area size

OUT（Return）

*fname	First job name storage pointer

Return Value

－1：No job
－2：Internal error (memory allocation error)
－3：Internal error (memory lock error)
－4：Other errors
0：Job found

BscFindNext

FUNCTION: Reads the next job name registered at the present time.

FORMAT: _declspec(dllexport) short APIENTRY BscFindNext(short nCid,char *fname,short size);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*fname	N-th job name storage pointer
size	Job name storage area size

OUT(Return)

*fname	N-th job name storage pointer

Return Value

－1 : No next job
0 : Next job found

REMARKS: Call Condition

The BscFindFirst function must be called up before executing this function.

BscFindNextMaster

FUNCTION: Reads the next job name in the job list that belongs to the master job.

FORMAT: _declspec(dllexport) short APIENTRY BscFindNextMaster(short nCid,char *fname,short size);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*fname	N-th job name storage pointer
size	Job name storage area size

OUT(Return)

*fname	N-th job name storage pointer

Return Value

－1：No next job
0：Next job found

REMARKS: Call Condition

The BscFindFirstMaster function must be called up before executing this function.

BscGetCtrlGroup

FUNCTION: Reads control group and task information.

FORMAT: _declspec(dllexport) short APIENTRY BscGetCtrlGroup(short nCid,short *groupinf,short *taskinf);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*groupinf	Control group information storage pointer
*taskinf	Task information storage pointer

OUT(Return)

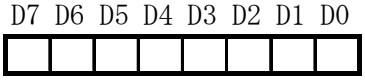
*groupinf	Control group information storage pointer
*taskinf	Task information storage pointer

Return Value

0:Normal completion
Others:Error codes

REMARKS: Control Gourp Information

The control group information is represented by bit data in decimals.



D0:R1(Robot 1)	D4:S3(Station 3)
D1:R2(Robot 2)	D5:S4(Station 4)
D2:S1(Station 1)	D6:S5(Station 5)
D3:S2(Station 2)	D7:S6(Station 6)

Task Information

The task information is represented as follows.

0 : Master task
1 : Sub 1 task
2 : Sub 2 task

"0" is returned if independent control is not allowed in the system.

NOTE

This function is effective only for transmission against the MRC (MRC transmission function). It cannot be used for transmission against the MRC (ERC compatible transmission function). Refer to the BscGetCtrlGroupXrc for transmission against the NX100/XRC (NX100/XRC transmission function).

BscGetCtrlGroupXrc

FUNCTION: Reads control group and task information.

FORMAT: _declspec(dllexport) short APIENTRY BscGetCtrlGroupXrc(short nCid,short *groupinf,short *stationinf, short *taskinf);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number
*groupinf Control group information storage pointer (robot axis)
*stationinf Control group information storage pointer (station axis)
*taskinf Task information storage pointer

OUT(Return)

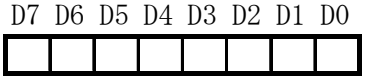
*groupinf Control group information storage pointer (robot axis)
*groupinf Control group information storage pointer (station axis)
*taskinf Task information storage pointer

Return Value

0:Normal completion
Others:Error codes

REMARKS: Control Group Information (Robot Axis)

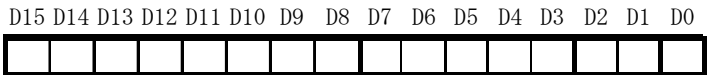
The control group information is represented by bit data in decimals.



D0: R1 (Robot 1)
D1: R2 (Robot 2)
D2: R3 (Robot 3)
D3: R4 (Robot 4)

Control Group Information (Station Axis)

The control group information is represented by bit data in decimals.



D0: S1 (Station 1)
D1: S2 (Station 2)
D2: S3 (Station 3)
D3: S4 (Station 4)
D4: S5 (Station 5)
D5: S6 (Station 6)
D6: S7 (Station 7)
D7: S8 (Station 8)
D8: S9 (Station 9)
D9: S10 (Station 10)
D10: S11 (Station 11)
D11: S12 (Station 12)

* The control group information S7 to S12 are only for the NX100.

Task Information

The task information is represented as follows.
0: Master task

1: Sub 1 task
2: Sub 2 task
3: Sub 3 task
4: Sub 4 task
5: Sub 5 task
6: Sub 6 task
7: Sub 7 task

"0" is returned if independent control is not allowed in the system.

NOTE

This function is effective for transmission against the NX100/XRC (NX100/XRC transmission function). Refer to BscGetCtrlGroup for transmission against the MRC.

BscGetError

FUNCTION: **Reads an error code or alarm code.**

FORMAT: **_declspec(dllexport) short APIENTRY BscGetError(short nCid);**

ARGUMENTS: **IN (Transfer)**

nCid Communication handler ID number

OUT (Return)

None

Return Value

－1 : Acquisition Failure
0 : No error
Others : Error codes

REMARKS: **Restrictions**

This function is effective for transmission with the ERC. Refer to BscGetError2 for transmission with the NX100, XRC or MRC.

BscGetError2

FUNCTION: Reads an error code or alarm code.

FORMAT: _declspec(dllexport) short APIENTRY BscGetError2(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
0：No error
Others：Error codes

BscGetFirstAlarm

FUNCTION: Reads an alarm code and returns the alarm code and alarm data.

FORMAT: _declspec(dllexport) short APIENTRY BscGetFirstAlarm(short, nCid,short *data)

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*data	Alarm data storage pointer

OUT(Return)

*data	Alarm data storage pointer

Return Value

0:No alarm
Others:Alarm code numbers

REMARKS: Call Condition

The BscGetError2 function must be called up before executing this function.

BscGetFirstAlarmS

FUNCTION: **Reads an alarm code and returns the alarm code, alarm data and alarm message.**

FORMAT: **_declspec(dllexport) short APIENTRY BscGetFirstAlarm(short, nCid,short *data,char *msg);**

ARGUMENTS: **IN (Transfer)**

nCid	Communication handler ID number
*data	Alarm data storage pointer
*msg	Alarm message storage pointer

OUT (Return)

*data	Alarm data storage pointer
*msg	Alarm message storage pointer

Return Value

0 : No alarm
Others : Alarm code numbers

REMARKS: **Call Condition**

The BscReadAlarmS function must be called up before executing this function.

Restrictions

This function is effective for transmission with the NX100 (NX100 communication function).

BscGetNextAlarm

FUNCTION: Reads the next alarm code and alarm data.

FORMAT: _declspec(dllexport)short APIENTRY BscGetNextAlarm(short nCid,short *data);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*data	Alarm data storage pointer

OUT(Return)

*data	Alarm data storage pointer

Return Value

0:No alarm
Others:Alarm code numbers

REMARKS: Call Condition

The BscGetFirstAlarm function must be called up before executing this function.

BscGetNextAlarmS

FUNCTION: Reads the next alarm code, alarm data and alarm message.

FORMAT: _declspec(dllexport)short APIENTRY BscGetNextAlarmS(short nCid,short *data,char *msg);

ARGUMENTS:

IN (Transfer)

nCid	Communication handler ID number
*data	Alarm data storage pointer
*msg	Alarm message storage pointer

OUT (Return)

*data	Alarm data storage pointer
*msg	Alarm message storage pointer

Return Value

0 : No alarm
Others : Alarm code numbers

REMARKS:

Call Condition

The BscGetFirstAlarmS function must be called up before executing this function.

Restrictions

This function is effective for transmission with the NX100 (NX100 communication function).

BscGetStatus

FUNCTION: Reads the status information.

FORMAT: _declspec(dllexport) short APIENTRY BscGetStatus(short nCid,short *d1,short *d2)

ARGUMENTS: IN (Transfer)

nCid	Communication handler ID number
*d1	Data 1 storage pointer
*d2	Data 2 storage pointer

OUT (Return)

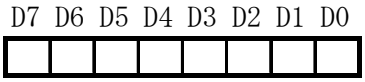
*d1	Data 1 storage pointer
*d2	Data 2 storage pointer

Return Value

－1 : Fetch failed
Others : Normal completion

REMARKS: Data 1

Data 1 are represented by bit data in decimals.

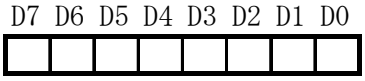


D0 : Step
D1 : 1-cycle
D2 : Auto operation
D3 : Operating
D4 : Operation at safe speed
D5 : Teach *
D6 : Play *
D7 : Command remote *

*: Effective only for NX100, XRC and MRC.

Data 2

Data 2 are represented by bit data in decimals.



D0 : Hold (NX100/XRC/MRC: Playback box hold, ERC:Panel hold)
D1 : Hold (NX100/XRC/MRC: Programming pendant hold, ERC: T-BOX hold)
D2 : Hold (External hold)
D3 : Hold (Command hold)
D4 : Alarm occurred
D5 : Error occurred
D6 : Servo ON

BscGetUFrame

FUNCTION: Reads specified user frame data.

FORMAT: _declspec(dllexport) short APIENTRY BscGetUFrame(short nCid,char *ufname,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*ufname	Storage pointer of user coordinate name
*p	User coordinate data storage pointer

OUT(Return)

*p	User coordinate data storage pointer

Return Value

－1：User coordinate name error
0：Normal completion
Others：Error codes

REMARKS: User Coordinate Name

The following coordinate names correspond to the user coordinate numbers.

User Coordinate Name	Specified Name	User Coordinate Name	Specified Name
User coordinate 1	UF1	User coordinate 13	UF13
User coordinate 2	UF2	User coordinate 14	UF14
User coordinate 3	UF3	User coordinate 15	UF15
User coordinate 4	UF4	User coordinate 16	UF16
User coordinate 5	UF5	User coordinate 17	UF17
User coordinate 6	UF6	User coordinate 18	UF18
User coordinate 7	UF7	User coordinate 19	UF19
User coordinate 8	UF8	User coordinate 20	UF20
User coordinate 9	UF9	User coordinate 21	UF21
User coordinate 10	UF10	User coordinate 22	UF22
User coordinate 11	UF11	User coordinate 23	UF23
User coordinate 12	UF12	User coordinate 24	UF24

*User coordinate numbers 9 to 24 are effective for NX100/XRC/MRC.

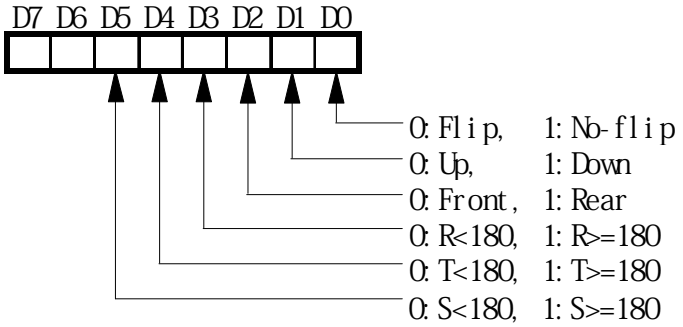
Variable type

Coordinate values of the user coordinate system specified with the user coordinate number are assigned to the user coordinate data as follows.

Variables	Coordinate System	Meaning
P[0]	ORG	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[1]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[2]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[3]		Wrist angle TX (unit:°, effective down to 2 decimal places)
P[4]		Wrist angle TY (unit:°, effective down to 2 decimal places)
P[5]		Wrist angle TZ (unit:°, effective down to 2 decimal places)
P[6]		Form
P[7]	XX	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[8]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[9]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[10]		Wrist angle TX (unit:°, effective down to 2 decimal places)
P[11]		Wrist angle TY (unit:°, effective down to 2 decimal places)
P[12]		Wrist angle TZ (unit:°, effective down to 2 decimal places)
P[13]		Form
P[14]	XY	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[15]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[16]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[17]		Wrist angle TX (unit:°, effective down to 2 decimal places)
P[18]		Wrist angle TY (unit:°, effective down to 2 decimal places)
P[19]		Wrist angle TZ (unit:°, effective down to 2 decimal places)
P[20]		Form
P[21]	Tool number (0 to 23)	
P[22]	7th axis pulse number (mm for traveling axis)	
P[23]	8th axis pulse number (mm for traveling axis)	
P[24]	9th axis pulse number (mm for traveling axis)	
P[25]	10th axis pulse number	
P[26]	11th axis pulse number	
P[27]	12th axis pulse number	

Form

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

BscGetVarData

FUNCTION: Receives variables.

FORMAT: _declspec(dllexport) short APIENTRY BscGetVarData(short nCid,short type,short varno,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communicaion handler ID number
type	Variable type
varno	Variable number
*p	Variable storage pointer

OUT(Return)

*p	Variable storage pointer

Return Value

0:Normal completion
Others:Error codes

REMARKS: Variable Types

The variable types are represented as follows.

0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)

Details of Variables

	Byte type	Integer type	Double-precision type	Real type	Robot axis position type	Base axis position type	Station axis position type
P[0]	Value	Value	Value	Value	0	0	0
P[1]	-	-	-	-	S-axis pulse number	1st base axis pulse number	1st station axis pulse number
P[2]	-	-	-	-	L-axis pulse	2nd base axis pulse	2nd station axis

					number	number	pulse number
P[3]	–	–	–	–	U-axis pulse number	3rd base axis pulse number	3rd station axis pulse number
P[4]	–	–	–	–	R-axis pulse number	4th base axis pulse number	4th station axis pulse number
P[5]	–	–	–	–	B-axis pulse number	5th base axis pulse number	5th station axis pulse number
P[6]	–	–	–	–	T-axis pulse number	6th base axis pulse number	6th station axis pulse number
P[7]	–	–	–	–	Tool number	Tool number	Tool number
P[8]	–	–	–	–	–	–	–
P[9]	–	–	–	–	–	–	–

	Robot axis position type	Base axis position type
P[0]	1	1
P[1]	Coordinate type	Coordinate type
P[2]	X-axis coordinate (unit: mm)	1st base axis XYZ value (unit: mm)
P[3]	Y-axis coordinate (unit: mm)	2nd base axis XYZ value (unit: mm)
P[4]	Z-axis coordinate (unit: mm)	3rd base axis XYZ value (unit: mm)
P[5]	Tx (unit: °)	4th base axis XYZ value (unit: mm)
P[6]	Ty (unit: °)	5th base axis XYZ value (unit: mm)
P[7]	Tz (unit: °)	6th base axis XYZ value (unit: mm)
P[8]	Form	Form
P[9]	Tool number	Tool number

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.
See the following for details on the coordinate system types and form.

Coordinate Types

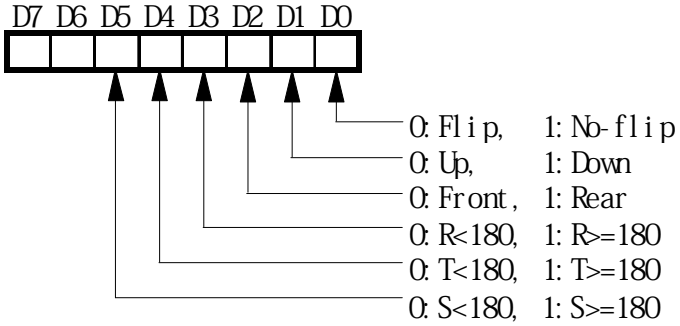
The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22
10	User coordinate 9	24	User coordinate 23
11	User coordinate 10	25	User coordinate 24
12	User coordinate 11	26	Tool coordinate

13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



＊With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

NOTE

This function is effective only for transmission against the NX100/XRC/MRC (NX100/XRC/MRC transmission function). It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

BscGetVarData2

FUNCTION: Receives variables.(7axes or more)

FORMAT: _declspec(dllexport) short APIENTRY BscGetVarData2(short nCid,short type,short varno,double *p,short axisNum);

ARGUMENTS: IN(Transfer)

nCid	Communicaion handler ID number
type	Variable type
varno	Variable number
*p	Variable storage pointer
axisNum	Axis

OUT(Return)

*p	Variable storage pointer

Return Value

0:Normal completion
Others:Error codes

REMARKS: Variable Types

The variable types are represented as follows.
0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)

Details of Variables

	Byte type	Integer type	Double-precision type	Real type	Robot axis position type	Base axis position type	Station axis position type
P[0]	Value	Value	Value	Value	0	0	0
P[1]	-	-	-	-	S-axis pulse number	1st base axis pulse number	1st station axis pulse number

P[2]	–	–	–	–	L-axis pulse number	2nd base axis pulse number	2nd station axis pulse number
P[3]	–	–	–	–	U-axis pulse number	3rd base axis pulse number	3rd station axis pulse number
P[4]	–	–	–	–	R-axis pulse number	4th base axis pulse number	4th station axis pulse number
P[5]	–	–	–	–	B-axis pulse number	5th base axis pulse number	5th station axis pulse number
P[6]	–	–	–	–	T-axis pulse number	6th base axis pulse number	6th station axis pulse number
P[7]	–	–	–	–	7axes pulse number	Tool number	Tool number
P[8]	–	–	–	–	8axes pulse number	–	–
P[9]	–	–	–	–	Tool number	–	–

	Robot axis position type	Base axis position type
P[0]	1	1
P[1]	Coordinate type	Coordinate type
P[2]	X-axis coordinate (unit: mm)	1st base axis XYZ value (unit: mm)
P[3]	Y-axis coordinate (unit: mm)	2nd base axis XYZ value (unit: mm)
P[4]	Z-axis coordinate (unit: mm)	3rd base axis XYZ value (unit: mm)
P[5]	Tx (unit: °)	4th base axis XYZ value (unit: mm)
P[6]	Ty (unit: °)	5th base axis XYZ value (unit: mm)
P[7]	Tz (unit: °)	6th base axis XYZ value (unit: mm)
P[8]	Form	Form
P[9]	Tool number	Tool number

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.
See the following for details on the coordinate system types and form.

Coordinate Types

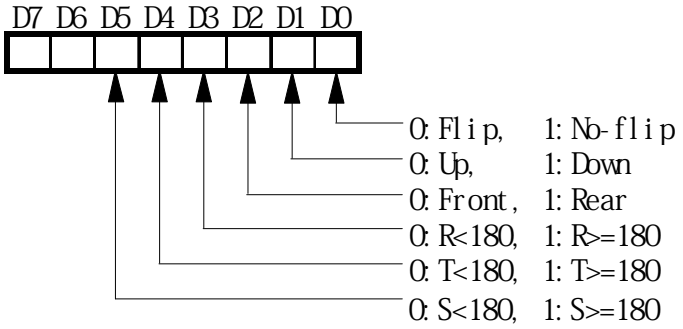
The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22
10	User coordinate 9	24	User coordinate 23

11	User coordinate 10	25	User coordinate 24
12	User coordinate 11	26	Tool coordinate
13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



NOTE

This function is effective only for transmission against the NX100/XRC. It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

BscHostGetVarData

FUNCTION: Receives variables.

FORMAT: _declspec(dllexport) short APIENTRY BscHostGetVarData(short nCid,short type,short varno,double *p,char *str);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
*p	Head pointer to the numeric variable storage area
*str	Head pointer to the character variable storage area

OUT(Return)

*p	Head pointer to the numeric variable storage area

Return Value

0:Normal completion
Others:Error codes

REMARKS: Restrictions

This function is effective only for transmission with the NX100/XRC/MRC (NX100/XRC/MRC transmission function). String variables can only be used with the NX100 ver3.0 or later.

Variable Types

The variable types are represented as follows.

0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)
7 : String type

Content of the numeric variable storage area

Depending on the variable type, the numeric variable storage area contains the number of values indicated below.

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content				
			P[0]	P[1]	P[2]	P[3]	P[4]
0	-	1	Byte				
1	-	1	Integer	-	-	-	-
2	-	1	Double	-	-	-	-
3	-	1	Real	-	-	-	-
4	Pulse	8	0	S-axis Pulses	L-axis Pulses	U-axis Pulses	R-axis Pulses
4	XYZ	10	1	Coordinate Type	X-axis (mm)	Y-axis (mm)	Z-axis (mm)
5	Pulse	8	0	Base Axis-1 Pulses	Base Axis-2 Pulses	Base Axis-3 Pulses	Base Axis-4 Pulses
5	XYZ	10	1	Coordinate Type	X-axis (mm)	Y-axis (mm)	Z-axis (mm)
6	Pulse	8	0	Station Axis-1 Pulses	Station Axis-2 Pulses	Station Axis-3 Pulses	Station Axis-4 Pulses

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content				
			P[5]	P[6]	P[7]	P[8]	P[9]
0	-	1					
1	-	1	-	-	-	-	-
2	-	1	-	-	-	-	-
3	-	1	-	-	-	-	-
4	Pulse	8	B-axis Pulses	T-axis Pulses	Tool Number		
4	XYZ	10	Rx Angle(deg)	Ry Angle(deg)	Rz Angle(deg)	Form	Tool Number
5	Pulse	8	Base Axis-5 Pulses	Base Axis-6 Pulses	Tool Number		
5	XYZ	10	Rx Angle(deg)	Ry Angle(deg)	Rz Angle(deg)	Form	Tool Number
6	Pulse	8	Station Axis-5 Pulses	Station Axis-6 Pulses	Tool Number		

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.

See below for details on the coordinate system types and form.

Content of the character variable storage area

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content
			str
7	-	16	String

NOTE:
When this function is used to receive a string type variable make sure that the character variable storage area is allocated for 17 characters.

Declaration in Visual Basic: Dim S_Variable As String *17
Declaration in C++: char S_Variable[17]

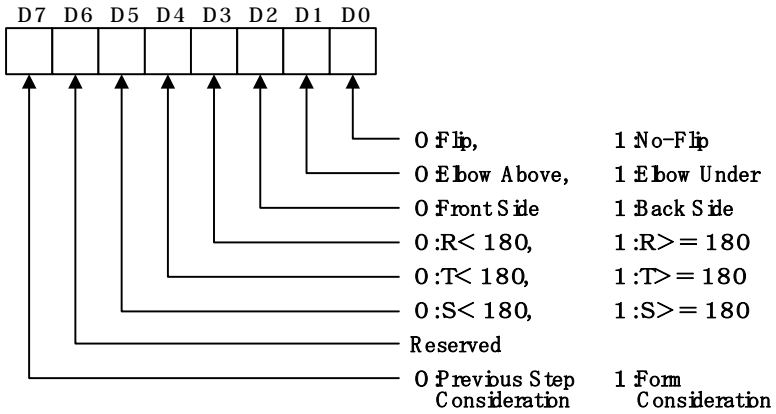
Coordinate Types

The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22
10	User coordinate 9	24	User coordinate 23
11	User coordinate 10	25	User coordinate 24
12	User coordinate 11	26	Tool coordinate
13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



* With the MRC or MRC Ⅱ, the data of D6 and D7 are disregarded.

BscHostGetVarDataM

FUNCTION: Receives multiple variables at the same time.

FORMAT: _declspec(dllexport) short APIENTRY BscHostGetVarDataM(short nCid,short type,short varno,short num, double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
num	Number of variables
*p	Head pointer to the numeric variable storage area

OUT(Return)

*p	Head pointer to the numeric variable storage area

Return Value

0:Normal completion
Others:Error codes

REMARKS: Restrictions

This function is effective only for transmission with the NX100 (NX100 transmission function).

Variable Types

The variable types are represented as follows.
0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type

Variable Designation Method

The variable information transmitted is composed of the number of values (num) requested of the specified variable type, beginning with the value of the specified variable number (varno) followed by the values of subsequent variables.

BscIsAlarm

FUNCTION: Reads alarm status.

FORMAT: _declspec(dllexport) short APIENTRY BscIsAlarm(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
0：No alarm
1：Alarm

BscIsCtrlGroup

FUNCTION: Reads control group information.

FORMAT: _declspec(dllexport) short APIENTRY BscIsCtrlGroup(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

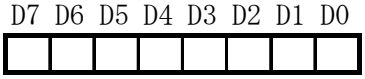
None

Return Value

－1:Fetch failed
Others:Control group information

REMARKS: Control Group Information

The control group information is represented by bit data in decimals.



D0:R1(Robot 1)
D1:R2(Robot 2)
D2:S1(Station 1)
D3:S2(Station 2)
D4:S3(Station 3)
D5:S4(Station 4)
D6:S5(Station 5)
D7:S6(Station 6)

NOTE

This function is effective only for transmission against MRC (MRC transmission function). It cannot be used for transmission against MRC (ERC compatible transmission function). Refer to BscIsCtrlGroupXrc for transmission against NX100/XRC (NX100/XRC transmission function).

BscIsCtrlGroupXrc

FUNCTION: Reads control group information.

FORMAT: _declspec(dllexport)short APIENTRY BscIsCtrlGroupXrc (short nCid,short *robtask, short *stattask);

ARGUMENTS: IN (Transfer)

nCid Communication handler ID number
*robtask Control group information storage pointer (robot axis)
*stattask Control group information storage pointer (station axis)

OUT (Return)

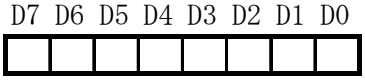
*robtask Control group information storage pointer (robot axis)
*stattask Control group information storage pointer (station axis)

Return Value

－1 : Fetch failed
Others : Control group information

REMARKS: Control Group Information (Robot Axis)

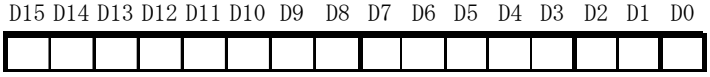
The control group information is represented by bit data in decimals.



D0: (Robot 1)
D1: (Robot 2)
D2: (Robot 3)
D3: (Robot 4)

Control Group Information (Station Axis)

The control group information is represented by bit data in decimals.



D0: S1 (Station 1)
D1: S2 (Station 2)
D2: S3 (Station 3)
D3: S4 (Station 4)
D4: S5 (Station 5)
D5: S6 (Station 6)
D6: S7 (Station 7)
D7: S8 (Station 8)
D8: S9 (Station 9)
D9: S10 (Station 10)
D10: S11 (Station 11)
D11: S12 (Station 12)

* The control group information S7 to S12 are only for the NX100.

NOTE

This function is effective only for transmission against NX100/XRC (NX100/XRC transmission function). Refer to BscIsCtrlGroup for transmission against MRC.

BscIsCycle

FUNCTION: Reads playback mode information.

FORMAT: _declspec(dllexport) short APIENTRY BscIsCycle(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
0：Step mode
1：1-cycle mode
2：Auto mode

BscIsError

FUNCTION: Reads error status.

FORMAT: _declspec(dllexport) short APIENTRY BscIsError(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

-1 : Fetch failed
 0 : No error
 1 : Error found

BscIsHold

FUNCTION: **Reads hold status.**

FORMAT: **_declspec(dllexport) short APIENTRY BscIsHold(short nCid);**

ARGUMENTS: **IN(Transfer)**

nCid Communication handler ID number

OUT(Return)

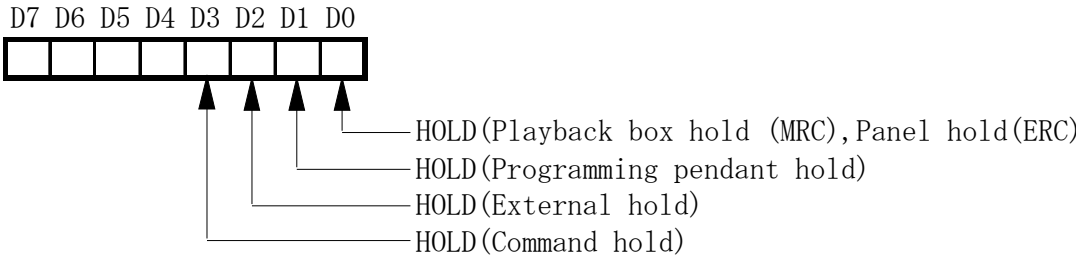
None

Return Value

－1:Fetch failed
0:Not held
Others:See below

REMARKS: **Hold Status**

The hold status data are represented by bit data in decimals.



BscIsJobLine

FUNCTION: Reads the current job line number.

FORMAT: _declspec(dllexport) short APIENTRY BscIsJobLine(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
Others：Line numbers

BscIsJobName

FUNCTION: Reads the current job name.

FORMAT: _declspec(dllexport) short APIENTRY BscIsJobName(short nCid,char *jobname,short size);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*jobname	Job name storage pointer
size	Job name storage area size

OUT(Return)

*jobname	Job name storage pointer

Return Value

－1：Fetch failed
0：Normal completion

BscIsJobStep

FUNCTION: Reads the current job step number.

FORMAT: _declspec(dllexport) short APIENTRY BscIsJobStep(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
Others：Step numbers

BscIsLoc

FUNCTION: Reads the current robot position in pulse or XYZ frame system.

FORMAT: _declspec(dllexport) short APIENTRY BscIsLoc(short nCid,short ispulse,short *rconf,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
ispulse	0:Cartesian coordinate system; 1:Joint coordinate system
*rconf	Form storage pointer
*p	Current position storage pointer

OUT(Return)

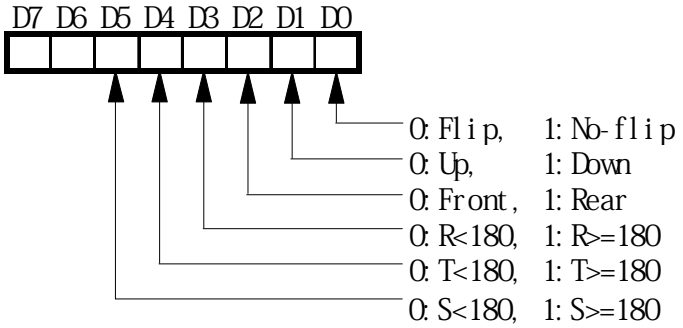
*rconf	Form storage pointer
*p	Current position storage pointer

Return Value

－1:Fetch failed
0:Normal completion

REMARKS: Form

The form data are represented by bit data in decimals.



* With the ERC or ERCⅡ, the data of D3, D4 and D5 are ignored.

Current Position

The current position data are as follows when the joint coordinate system or Cartesian coordinate system are specified.

	Joint coordinate system	Cartesian coordinate system
P[0]	S-axis pulse number	X-axis coordinate (unit: mm)
P[1]	L-axis pulse number	Y-axis coordinate (unit: mm)
P[2]	U-axis pulse number	Z-axis coordinate (unit: mm)
P[3]	R-axis pulse number	Wrist angle TX (unit: °)
P[4]	B-axis pulse number	Wrist angle TY (unit: °)
P[5]	T-axis pulse number	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number	10th axis pulse number
P[10]	11th axis pulse number	11th axis pulse number
P[11]	12th axis pulse number	12th axis pulse number

BscIsPlayMode

FUNCTION: Reads the operation mode.

FORMAT: _declspec(dllexport) short APIENTRY BscIsPlayMode(short nCid);

ARGUMENTS: IN(Transfer)

nCid　　Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
0：Not operating
1：Operating
2：Operating at safe speed

BscIsRemoteMode

FUNCTION: Reads the command remote mode status.

FORMAT: _declspec(dllexport) short APIENTRY BscIsRemoteMode(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1：Fetch failed
0：Not command remote mode
1：Command remote mode

BscIsRobotPos

FUNCTION: **Reads the current robot position in a specified frame system. The existence of the external axis can also be specified.**

FORMAT: **_declspec(dllexport) short APIENTRY BscIsRobotPos(short nCid,char *framename,int isex,short *rconf,short *toolno,double *p);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
*framename	Coordinate name; BASE:Base coordinate system; ROBOT:Robot coordinate system; UF1:User coordinate system1...
isex	0:No external axis, 1:With external axis
*rconf	Form storage pointer
*toolno	Tool number storage pointer
*p	Current position storage pointer

OUT(Return)

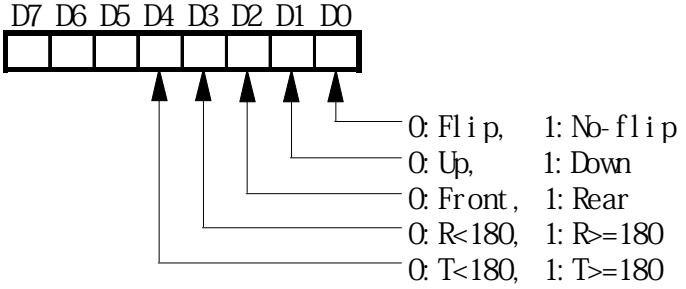
*rconf	Form storage pointer
*toolno	Tool number storage pointer
*p	Current position storage pointer

Return Value

－1:Fetch failed
0:Normal completion

REMARKS: **Form**

The form data are represented by bit data in decimals.



* With the ERC or ERCⅡ, the data of D3 and D4 are ignored.

Current Position

The current position data are as follows when the joint coordinate system or Cartesian coordinate system is specified.

	Current position in the specified coordinate system
P[0]	X-axis coordinate system (unit: mm)
P[1]	Y-axis coordinate system (unit: mm)
P[2]	Z-axis coordinate system (unit: mm)
P[3]	Wrist angle TX (unit: °)
P[4]	Wrist angle TY (unit: °)
P[5]	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

BscIsServo

FUNCTION: Reads the servo status.

FORMAT: _declspec(dllexport) short APIENTRY BscIsServo(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1:Fetch failed
0:Servo OFF
1:Servo ON

BscIsTaskInf

FUNCTION: Reads task information.

FORMAT: _declspec(dllexport) short APIENTRY BscIsTaskInf(short nCid);

ARGUMENTS

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1:Fetch failed
Others:Task information

REMARKS:

Task Information

The task information is represented as follows.
0 : Master task
1 : Sub 1 task
2 : Sub 2 task
"0" is returned when independent control is not allowed in the system.

NOTE

This function is effective only for transmission against the MRC (MRC transmission function). It cannot be used for transmission against the MRC (ERC compatible transmission function). Refer to BscIsTaskInfXrc for transmission against the NX100/XRC (NX100/XRC transmission function).

BscIsTaskInfXrc

FUNCTION: Reads task information.

FORMAT: _declspec(dllexport) short APIENTRY BscIcTaskInfXrc(short nCid)

ARGUMENTS

IN (Transfer)

nCid Communication handler ID number

OUT (Return)

None

Return Value

-1 : Fetch failed
Others : Error codes

REMARKS:

Task Information

The task information is represented as follows.
0: Master task
1: Sub 1 task
2: Sub 2 task
3: Sub 3 task
4: Sub 4 task
5: Sub 5 task
6: Sub 6 task
7: Sub 7 task
"0" is returned if independent control is not allowed in the system.

NOTE

This function is effective for transmission against the NX100/XRC (NX100/XRC transmission function). Refer to BscIsTaskInf for transmission against the MRC.

BscIsTeachMode

FUNCTION: Reads whether in the teach mode or play mode.

FORMAT: _declspec(dllexport) short APIENTRY BscIsTeachMode(short,nCid);

ARGUMENTS: IN（Transfer）

nCid　　Communication handler ID number

OUT（Return）

None

Return Value

－1：Fetch failed
0：Teach mode
1：Play mode

BscJobWait

FUNCTION: **Waits for job completion until the robot stops or specified time expires.**

FORMAT: **_declspec(dllexport) short APIENTRY BscJobWait(short nCid,short time);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
time	Wait time(－1:Unlimited; 0 to 32767seconds)

OUT(Return)

None

Return Value

－2:Abnormal completion
－1:Operation incomplete
0:Operation completed
Others:Error codes

REMARKS: **Cause of Incomplete Operation**

These causes are considered for imcomplete operation.
＊The robot was stopped via teach pendant or by external hold.
＊The robot was stopped by alarm.
＊The robot was stopped by emergency stop.
＊Time expired

BscReadAlarmS

FUNCTION: Reads the error code, error data and error message.

FORMAT: _declspec(dllexport) short APIENTRY BscReadAlarmS(short, nCid,short *data,char *msg);

ARGUMENTS: IN (Transfer)

nCid	Communication handler ID number
*data	Error data storage pointer
*msg	Error message storage pointer

OUT (Return)

*data	Error data storage pointer
*msg	Error message storage pointer

Return Value

－1 : Error code acquisition failure
0 : No Error
Others : Error code numbers

REMARKS: Restrictions

This function is effective for transmission with the NX100 (NX100 communication function).

BscCancel

FUNCTION: Cancels an error.

FORMAT: _declspec(dllexport) short APIENTRY BscCancel(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscChangeTask

FUNCTION: Changes a task.

FORMAT: _declspec(dllexport) short APIENTRY BscChangeTask(short nCid,short task);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
task	Specified task number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Specified Task Number

The task number is represented as follows.
0:Master task
1:Subtask 1
2:Subtask 2
3:Subtask 3
4:Subtask 4
5:Subtask 5
6:Subtask 6
7:Subtask 7
* Specified task number 3 to 7 are only for the NX100 and XRC.

NOTE

This function is effective only for transmission against the NX100/XRC/MRC (NX100/XRC/MRC transmission function). It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

When the power supply of robot controller is started up, a master task is selected as an task to be controlled. This function can not be used in a system where an independent control is not allowed.

BscContinueJob

FUNCTION: Starts job.(Execution starts from the current line of the current job.)

FORMAT: _declspec(dllexport) short APIENTRY BscContinueJob(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscConvertJobP2R

FUNCTION: Converts a pulse job to a relative job in a specified frame system.

FORMAT: _declspec(dllexport) short APIENTRY BscConvertJobP2R(short nCid,char *name,char *framename);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number
*name Job name storage pointer
*framename Coordinate name: BASE:Base coordinate: ROBOT:Robot coordinate: UF1:User coordinate1...

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscConvertJobR2P

FUNCTION: Converts a relative job in a specified frame system to a pulse job.

FORMAT: _declspec(dllexport) short APIENTRY BscConvertJobR2P(short nCid,char *name,short cv_type,char *var_no);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*name	Job name storage pointer
cv_type	Conversion method
var_no	Reference position variable number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Conversion Method

The conversion method is represented as follows.
0:Previous step regarded (B-axis sign constant)
1:Type regarded
2:Previous step regarded (Minimum R-axis movement)

NOTE

This function is effective only for transmission against the NX100/XRC/MRC (NX100/XRC/MRC transmission functions.) It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

BscDeleteJob

FUNCTION: Deletes a job.

FORMAT: _declspec(dllexport) short APIENTRY BscDeleteJob(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
1:Cannot delete
Others: Error codes

REMARKS: Call Condition

The BscSelectJob function must be called up and the job name to be deleted must be specified before executing this function.

BscHoldOn

FUNCTION: Sets hold-ON.

FORMAT: _declspec(dllexport) short APIENTRY BscHoldOn(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscHoldOff

FUNCTION: Sets hold-OFF.

FORMAT: _declspec(dllexport) short APIENTRY BscHoldOff(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscHostPutVarData

FUNCTION: Sets variables.

FORMAT: _declspec(dllexport) short APIENTRY BscHostPutVarData(short nCid,short type,short varno,double *p,char *str);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
*p	Head pointer to the numeric variable storage area
*str	Head pointer to the character variable storage area

OUT(Return)

None

Return Value

0:Normal completion
Others:Error codes

REMARKS: Restrictions

This function is effective only for transmission with the NX100/XRC/MRC (NX100/XRC/MRC transmission function). String variables can only be used with the NX100 ver3.0 or later.

Variable Types

The variable types are represented as follows.

0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)
7 : String type

Content of the numeric variable storage area

Depending on the variable type, the numeric variable storage area contains the number of values indicated below.

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content				
			P[0]	P[1]	P[2]	P[3]	P[4]
0	–	1	Byte				
1	–	1	Integer	–	–	–	–
2	–	1	Double	–	–	–	–
3	–	1	Real	–	–	–	–
4	Pulse	8	0	S-axis Pulses	L-axis Pulses	U-axis Pulses	R-axis Pulses
4	XYZ	10	1	Coordinate Type	X-axis (mm)	Y-axis (mm)	Z-axis (mm)
5	Pulse	8	0	Base Axis-1 Pulses	Base Axis-2 Pulses	Base Axis-3 Pulses	Base Axis-4 Pulses
5	XYZ	10	1	Coordinate Type	X-axis (mm)	Y-axis (mm)	Z-axis (mm)
6	Pulse	8	0	Station Axis-1 Pulses	Station Axis-2 Pulses	Station Axis-3 Pulses	Station Axis-4 Pulses

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content				
			P[5]	P[6]	P[7]	P[8]	P[9]
0	–	1					
1	–	1	–	–	–	–	–
2	–	1	–	–	–	–	–
3	–	1	–	–	–	–	–
4	Pulse	8	B-axis Pulses	T-axis Pulses	Tool Number		
4	XYZ	10	Rx Angle(deg)	Ry Angle(deg)	Rz Angle(deg)	Form	Tool Number
5	Pulse	8	Base Axis-5 Pulses	Base Axis-6 Pulses	Tool Number		
5	XYZ	10	Rx Angle(deg)	Ry Angle(deg)	Rz Angle(deg)	Form	Tool Number
6	Pulse	8	Station Axis-5 Pulses	Station Axis-6 Pulses	Tool Number		

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.
See below for details on the coordinate system types and form.

Content of the character variable storage area

Variable Type Number	Data Type (Pulse/ XYZ)	Number of values	Content
			str
7	–	16	String

NOTE:
When this function is used to receive a string type variable make sure that the character variable storage area is allocated for 17 characters.

Declaration in Visual Basic: Dim S_Variable As String *17
Declaration in C++: char S_Variable[17]

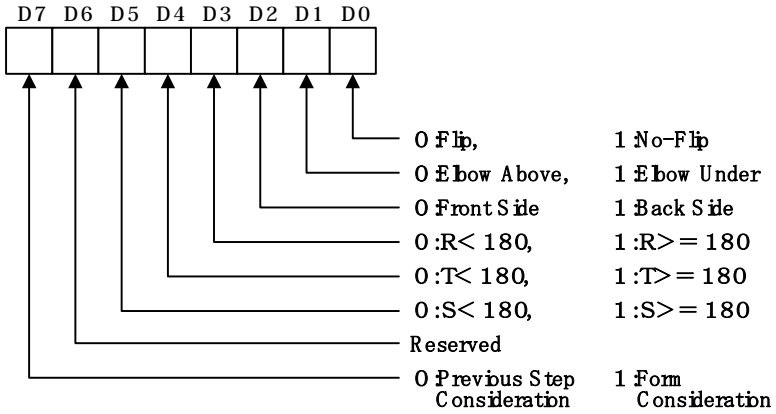
Coordinate Types

The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22
10	User coordinate 9	24	User coordinate 23
11	User coordinate 10	25	User coordinate 24
12	User coordinate 11	26	Tool coordinate
13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



* With the MRC or MRC Ⅱ, the data of D6 and D7 are disregarded.

BscHostPutVarDataM

FUNCTION: Sets multiple variables at the same time.

FORMAT: _declspec(dllexport) short APIENTRY BscHostPutVarDataM(short nCid,short type,short varno,short num, double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
num	Number of variables
*p	Head pointer to the numeric variable storage area

OUT(Return)

None

Return Value

0:Normal completion
Others:Error codes

REMARKS: Restrictions

This function is effective only for transmission with the NX100 (NX100 transmission function).

Variable Types

The variable types are represented as follows.
0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type

Variable Designation Method

The variable information transmitted is composed of the number of values (num) requested of the specified variable type, beginning with the value of the specified variable number (varno) followed by the values of subsequent variables.

BscImov

FUNCTION: **Moves robot with linear motion form the current position for the increment value in a specified frame system.**

FORMAT: **_declspec(dllexport) short APIENTRY BscImov(short nCid,char *vtype,double spd,char *framename,short toolno,double *p)**

ARGUMENTS: **IN (Transfer)**

nCid Communication handler ID number
*vtype Move speed selection; V : Control point; VR : Position angular
spd Move speed (0. 1 to □□□□. □mm/s,0. 1 to □□□. □° /s)
*framename Coordinate name; BASE : Base coordinate; ROBOT : Robot coordinate;
UF1 : User coordinate1…
TOOL:Tool coordinate (Only for NX100/XRC/MRC)
toolno Tool number
*p Target position storage pointer

OUT (Return)

None

Return Value

0 : Normal completion
Others: Error codes

REMARKS: **Target Position**

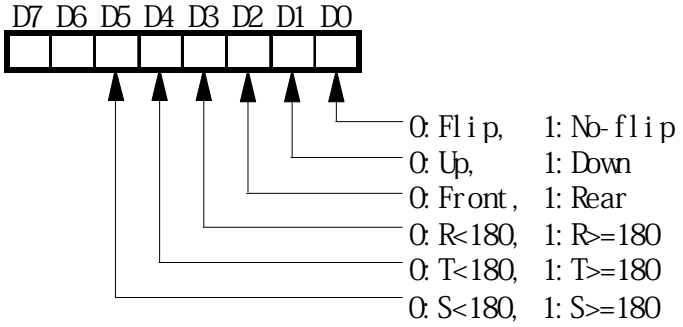
The target position is represented as follows.

	Target position in specified coordinate system
P[0]	X-axis coordinate system (unit: mm)
P[1]	Y-axis coordinate system (unit: mm)
P[2]	Z-axis coordinate system (unit: mm)
P[3]	Wrist angle TX (unit: °)
P[4]	Wrist angle TY (unit: °)
P[5]	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

* Set "0" for data P[7] to P[11] if the system has no external axis.

Form

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4 and D5are ignored.

BscMDSP

FUNCTION: Sends message data.

FORMAT: _declspec(dllexport) short APIENTRY BscMDSP(short nCid,char *ptr);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*ptr	Message storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Number of message characters

The character string for a message is restricted as follows.
With NX100/XRC/MRC;
Character string with 30 characters maximum.
With ERC;
Character string with 28 characters maximum.

BscMov

FUNCTION: **Moves robot with specified motion from the current position to a target position in a specified frame system.**

FORMAT: **_declspec(dllexport) short APIENTRY BscMov(short nCid,char *movtype,char *vtype,double spd,char *framename,short rconf,short toolno,double *p);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
*movtype	Motion type; MOVJ:Joint; MOVL:Linear; IMOV:Linear (incremental value)
*vtype	Move speed selection; V:Control point; VR:Position angular
spd	Move speed (0.1 to □□□□.□mm/s,0.1 to □□□.□° /s)
*framename	Coordinate name; BASE:Base coordinate; ROBOT:Robot coordinate; UF1:User coordinate1... TOOL:Tool coordinate (Only for NX100/XRC/MRC with motion type "IMOV.")
rconf	Form
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

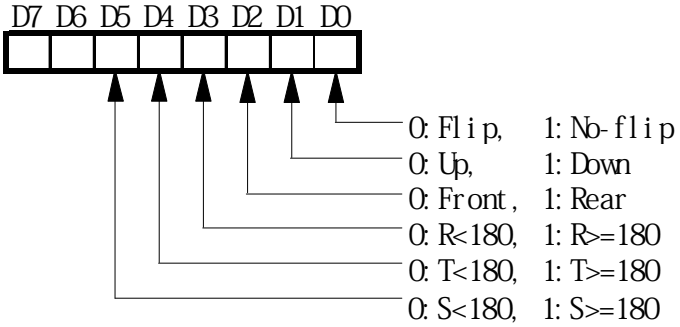
None

Return Value

0:Normal completion
Others: Error codes

REMARKS: **Form**

The form data are represented by bit data in decimals.



＊With the ERC or ERCⅡ, the data of D3, D4 and D5are ignored.

Target Position

The target position data are represented as follows.

	Target position in the specified coordinate system
P[0]	X-axis coordinate system (unit: mm)
P[1]	Y-axis coordinate system (unit: mm)
P[2]	Z-axis coordinate system (unit: mm)
P[3]	Wrist angle TX (unit: °)
P[4]	Wrist angle TY (unit: °)
P[5]	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

＊Set "0" for data P[7] to P[11] if the system has no external axis.

BscMovj

FUNCTION: **Moves robot with joint motion to a target position in a specified frame system.**

FORMAT: **_declspec(dllexport) short APIENTRY BscMovj(short nCid,double spd,char *framename,short rconf,short toolno, double *p);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
spd	Move speed(0. 01 to 100. 0%)
*framename	Coordinate name; BASE:Base coordinate; ROBOT:Robot coordinate; UF1:User coordinate1...
rconf	Form
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

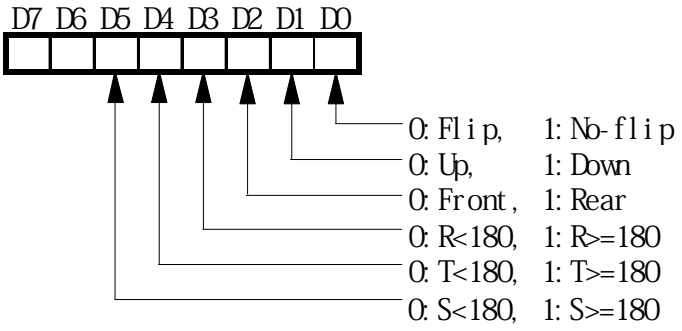
None

Return Value

0:Normal completion
Others: Error codes

REMARKS: **Form**

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

Target Position

The target positions are represented as follows.

	Target position in the specified coordinate system
P[0]	X-axis coordinate system (unit: mm)
P[1]	Y-axis coordinate system (unit: mm)
P[2]	Z-axis coordinate system (unit: mm)
P[3]	Wrist angle TX (unit: °)
P[4]	Wrist angle TY (unit: °)
P[5]	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

* Set "0" for data P[7] to P[11] if the system has no external axis.

BscMovl

FUNCTION: **Moves robot with linear motion to a target position in a specified frame system.**

FORMAT: **_declspec(dllexport) short APIENTRY BscMovl(short nCid,char *vtype,double spd,char *framename,short rconf,short toolno,double *p);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
*vtype	Move speed selection; V:Control point; VR:Position angular
spd	Move speed(0. 1 to □□□□. □mm/s,0. 1 to □□□. □° /s)
*framename	Coordinate name; BASE:Base coordinate; ROBOT:Robot coordinate; UF1:User coordinate1...
rconf	Form
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

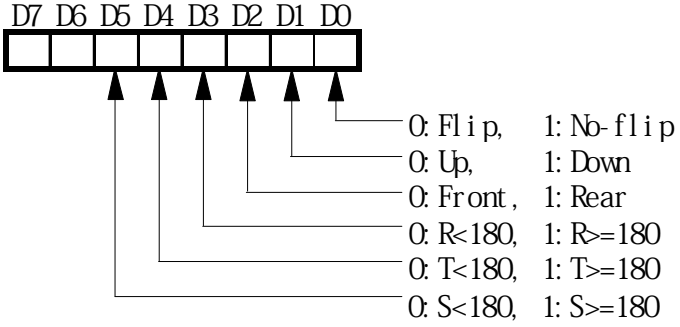
None

Return Value

0:Normal completion
Others: Error codes

REMARKS: **Form**

The form data are represented by bit data in decimals.



* With ERC or ERCⅡ, the data of D3, D4, and D5 are ignored.

Target Position

The target positions are represented as follows.

	Target position in the specified coordinate system
P[0]	X-axis coordinate system (unit: mm)
P[1]	Y-axis coordinate system (unit: mm)
P[2]	Z-axis coordinate system (unit: mm)
P[3]	Wrist angle TX (unit: °)
P[4]	Wrist angle TY (unit: °)
P[5]	Wrist angle TZ (unit: °)
P[6]	7th axis pulse number (mm for traveling axis)
P[7]	8th axis pulse number (mm for traveling axis)
P[8]	9th axis pulse number (mm for traveling axis)
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

* Set "0" for data P[7] to P[11] if the system has no external axis.

BscOPLock

FUNCTION: Interlocks the robot.

FORMAT: _declspec(dllexport) short APIENTRY BscOPLock(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Interlock Status

Once interlock is set, all but the following are interlocked.
With NX100/XRC
＊Hold from the programming pendant
＊Hold, emergency stop from the playback box
＊Input signal other than I/O 404x, 405x and 409x (including external hold, external servo OFF)
Interlock cannot be accomplished when the programming pendant is in the editing mode, or when file access is operating by other functions.

With MRC
＊Hold from the programming pendant
＊Hold, emergency stop from the playback box
＊Input signal other than I/O 404x and 405x (including external hold, external servo OFF)
Interlock cannot be accomplished when the programming pendant is in the editing mode, or when file access is operating by other functions.

With ERC
＊Start and hold buttons of panel operation
＊Emergency stop button of panel operation
＊Servo power ON button of panel operation

BscOPUnLock

FUNCTION: Releases the robot interlocked status.

FORMAT: _declspec(dllexport) short APIENTRY BscOPUnLock(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscPMov

FUNCTION: Moves robot to a specified pulse position.

FORMAT: _declspec(dllexport) short APIENTRY BscPMov(short nCid,char *movtype,char *vtype,double spd,short toolno,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*movtype	Motion type; MOVJ:Joint; MOVL:Linear
*vtype	Move speed selection; V:Control point; VR:Position angular
spd	Move speed(0.1 to □□□□.□mm/s,0.1 to □□□.□° /s)
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Target Position

The target position data are represented as follows.

	Target position in units of pulses
P[0]	S-axis pulse number
P[1]	L-axis pulse number
P[2]	U-axis pulse number
P[3]	R-axis pulse number
P[4]	B-axis pulse number
P[5]	T-axis pulse number
P[6]	7th axis pulse number
P[7]	8th axis pulse number
P[8]	9th axis pulse number
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

＊Set "0" for data P[7] to P[11] if the system has no external axis.

BscPMovj

FUNCTION: Moves robot to a specified pulse position with joint motion.

FORMAT: _declspec(dllexport) short APIENTRY BscPMovj(short nCid,double sped,short toolno,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
spd	Move speed(0. 1 to □□□□. □mm/s,0. 1 to □□□. □° /s)
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Target Position

The target position data are represented as follows.

	Target position in units of pulses
P[0]	S-axis pulse number
P[1]	L-axis pulse number
P[2]	U-axis pulse number
P[3]	R-axis pulse number
P[4]	B-axis pulse number
P[5]	T-axis pulse number
P[6]	7th axis pulse number
P[7]	8th axis pulse number
P[8]	9th axis pulse number
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

* Set "0" for data P[7] to P[11] if the system has no external axis.

BscPMovl

FUNCTION: **Moves robot to a specified pulse position with linear motion.**

FORMAT: **_declspec(dllexport) short APIENTRY BscPMovl(short nCid,char *vtype,double spd,short toolno,double *p);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
*vtype	Move speed selection; V:Control point; VR:Position angular
spd	Move speed(0.1 to □□□□.□mm/s,0.1 to □□□.□° /s)
toolno	Tool number
*p	Target position storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: **Target Position**

The target position data are represented as follows.

	Target position in units of pulses
P[0]	S-axis pulse number
P[1]	L-axis pulse number
P[2]	U-axis pulse number
P[3]	R-axis pulse number
P[4]	B-axis pulse number
P[5]	T-axis pulse number
P[6]	7th axis pulse number
P[7]	8th axis pulse number
P[8]	9th axis pulse number
P[9]	10th axis pulse number
P[10]	11th axis pulse number
P[11]	12th axis pulse number

* Set "0" for data P[7] to P[11] if the system has no external axis.

BscPutUFrame

FUNCTION: Sets a specified user frame data.

FORMAT: _declspec(dllexport) short APIENTRY BscPutUFrame(shortnCid,char *ufname,double *p);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number
*ufname Storage pointer of the user coordinate name to be written in
*p User coordinate data storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: User Coordinate Name

The following coordinate names correspond to the user coordinate numbers.

User Coordinate Name	Specified Name	User Coordinate Name	Specified Name
User coordinate 1	UF1	User coordinate 13	UF13
User coordinate 2	UF2	User coordinate 14	UF14
User coordinate 3	UF3	User coordinate 15	UF15
User coordinate 4	UF4	User coordinate 16	UF16
User coordinate 5	UF5	User coordinate 17	UF17
User coordinate 6	UF6	User coordinate 18	UF18
User coordinate 7	UF7	User coordinate 19	UF19
User coordinate 8	UF8	User coordinate 20	UF20
User coordinate 9	UF9	User coordinate 21	UF21
User coordinate 10	UF10	User coordinate 22	UF22
User coordinate 11	UF11	User coordinate 23	UF23
User coordinate 12	UF12	User coordinate 24	UF24

* User coordinate numbers 9 to 24 are effective only for NX100/XRC/MRC.

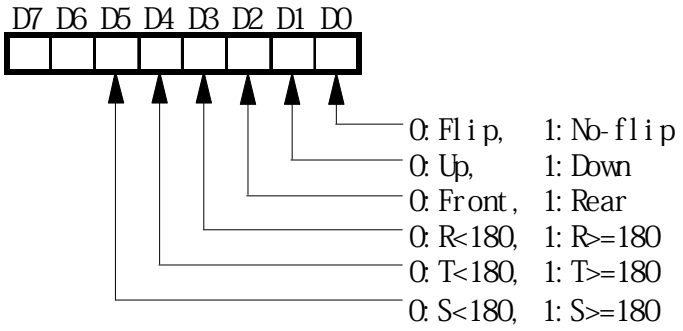
Variable type

Coordinate values of the user coordinate system specified with the user coordinate number are assigned to the user coordinate data as follows.

Variables	Coordinate System	Meaning
P[0]	ORG	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[1]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[2]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[3]		Wrist angle TX (unit: °, effective down to 2 decimal places)
P[4]		Wrist angle TY (unit: °, effective down to 2 decimal places)
P[5]		Wrist angle TZ (unit: °, effective down to 2 decimal places)
P[6]		Form
P[7]	XX	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[8]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[9]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[10]		Wrist angle TX (unit: °, effective down to 2 decimal places)
P[11]		Wrist angle TY (unit: °, effective down to 2 decimal places)
P[12]		Wrist angle TZ (unit: °, effective down to 2 decimal places)
P[13]		Form
P[14]	XY	X-axis coordinate (unit: mm, effective down to 3 decimal places)
P[15]		Y-axis coordinate (unit: mm, effective down to 3 decimal places)
P[16]		Z-axis coordinate (unit: mm, effective down to 3 decimal places)
P[17]		Wrist angle TX (unit: °, effective down to 2 decimal places)
P[18]		Wrist angle TY (unit: °, effective down to 2 decimal places)
P[19]		Wrist angle TZ (unit: °, effective down to 2 decimal places)
P[20]		Form
P[21]	Tool number (0 to 23)	
P[22]	7th axis pulse number (mm for traveling axis)	
P[23]	8th axis pulse number (mm for traveling axis)	
P[24]	9th axis pulse number (mm for traveling axis)	
P[25]	10th axis pulse number	
P[26]	11th axis pulse number	
P[27]	12th axis pulse number	

Form

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

BscPutVarData

FUNCTION: Sets variable data.

FORMAT: _declspec(dllexport) short APIENTRY BscPutVarData(short nCid,short type,short varno,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
*p	Variable storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Variable Types

The variable types are represented as follows.

0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)

Details of Variables

	Byte type	Integer type	Double-precision type	Real type	Robot axis position type	Base axis position type	Station axis position type
P[0]	Value	Value	Value	Value	0	0	0
P[1]	-	-	-	-	S-axis pulse number	1st base axis pulse number	1st station axis pulse number
P[2]	-	-	-	-	L-axis pulse number	2nd base axis pulse number	2nd station axis pulse number

P[3]	–	–	–	–	U-axis pulse number	3rd base axis pulse number	3rd station axis pulse number
P[4]	–	–	–	–	R-axis pulse number	4th base axis pulse number	4th station axis pulse number
P[5]	–	–	–	–	B-axis pulse number	5th base axis pulse number	5th station axis pulse number
P[6]	–	–	–	–	T-axis pulse number	6th base axis pulse number	6th station axis pulse number
P[7]	–	–	–	–	Tool number	Tool number	Tool number
P[8]	–	–	–	–	–	–	–
P[9]	–	–	–	–	–	–	–

	Robot axis position type	Base axis position type
P[0]	1	1
P[1]	Coordinate type	Coordinate type
P[2]	X-axis coordinate (unit: mm)	1st base axis XYZ value (unit: mm)
P[3]	Y-axis coordinate (unit: mm)	2nd base axis XYZ value (unit: mm)
P[4]	Z-axis coordinate (unit: mm)	3rd base axis XYZ value (unit: mm)
P[5]	Tx (unit: °)	4th base axis XYZ value (unit: mm)
P[6]	Ty (unit: °)	5th base axis XYZ value (unit: mm)
P[7]	Tz (unit: °)	6th base axis XYZ value (unit: mm)
P[8]	Form	Form
P[9]	Tool number	Tool number

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.
See the following for details on the coordinate system types and form.

Coordinate Types

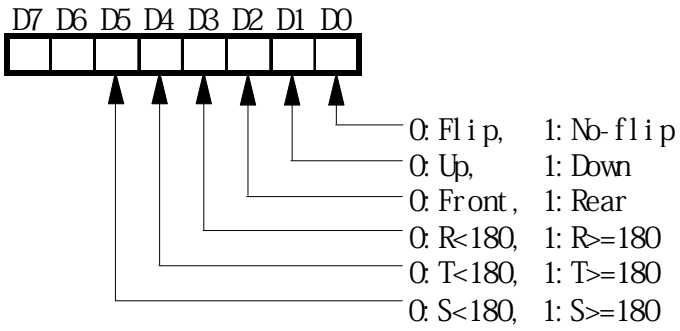
The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22
10	User coordinate 9	24	User coordinate 23
11	User coordinate 10	25	User coordinate 24

12	User coordinate 11	26	Tool coordinate
13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4, and D5 are ignored.

NOTE

This function is effective only for transmission against the NX100/XRC/MRC (NX100/XRC/MRC transmission functions). It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

BscPutVarData2

FUNCTION: Sets variable data. (7axes or more)

FORMAT: _declspec(dllexport) short APIENTRY BscPutVarData2(short nCid,short type,short varno,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type
varno	Variable number
*p	Variable storage pointer

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Variable Types

The variable types are represented as follows.

0 : Byte type
1 : Integer type
2 : Double-precision type
3 : Real type
4 : Robot axis position type
5 : Base axis position type
6 : Station axis position type (pulse type only)

Details of Variables

	Byte type	Integer type	Double-precision type	Real type	Robot axis position type	Base axis position type	Station axis position type
P[0]	Value	Value	Value	Value	0	0	0
P[1]	-	-	-	-	S-axis pulse number	1st base axis pulse number	1st station axis pulse number
P[2]	-	-	-	-	L-axis pulse number	2nd base axis pulse number	2nd station axis pulse number

P[3]	–	–	–	–	U-axis pulse number	3rd base axis pulse number	3rd station axis pulse number
P[4]	–	–	–	–	R-axis pulse number	4th base axis pulse number	4th station axis pulse number
P[5]	–	–	–	–	B-axis pulse number	5th base axis pulse number	5th station axis pulse number
P[6]	–	–	–	–	T-axis pulse number	6th base axis pulse number	6th station axis pulse number
P[7]	–	–	–	–	7axes pulse number	Tool number	Tool number
P[8]	–	–	–	–	8axes pulse number	–	–
P[9]	–	–	–	–	Tool number	–	–

	Robot axis position type	Base axis position type
P[0]	1	1
P[1]	Coordinate type	Coordinate type
P[2]	X-axis coordinate (unit: mm)	1st base axis XYZ value (unit: mm)
P[3]	Y-axis coordinate (unit: mm)	2nd base axis XYZ value (unit: mm)
P[4]	Z-axis coordinate (unit: mm)	3rd base axis XYZ value (unit: mm)
P[5]	Tx (unit: °)	4th base axis XYZ value (unit: mm)
P[6]	Ty (unit: °)	5th base axis XYZ value (unit: mm)
P[7]	Tz (unit: °)	6th base axis XYZ value (unit: mm)
P[8]	Form	Form
P[9]	Tool number	Tool number

pulse

The robot axis position and base axis position type variables include the type and XYZ type, according to the first return value. The station axis position type variable contains the pulse type only.
See the following for details on the coordinate system types and form.

Coordinate Types

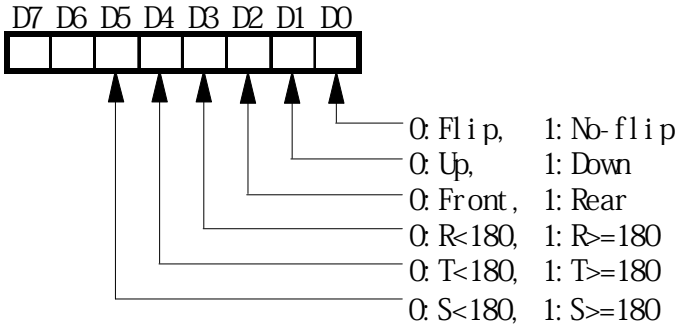
The following coordinate names correspond to the coordinate type data.

Coordinate type	Coordinate name	Coordinate type	Coordinate name
0	Base coordinate	14	User coordinate 13
1	Robot coordinate	15	User coordinate 14
2	User coordinate 1	16	User coordinate 15
3	User coordinate 2	17	User coordinate 16
4	User coordinate 3	18	User coordinate 17
5	User coordinate 4	19	User coordinate 18
6	User coordinate 5	20	User coordinate 19
7	User coordinate 6	21	User coordinate 20
8	User coordinate 7	22	User coordinate 21
9	User coordinate 8	23	User coordinate 22

10	User coordinate 9	24	User coordinate 23
11	User coordinate 10	25	User coordinate 24
12	User coordinate 11	26	Tool coordinate
13	User coordinate 12	27	Master tool coordinate

Form

The form data are represented by bit data in decimals.



NOTE

This function is effective only for transmission against the NX100/XRC. It cannot be used for transmission against the NX100/XRC/MRC (ERC compatible transmission function).

BscStartJob

FUNCTION: Starts job. (A job to be started has the job name which is selected last.)

FORMAT: _declspec(dllexport) short APIENTRY BscStartJob(Short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
1:Current job name not specified
Others: Error codes

REMARKS: Call Condition

The BscSelectJob function must be called up and the current job name must be specified before executing this function.
To restart a job during startup that has been held by the BscHoldOn function, release the hold by BscHoldOff function to call up the BscContinueJob function.

BscSelectJob

FUNCTION: Selects a job.

FORMAT: _declspec(dllexport) short APIENTRY BscSelectJob(short nCid,char *name);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*name	Job name storage pointer

OUT(Return)

None

Return Value

O:Normal completion
Others: Error codes

REMARKS: Job Name

The character string for the job name is restricted as follows.
Character string with 30 characters maximum. (8 characters that can be used in the MS-DOS)
Specify "*" instead of the job name to select all the jobs.

BscSelectMode

FUNCTION: Selects mode. (Teach or Play)

FORMAT: _declspec(dllexport) short APIENTRY BscSelectMode(short nCid,short mode);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
mode	Selected mode

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Selected Mode

The selected mode is represented as follows.
１：Teach
２：Play

BscSelLoopCycle

FUNCTION: Changes the cycle mode to auto mode.

FORMAT: _declspec(dllexport) short APIENTRY
BscSelLoopCycle(short,nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscSelOneCycle

FUNCTION: Changes the cycle mode to 1-cycle mode.

FORMAT: _declspec(dllexport) short APIENTRY BscSelOneCycle(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscSelStepCycle

FUNCTION: Changes the cycle mode to step mode.

FORMAT: _declspec (dllexport) short APIENTRY BscSelStepCycle(short nCid);

ARGUMENTS:

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscSetLineNumber

FUNCTION: Sets a line number of current job.

FORMAT: _declspec(dllexport) short APIENTRY BscSetLineNumber(short nCid,short line);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
line	Line number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscSetMasterJob

FUNCTION: Sets a job as a master job.

FORMAT: _declspec(dllexport) short APIENTRY BscSetMasterJob(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Call Condition

The BscSelectJob function must be called up and the registered job must be specified before executing this function.

BscReset

FUNCTION: Resets a robot alarm.

FORMAT: _declspec(dllexport) short APIENTRY BscReset(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscSetCtrlGroup

FUNCTION: Sets a control group.

FORMAT: _declspec(dllexport) short APIENTRY BscSetCtrlGroup(short nCid,short groupno);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
groupno	Control group information to be set

OUT(Return)

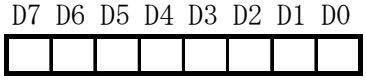
None

Return Value

0:Normal completion
Others: Error codes

REMARKS: Control Group Information

The control group information is represented by bit data in decimals.



D0:R1(Robot 1)
D1:R2(Robot 2)
D2:S1(Station 1)
D3:S2(Station 2)
D4:S3(Station 3)
D5:S4(Station 4)
D6:S5(Station 5)
D7:S6(Station 6)

NOTE

This function is effective only for transmission against the MRC (MRC transmission function). It cannot be used for transmission against the MRC (ERC compatible transmission function). Refer to BscSetCtrlGroupXrc for the transmission against the NX100/XRC (NX100/XRC transmission function).

When the power supply of robot controller is started up, robot 1, base 1, and station 1 (when a base and a stations exist) are specified. In a system with a base axis (such as travel axis), when the manipulator with this base axis is specified, this base axis is automatically specified.

The following settings can not be made.
. Selection of control axis which does not exist
. Simultaneous specification of R1 and R2
. Specification of multiple number of stations

BscSetCtrlGroupXrc

FUNCTION: Sets a control group.

FORMAT: _declspec(dllexport)short APIENTRY BscSetCtrlGroupXrc(short nCid,short groupno1, short groupno2);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
groupno1	Control group information to be set (robot axis)
groupno2	Control group information to be set (station axis)

OUT(Return)

groupno1	Control group information to be set (robot axis)
groupno2	Control group information to be set (station axis)

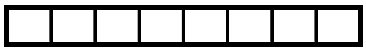
Return Value

0:Normal completion
Others: Error codes

REMARKS: Control Group Information (Robot Axis)

The control group information is represented by bit data in decimals.

D7 D6 D5 D4 D3 D2 D1 D0



D0: R1(Robot 1)
D1: R2(Robot 2)
D2: R3 (Robot 3)
D3: R4 (Robot 4)

REMARKS: Control Group Information (Station Axis)

The control group information is represented by bit data in decimals.

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

D0: S1 (Station 1)
D1: S2 (Station 2)
D2: S3 (Station 3)
D3: S4 (Station 4)
D4: S5 (Station 5)
D5: S6 (Station 6)
D6: S7 (Station 7)
D7: S8 (Station 8)
D8: S9 (Station 9)
D9: S10 (Station 10)
D10: S11 (Station 11)
D11: S12 (Station 12)

* The control group information S7 to S12 are only for the NX100.

NOTE

This function is effective only for transmission against the NX100/XRC (NX100/XRC transmission function). Refer to BscSetCtrlGroup for transmission against the MRC.

When the power supply of robot controller is started up, robot 1, base 1, and station 1 (when a base and a stations exist) are specified. In a system with a base axis

(such as travel axis), when the manipulator with this base axis is specified, this base axis is automatically specified.

The following settings can not be made.
. Selection of control axis which does not exist
. Simultaneous specification of R1 and R2
. Specification of multiple number of stations

BscServoOff

FUNCTION: Sets servo power supply OFF.

FORMAT: _declspec(dllexport) short APIENTRY BscServoOff(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

BscServoOn

FUNCTION: Sets servo power supply ON.

FORMAT: _declspec(dllexport) short APIENTRY BscServoOn(short nCid);

ARGUMENT: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others: Error codes

7.4 DCI Funtion

Job save, load, or variable load, save are automatically accomplished when the robot is under playback mode, by preparing the functions corresponding to the instructions.
Reads the robot status (current position, alarm, error, servo status, etc.), and controls the system (start, hold, job call, etc.).
The following functions are available.

BscDCILoadSave
BscDCILoadSaveOnce
BscDCIGetPos
BscDCIGetPos2
BscDCIGetVarData
BscDCIPutPos
BscDCIPutPos2
BscDCIPutVarData

BscDCILoadSave

FUNCTION: Loads or saves a job with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCILoadSave(short nCid,short timec);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
timec	Waiting time for sending/receiving (sec)

OUT(Return)

None

Return Value

－1：Failed to send/receive
Others：Number of received jobs

REMARKS: Number of Sending/Receiving

This function retries communication of the sending/receiving signal until the specified waiting time comes.

BscDCILoadSaveOnce

FUNCTION: Loads or saves a job with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCILoadSaveOnce(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

－1 : Failed to send/receive
Others : Number of received jobs

REMARKS: Number of Sending/Receiving

This function waits indefinitely until sending/receiving request is sent from the robot. Communication is accomplished a single time when the request arrives.

BscDCIGetPos

FUNCTION: Gets a variable with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCIGetPos(short nCid,short *type,short *rconf,double *p);

ARGUMENTS: IN (Transfer)

nCid	Communication handler ID number
*type	Variable type number
*rconf	Form data storage pointer
*p	Variable storage pointer

OUT (Return)

*rconf	Form data storage pointer
*p	Variable storage pointer

Return Value

－1 : Failed to send
Others : Variable type number

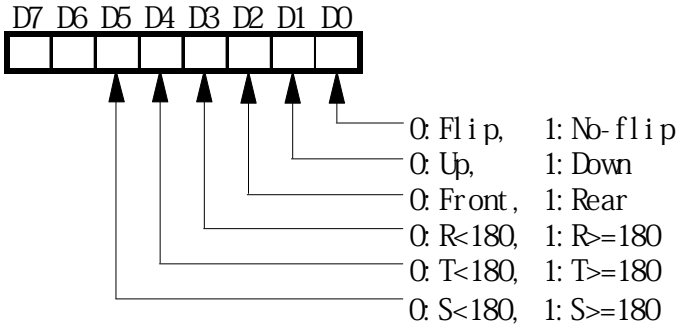
REMARKS: Variable Type Number

The variable type number is represented as follows.

Variable Contents	MRC	ERC
1	Byte type	Byte type
2	Integer type	Integer type
3	Double-precision type	Double-precision type
4	Real type	Real type
5	Robot axis position type (pulse)	Robot axis position type (pulse)
6	Robot axis position type (XYZ)	Robot axis position type (XYZ)
7	Base axis position type (pulse)	External axis position type (pulse)
8	Base axis position type (XYZ)	External axis position type (XYZ)
9	Station axis position type (pulse)	-

Form

The form data are represented by bit data in decimals.



* With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

Variables

The variable types are represented as follows.

Variable Contents	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
P[0]	Value	Value	Value	Value	S-axis pulse number	X-axis coordinate (unit: mm)
P[1]	-	-	-	-	L-axis pulse number	Y-axis coordinate (unit: mm)
P[2]	-	-	-	-	U-axis pulse number	Z-axis coordinate (unit: mm)
P[3]	-	-	-	-	R-axis pulse number	Tx (unit:°)
P[4]	-	-	-	-	B-axis pulse number	Ty (unit:°)
P[5]	-	-	-	-	T-axis pulse number	Tz (unit:°)

Variable Contents	Type 7	Type 8	Type 9
P[0]	1st base axis pulse number	1st base axis orthogonal value (unit: mm)	1st station axis pulse number
P[1]	2nd base axis pulse number	2nd base axis orthogonal value (unit: mm)	2nd station axis pulse number
P[2]	3rd base axis pulse number	3rd base axis orthogonal value (unit: mm)	3rd station axis pulse number
P[3]	4th base axis pulse number	4th base axis orthogonal value (unit: mm)	4th station axis pulse number
P[4]	5th base axis pulse number	5th base axis orthogonal value (unit: mm)	5th station axis pulse number
P[5]	6th base axis pulse number	6th base axis orthogonal value (unit: mm)	6th station axis pulse number

BscDCIGetPos2

FUNCTION: Gets a variable with DCI instruction. (7axes or more)

FORMAT: _declspec(dllexport) short APIENTRY BscDCIGetPos2(short nCid,short *type,short *rconf,double *p,short *axisNum);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*type	Variable type number
*rconf	Form data storage pointer
*p	Variable storage pointer
*axisNum	Axis storage pointer

OUT(Return)

*rconf	Form data storage pointer
*p	Variable storage pointer

Return Value

－1：Failed to send
Others：Variable type number

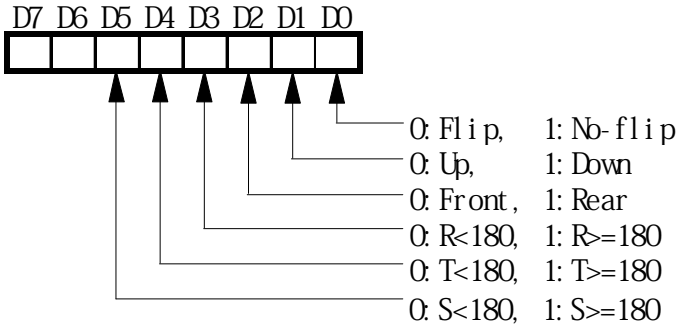
REMARKS: Variable Type Number

The variable type number is represented as follows.

Variable Contents	MRC	ERC
1	Byte type	Byte type
2	Integer type	Integer type
3	Double-precision type	Double-precision type
4	Real type	Real type
5	Robot axis position type (pulse)	Robot axis position type (pulse)
6	Robot axis position type (XYZ)	Robot axis position type (XYZ)
7	Base axis position type (pulse)	External axis position type (pulse)
8	Base axis position type (XYZ)	External axis position type (XYZ)
9	Station axis position type (pulse)	-

Form

The form data are represented by bit data in decimals.



Variables

The variable types are represented as follows.

Variable Contents	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
P[0]	Value	Value	Value	Value	S-axis pulse number	X-axis coordinate (unit: mm)
P[1]	-	-	-	-	L-axis pulse number	Y-axis coordinate (unit: mm)
P[2]	-	-	-	-	U-axis pulse number	Z-axis coordinate (unit: mm)
P[3]	-	-	-	-	R-axis pulse number	Tx (unit:°)
P[4]	-	-	-	-	B-axis pulse number	Ty (unit:°)
P[5]	-	-	-	-	T-axis pulse number	Tz (unit:°)
P[6]	-	-	-	-	7axes pulse number	-
P[7]	-	-	-	-	8axes pulse number	-

Variable Contents	Type 7	Type 8	Type 9
P[0]	1st base axis pulse number	1st base axis orthogonal value (unit: mm)	1st station axis pulse number
P[1]	2nd base axis pulse number	2nd base axis orthogonal value (unit: mm)	2nd station axis pulse number
P[2]	3rd base axis pulse number	3rd base axis orthogonal value (unit: mm)	3rd station axis pulse number
P[3]	4th base axis pulse number	4th base axis orthogonal value (unit: mm)	4th station axis pulse number
P[4]	5th base axis pulse number	5th base axis orthogonal value (unit: mm)	5th station axis pulse number
P[5]	6th base axis pulse number	6th base axis orthogonal value (unit: mm)	6th station axis pulse number

BscDCIGetVarData

FUNCTION: Gets a variable with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCIGetVarData(short nCid,short *type,short *rconf,double *p,char *str);

ARGUMENTS: IN (Transfer)

nCid	Communication handler ID number
*type	Variable type number (pointer)
*rconf	Form data (pointer)
*p	Head pointer to the numeric variable storage area
*str	Head pointer to the character variable storage area

OUT (Return)

*rconf	Form data (pointer)
*p	Head pointer to the numeric variable storage area
*str	Head pointer to the character variable storage area

Return Value

－1 : Failed to send
Others : Variable type number

REMARKS: Restrictions

String variables can only be used with the NX100 ver3.0 or later.

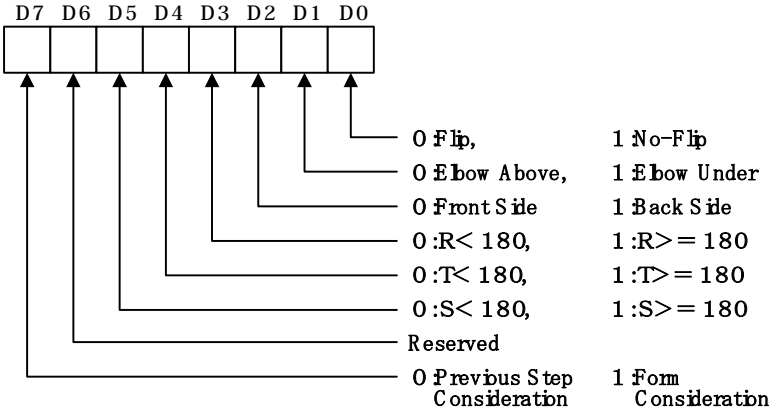
Variable Type Number

The variable type number is represented as follows.

Variable Contents	NX100 (v3.0 and after)	NX100 (before v3.0)/XRC/MRC	ERC
1	Byte type		Byte type
2	Integer type		Integer type
3	Double-precision type		Double-precision type
4	Real type		Real type
5	Robot axis position type (pulse)		Robot axis position type (pulse)
6	Robot axis position type (XYZ)		Robot axis position type (XYZ)
7	Base axis position type (pulse)		External axis position type (pulse)
8	Base axis position type (XYZ)		External axis position type (XYZ)
9	Station axis position type (pulse)		－
10	String type	－	－

Form

The form data are represented by bit data in decimals.



1) With the ERC or ERC Ⅱ, the data from D3 to D7 are disregarded.
2) With the MRC or MRC Ⅱ, the data D6 and D7 are disregarded.

Content of the numeric variable storage area

Depending on the variable type, the numeric variable storage area contains the number of values indicated below.

Variable Type Number	Number of values	Content					
		P[0]	P[1]	P[2]	P[3]	P[4]	P[5]
1	1	Byte					
2	1	Integer	–	–	–	–	–
3	1	Double	–	–	–	–	–
4	1	Real	–	–	–	–	–
5	6	S-axis Pulses	L-axis Pulses	U-axis Pulses	R-axis Pulses	U-axis Pulses	R-axis Pulses
6	6	X-axis (mm)	Y-axis (mm)	Z-axis (mm)	Wrist angle Rx (deg)	Wrist angle Ry (deg)	Wrist angle Rz (deg)
7	6	Base Axis-1 Pulses	Base Axis-2 Pulses	Base Axis-3 Pulses	Base Axis-4 Pulses	Base Axis-5 Pulses	Base Axis-6 Pulses
8	6	Base Axis-1 (mm)	Base Axis-2 (mm)	Base Axis-3 (mm)	Base Axis-4 (mm)	Base Axis-5 (mm)	Base Axis-6 (mm)
9	6	Station Axis-1 Pulses	Station Axis-2 Pulses	Station Axis-3 Pulses	Station Axis-4 Pulses	Station Axis-5 Pulses	Station Axis-6 Pulses

Content of the character variable storage area

Variable Type Number	Number of values	Content
		str
10	16	String

NOTE:
When this function is used to receive a string type variable make sure that the character variable storage area is allocated for 17 characters.

Declaration in Visual Basic: Dim S_Variable As String *17
Declaration in C++: char S_Variable[17]

BscDCIPutPos

FUNCTION: Sets a variable with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCIPutPos(short nCid,short type,short rconf,double *p);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type number
rconf	Form data storage pointer
*p	Variable storage pointer

OUT(Return)

None

Return Value

－1：Failed to receive
Others：Normal completion

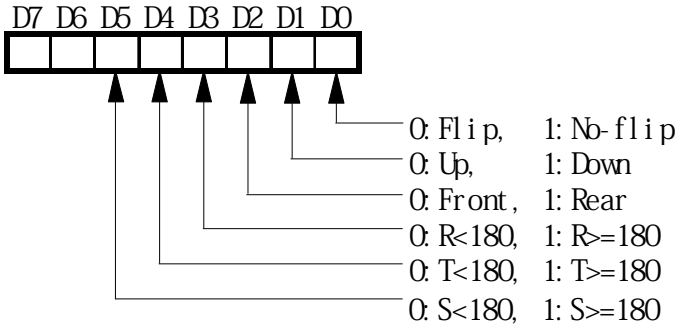
REMARKS: Variable Type Number

The variable type number is represented as follows.

Variable Contents	MRC	ERC
1	Byte type	Byte type
2	Integer type	Integer type
3	Double-precision type	Double-precision type
4	Real type	Real type
5	Robot axis position type (pulse)	Robot axis position type (pulse)
6	Robot axis position type (XYZ)	Robot axis position type (XYZ)
7	Base axis position type (pulse)	External axis position type (pulse)
8	Base axis position type (XYZ)	External axis position type (XYZ)
9	Station axis position type (pulse)	-

Form

The form data are represented by bit data in decimals.



With the ERC or ERC Ⅱ, the data of D3, D4 and D5 are ignored.

Variables

The variable types are represented as follows.

Variable Contents	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
P[0]	Value	Value	Value	Value	S-axis pulse number	X-axis coordinate (unit: mm)
P[1]	-	-	-	-	L-axis pulse number	Y-axis coordinate (unit: mm)
P[2]	-	-	-	-	U-axis pulse number	Z-axis coordinate (unit: mm)
P[3]	-	-	-	-	R-axis pulse number	Tx (unit:°)
P[4]	-	-	-	-	B-axis pulse number	Ty (unit:°)
P[5]	-	-	-	-	T-axis pulse number	Tz (unit:°)

Variable Contents	Type 7	Type 8	Type 9
P[0]	1st base axis pulse number	1st base axis orthogonal value (unit: mm)	1st station axis pulse number
P[1]	2nd base axis pulse number	2nd base axis orthogonal value (unit: mm)	2nd station axis pulse number
P[2]	3rd base axis pulse number	3rd base axis orthogonal value (unit: mm)	3rd station axis pulse number
P[3]	4th base axis pulse number	4th base axis orthogonal value (unit: mm)	4th station axis pulse number
P[4]	5th base axis pulse number	5th base axis orthogonal value (unit: mm)	5th station axis pulse number
P[5]	6th base axis pulse number	6th base axis orthogonal value (unit: mm)	6th station axis pulse number

BscDCIPutPos2

FUNCTION: Sets a variable with DCI instruction. (7axes or more)

FORMAT: _declspec(dllexport) short APIENTRY BscDCIPutPos2(short nCid,short type,short rconf,double *p,short axisNum);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
type	Variable type number
rconf	Form data storage pointer
*p	Variable storage pointer
axisNum	Axis

OUT(Return)

None

Return Value

－1 : Failed to receive
Others : Normal completion

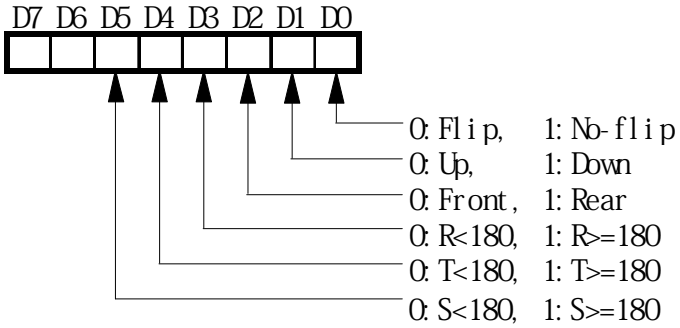
REMARKS: Variable Type Number

The variable type number is represented as follows.

Variable Contents	MRC	ERC
1	Byte type	Byte type
2	Integer type	Integer type
3	Double-precision type	Double-precision type
4	Real type	Real type
5	Robot axis position type (pulse)	Robot axis position type (pulse)
6	Robot axis position type (XYZ)	Robot axis position type (XYZ)
7	Base axis position type (pulse)	External axis position type (pulse)
8	Base axis position type (XYZ)	External axis position type (XYZ)
9	Station axis position type (pulse)	-

Form

The form data are represented by bit data in decimals.



Variables

The variable types are represented as follows.

Variable Contents	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6
P[0]	Value	Value	Value	Value	S-axis pulse number	X-axis coordinate (unit: mm)
P[1]	-	-	-	-	L-axis pulse number	Y-axis coordinate (unit: mm)
P[2]	-	-	-	-	U-axis pulse number	Z-axis coordinate (unit: mm)
P[3]	-	-	-	-	R-axis pulse number	Tx (unit:°)
P[4]	-	-	-	-	B-axis pulse number	Ty (unit:°)
P[5]	-	-	-	-	T-axis pulse number	Tz (unit:°)
P[6]	-	-	-	-	7axes pulse number	-
P[7]	-	-	-	-	8axes pulse number	-

Variable Contents	Type 7	Type 8	Type 9
P[0]	1st base axis pulse number	1st base axis orthogonal value (unit: mm)	1st station axis pulse number
P[1]	2nd base axis pulse number	2nd base axis orthogonal value (unit: mm)	2nd station axis pulse number
P[2]	3rd base axis pulse number	3rd base axis orthogonal value (unit: mm)	3rd station axis pulse number
P[3]	4th base axis pulse number	4th base axis orthogonal value (unit: mm)	4th station axis pulse number
P[4]	5th base axis pulse number	5th base axis orthogonal value (unit: mm)	5th station axis pulse number
P[5]	6th base axis pulse number	6th base axis orthogonal value (unit: mm)	6th station axis pulse number

BscDCIPutVarData

FUNCTION: Sets a variable with DCI instruction.

FORMAT: _declspec(dllexport) short APIENTRY BscDCIPutVarData(short nCid,short *type,short *rconf,double *p,char *str);

ARGUMENTS: IN (Transfer)

nCid	Communication handler ID number
*type	Variable type number (pointer)
*rconf	Form data (pointer)
*p	Head pointer to the numeric variable storage area
*str	Head pointer to the character variable storage area

OUT (Return)

None

Return Value

－1 : Failed to send
Others : Variable type number

REMARKS: Restrictions

String variables can only be used with the NX100 ver3.0 or later.

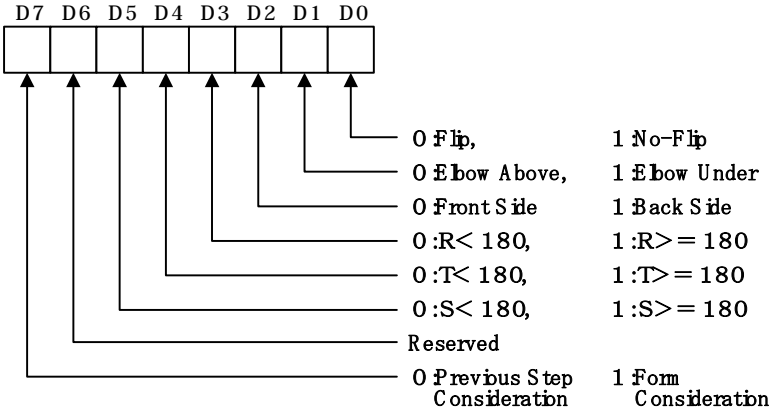
Variable Type Number

The variable type number is represented as follows.

Variable Contents	NX100 (v3.0 and after)	NX100 (before v3.0)/XRC/MRC	ERC
1	Byte type		Byte type
2	Integer type		Integer type
3	Double-precision type		Double-precision type
4	Real type		Real type
5	Robot axis position type (pulse)		Robot axis position type (pulse)
6	Robot axis position type (XYZ)		Robot axis position type (XYZ)
7	Base axis position type (pulse)		External axis position type (pulse)
8	Base axis position type (XYZ)		External axis position type (XYZ)
9	Station axis position type (pulse)		－
10	String type	－	－

Form

The form data are represented by bit data in decimals.



1) With the ERC or ERC Ⅱ, the data from D3 to D7 are disregarded.
2) With the MRC or MRC Ⅱ, the data D6 and D7 are disregarded.

Content of the numeric variable storage area

Depending on the variable type, the numeric variable storage area contains the number of values indicated below.

Variable Type Number	Number of values	Content					
		P[0]	P[1]	P[2]	P[3]	P[4]	P[5]
1	1	Byte					
2	1	Integer	–	–	–	–	–
3	1	Double	–	–	–	–	–
4	1	Real	–	–	–	–	–
5	6	S-axis Pulses	L-axis Pulses	U-axis Pulses	R-axis Pulses	U-axis Pulses	R-axis Pulses
6	6	X-axis (mm)	Y-axis (mm)	Z-axis (mm)	Wrist angle Rx (deg)	Wrist angle Ry (deg)	Wrist angle Rz (deg)
7	6	Base Axis-1 Pulses	Base Axis-2 Pulses	Base Axis-3 Pulses	Base Axis-4 Pulses	Base Axis-5 Pulses	Base Axis-6 Pulses
8	6	Base Axis-1 (mm)	Base Axis-2 (mm)	Base Axis-3 (mm)	Base Axis-4 (mm)	Base Axis-5 (mm)	Base Axis-6 (mm)
9	6	Station Axis-1 Pulses	Station Axis-2 Pulses	Station Axis-3 Pulses	Station Axis-4 Pulses	Station Axis-5 Pulses	Station Axis-6 Pulses

Content of the character variable storage area

Variable Type Number	Number of values	Content
		str
10	16	String

NOTE:
When this function is used to receive a string type variable make sure that the character variable storage area is allocated for 17 characters.

Declaration in Visual Basic: Dim S_Variable As String *17
Declaration in C++: char S_Variable[17]

7.5 I/O Signal Read/Write Function

Reads or writes the I/O signals.
The following functions are available.

BscReadIO
BscReadIO2
BscWriteIO
BscWriteIO2

BscReadIO

FUNCTION: **Reads specified count of coil status. Up to 256 coil numbers can be specified.**

FORMAT: **_declspec(dllexport) short APIENTRY BscReadIO(short nCid,short add,short num,short *stat);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
add	Read starting address number
num	Number of read signals (up to 256)
*stat	Coil status

OUT(Return)

*stat	Coil status

Return Value

-1: Header number error
0:Normal completion
Others:Error code

REMARKS: **Unnecessary Signals**

All unnecessary signals are set to 0 unless the number of the read data items is a multiple of 8.

List of I/O Signals

Signal	Signal Range	Name	Read	Write
0xxx	0010 to 0167 (128)	Robot universal input	○	×
1xxx	1010 to 1167 (128)	Robot universal output	○	×
2xxx	2010 to 2187 (144)	External input	○	×
3xxx	3010 to 3187 (144)	External output	○	×
4xxx	4010 to 4167 (128)	Robot specific input	○	×
5xxx	5010 to 5247 (192)	Robot specific output	○	×
6xxx	6010 to 6047 (32)	Timer/counter	×	×
7xxx	7010 to 7327 (256)	Auxiliary relay	○	×
8xxx	8010 to 8087 (64)	Control status signal	○	×
82xx	8210 to 8247 (32)	Pseudo input signal	○	×
9xxx	9010 to 9167 (128)	DL input	○	○

[ＭＲＣ]　　○: Available　　×: Not available

Signal	Signal Range	Name	Read	Write
0xxx	0010 to 0247 (192)	Robot universal input	○	×
1xxx	1010 to 1247 (192)	Robot universal output	○	×
2xxx	2010 to 2327 (256)	External input	○	×
3xxx	3010 to 3327 (256)	External output	○	×
4xxx	4010 to 4287 (224)	Robot specific input	○	×
5xxx	5010 to 5387 (304)	Robot specific output	○	×
6xxx	-	-	×	×
7xxx	7010 to 7887 (704)	Auxiliary relay	○	×
8xxx	8010 to 8127 (96)	Control status signal	○	×
82xx	8210 to 8247 (32)	Pseudo input signal	○	×
9xxx	9010 to 9167 (128)	Network input	○	○

[ＸＲＣ]　　○: Available　　×: Not available

NOTE

This function is effective only for transmission against the XRC/MRC (XRC/MRC transmission function). Refer to the BscReadIO2 for transmission against the NX100 (NX100 transmission function).

BscReadIO2

FUNCTION: **Reads specified count of coil status. Up to 256 coil numbers can be specified.**

FORMAT: **_declspec(dllexport) short APIENTRY BscReadIO2(short nCid,DWORD add,short num,short *stat);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
add	Read starting address number
num	Number of read signals (up to 256)
*stat	Coil status

OUT(Return)

*stat	Coil status

Return Value

-1: Header number error
0:Normal completion
Others:Error code

REMARKS: **Unnecessary Signals**

All unnecessary signals are set to 0 unless the number of the read data items is a multiple of 8.

List of I/O Signals

Signal	Signal Range	Name	Read	Write
0xxxx	00010 to 01287 (1024)	Robot universal input	○	×
1xxxx	10010 to 11287 (1024)	Robot universal output	○	×
2xxxx	20010 to 21287 (1024)	External input	○	×
22xxx	22010 to 23287 (1024)	Network input	○	×
3xxxx	30010 to 31287 (1024)	External output	○	○
32xxx	32010 to 33287 (1024)	Network output	○	×
4xxxx	40010 to 40807 (640)	Robot specific input	○	×
5xxxx	50010 to 51007 (800)	Robot specific output	○	×
6xxxx	-	-	×	×
7xxxx	70010 to 79997 (7992)	Auxiliary relay	○	×
8xxxx	80010 to 80647 (512)	Control status signal	○	×
82xxx	82010 to 82127 (96)	Pseudo input signal	○	×
9xxxx	90010 to 90327 (256)	Robot link	○	×

[ＮＸ１００]　　○: Available　　×: Not available

NOTE

This function is effective only for transmission against the NX100 (NX100 transmission function). Refer to the BscReadIO for transmission against the XRC/ MRC (XRC/MRC transmission function).

BscWriteIO

FUNCTION: Writes specified count of coil status. Up to 256 coil numbers can be specified. Address numbers to be written are only of Nos. 9000's.

FORMAT: _declspec(dllexport) short APIENTRY BscWriteIO(short nCid,short add,short num,short *stat);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
add	Read starting address number
num	Number of read signals (up to 256)
*stat	Coil status

OUT(Return)

*stat	Coil status

Return Value

-1: Header number error
0:Normal completion
Others:Error code

REMARKS: Unnecessary Signals

All unnecessary data exist in the last data unless the number of the written data items is a multiple of 8.

List of I/O Signals

Signal	Signal Range	Name	Read	Write
0xxx	0010 to 0167 (128)	Robot universal input	○	×
1xxx	1010 to 1167 (128)	Robot universal output	○	×
2xxx	2010 to 2187 (144)	External input	○	×
3xxx	3010 to 3187 (144)	External output	○	×
4xxx	4010 to 4167 (128)	Robot specific input	○	×
5xxx	5010 to 5247 (192)	Robot specific output	○	×
6xxx	6010 to 6047 (32)	Timer/counter	×	×
7xxx	7010 to 7327 (256)	Auxiliary relay	○	×
8xxx	8010 to 8087 (64)	Control status signal	○	×
82xx	8210 to 8247 (32)	Pseudo input signal	○	×
9xxx	9010 to 9167 (128)	Network input	○	○

[ＭＲＣ]　　○: Available　　×: Not available

Signal	Signal Range	Name	Read	Write
0xxx	0010 to 0247 (192)	Robot universal input	○	×
1xxx	1010 to 1247 (192)	Robot universal output	○	×
2xxx	2010 to 2327 (256)	External input	○	×
3xxx	3010 to 3327 (256)	External output	○	×
4xxx	4010 to 4287 (224)	Robot specific input	○	×
5xxx	5010 to 5387 (304)	Robot specific output	○	×
6xxx	-	-	×	×
7xxx	7010 to 7887 (704)	Auxiliary relay	○	×
8xxx	8010 to 8127 (96)	Control status signal	○	×
82xx	8210 to 8247 (32)	Pseudo input signal	○	×
9xxx	9010 to 9167 (128)	Network input	○	○

[ＸＲＣ]　　○: Available　　×: Not available

NOTE

This function is effective only for transmission against the XRC/MRC (XRC/MRC transmission function). Refer to the BscWriteIO2 for transmission against the NX100 (NX100 transmission function).

BscWriteIO2

FUNCTION: Writes specified count of coil status. Up to 256 coil numbers can be specified. Address numbers to be written are only of Nos. 9000's.

FORMAT: _declspec(dllexport) short APIENTRY BscWriteIO2(short nCid,DWORD add,short num,short *stat);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
add	Read starting address number
num	Number of read signals (up to 256)
*stat	Coil status

OUT(Return)

*stat	Coil status

Return Value

-1: Header number error
0:Normal completion
Others:Error code

REMARKS: Unnecessary Signals

All unnecessary data exist in the last data unless the number of the written data items is a multiple of 8.

List of I/O Signals

Signal	Signal Range	Name	Read	Write
0xxxx	00010 to 01287 (1024)	Robot universal input	○	×
1xxxx	10010 to 11287 (1024)	Robot universal output	○	×
2xxxx	20010 to 21287 (1024)	External input	○	×
22xxx	22010 to 23287 (1024)	Network input	○	○
3xxxx	30010 to 31287 (1024)	External output	○	×
32xxx	32010 to 33287 (1024)	Network output	○	×
4xxxx	40010 to 40807 (640)	Robot specific input	○	×
5xxxx	50010 to 51007 (800)	Robot specific output	○	×
6xxxx	-	-	×	×
7xxxx	70010 to 79997 (7992)	Auxiliary relay	○	×
8xxxx	80010 to 80647 (512)	Control status signal	○	×
82xxx	82010 to 82127 (96)	Pseudo input signal	○	×
9xxxx	90010 to 90327 (256)	Robot link	○	×

[ＮＸ１００]　　○: Available　　×: Not available

NOTE

This function is effective only for transmission against the NX100 (NX100 transmission function). Refer to the BscWriteIO for transmission against the XRC/ MRC (XRC/MRC transmission function).

7.6 Other Functions

The following functions are also available.

BscClose
BscCommand
BscConnect
BscDisConnect
BscDiskFreeSizeGet
BscEnforcedClose
BscGets
BscInBytes
BscIsErrorCode
BscOpen
BscOutBytes
BscPuts
BscReConnectJob
BscReStartJob
BscSetBreak
BscSetCom
BscSetEther
BscSetCondBSC
BscStatus

BscClose

FUNCTION: Releases a communication handler.

FORMAT: _declspec(dllexport) short APIENTRY BscClose(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others:Failed to release

REMARKS: Call Condition

It is necessary to disconnect the communications lines by BscDisConnect function before calling this function.

BscCommand

FUNCTION: **Sends a transmission command.**

FORMAT: **_declspec(dllexport) short APIENTRY BscCommand(short nCid,char *h_buf,char *d_buf,short fforever);**

ARGUMENTS: **IN(Transfer)**

nCid	Communication handler ID number
*h_buf	Header character string pointer
*d_buf	Data character string pointer
fforever	Robot response; 0:No wait; 1:Wait

OUT(Return)

None

Return Value

－1:Failed to send
Others:Normal completion

REMARKS: **Header Character String**

The header character string is represented by the header number and sub code number, in that order.

Data Character String

The data character string is represented by the data queue plus ¥r (carriage return) at the end.

<Example>
When sending the "SERVO ON" command
If Header number 01
Sub code number 000,
then Header character string 01,000
Data character string SVON 1¥r

BscConnect

FUNCTION: Connects communications lines.

FORMAT: _declspec(dllexport) short APIENTRY BscConnect(short nCid);

ARGUMENTS:

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Error
1:Normal completion

REMARKS:

Call Condition

Before calling this function, it is necessary to set the communications lines with BscOpen function followed by BscSetCom function (serial port) or BscSetEther function (Ethernet) or BscSetEServerMode function (Ethernet Server).

BscDisConnect

FUNCTION: Disconnects communications lines.

FORMAT: _declspec(dllexport) short APIENTRY BscDisConnect(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Error
1:Normal completion

BscDiskFreeSizeGet

FUNCTION: Gets free capacity of the specified drive.

FORMAT: _declspec(dllexport) short APIENTRY BscDiskFreeSizeGet(short nCid, short dno, long *dsize);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
dno	Drive number 1: A to 26: Z
dsize	Free capacity pointer

OUT(Return)

dsize	Free capacity pointer

Return Value

0:Error
1:Normal completion

BscEnforcedClose

FUNCTION: Closes compulsorily.

FORMAT: _declspec(dllexport) short APIENTRY BscEnforcedClose(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
Others:Failed to release

BscGets

FUNCTION: Sends a character string by transmission in TTY level.

FORMAT: _declspec(dllexport) short APIENTRY BscGets(short nCid,char *bufptr,WORD bsize,WORD *plengets);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*bufptr	Received character string pointer
bsize	Maximum character count
plengets	Received character count

OUT(Return)

*bufptr	Received character string pointer

Return Value

Received character count

BscInBytes

FUNCTION: Returns the number of characters which are received by transmission in TTY level.

FORMAT: _declspec(dllexport) short APIENTRY BscInBytes(short nCid);

ARGUMENTS:

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

Received character count

BscIsErrorCode

FUNCTION: Gets an error code.

FORMAT: _declspec(dllexport) short APIENTRY BscIsErrorCode(short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:No error
Others:Error codes

REMARKS: Call Condition

The BscIsError function must be called up and existence of error must be checked before executing this function.

BscOpen

FUNCTION: Gets a communication handler.

FORMAT: _declspec(dllexport) short APIENTRY BscOpen(char *path,short mode);

ARGUMENTS: IN(Transfer)

*path Communication current directory storage pointer
mode Communication type:
1 (=0×01): serial port,
16 (=0×10): Ethernet
256 (=0×100): Ethernet Server

OUT(Return)

None

Return Value

－1：Acquisition Failure
Others：Communication handler ID number

REMARKS: Call Condition

By calling the BscSetCom function (serial port) or BscSetEther (Ethernet) or BscSetEServerMode (Ethernet Server) and BscConnect function after calling this function, communications can be started.

Type of Communications

Only 1 (=1×01): serial port or 16 (=0×10): Ethernet or 256 (=0×100): Ethernet Server can be used. For any other values, an error occurs.

BscOutBytes

FUNCTION: Returns the remaining number of characters which are sent by transmission in TTY level.

FORMAT: _declspec(dllexport) short APIENTRY BscOutBytes(short nCid);

ARGUMENTS:

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

Sending character count

BscPuts

FUNCTION: Sends a character string by transmission in TTY level.

FORMAT: _declspec(dllexport) short APIENTRY BscPuts(short nCid,char *bufptr,WORD length);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*bufptr	Sending character string pointer
length	Sending character count

OUT(Return)

None

Return Value

Sending character count

BscReConnect

FUNCTION: Connects communications lines again.

FORMAT: _declspec(dllexport) short APIENTRY BscReConnect(short nCid);

ARGUMENTS:

IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Error
1:Normal completion

REMARKS:

Call Condition

Before calling this function, it is necessary to set the communications lines with the BscOpen function and BscSetCom function (serial port), or BscSetEther function (Ethernet) or BscSetESeverMode function (Ethernet Server).

BscReStartJob

FUNCTION: Starts job again.

FORMAT: _declspec(dllexport) short APIENTRY BscReStartJob(Short nCid);

ARGUMENTS: IN(Transfer)

nCid Communication handler ID number

OUT(Return)

None

Return Value

0:Normal completion
1:Current job name not specified
Others: Error codes

REMARKS: Call Condition

The BscSelectJob function must be called up and the current job name must be specified before executing this function.
To restart a job during startup that has been held by the BscHoldOn function, release the hold by BscHoldOff function to call up the BscContinueJob function.

BscSetBreak

FUNCTION: Cancels transmission.

FORMAT: _declspec(dllexport) short APIENTRY BscSetBreak(short nCid,short flg);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
flg	Forced completion flag; 0:No forced completion, 1:Forced completion

OUT(Return)

None

Return Value

－1:Communication handler error
0:Normal completion

BscSetCom

FUNCTION: Sets communications parameters of the serial port.

FORMAT: _declspec(dllexport)short APIENTRY BscSetCom(short nCid, short port, DWORD baud, short parity, short clen, short stp);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
port	Communication port number 1:COM1,2:COM2,3:COM3,4:COM4,・・・,255:COM255
baud	Baud rate 150, 300, 600, 1200, 2400, 4800, 9600, 19200
parity	Parity 0: None, 1: Odd, 2: Even
Clen	Data length 7: 7 bits, 8: 8 bits
Stp	Stop bit 0: 1 bit, 1: 1.5 bits, 2: 2 bits

OUT(Return)

None

Return Value

0:Error
1:Normal completion

REMARKS: Call Condition

Before calling this function, it is necessary to get the communication handler of the serial port with BscOpen function. After calling this function, communications can be done using the BscConnect function.

BscSetEServerMode

FUNCTION: Sets the communication parameters for Ethernet Server function.

FORMAT: _declspec(dllexport)short APIENTRY BscSetEServerMode(short nCid, char FAR *IPaddr, short Mode);

ARGUMENTS:

IN(Transfer)

nCid	Communication handler ID number
IPaddr	IP address of receiver
Mode	Server communication mode 1: Server mode, -1: Exclusive mode

OUT(Return)

None

Return Value

0: Error
1: Normal completion

REMARKS:

Restrictions

DCI function is not supported with Ethernet Server function communication.
The function is only available for communication with the NX100.

Call Condition

Before calling this function, it is necessary to get the communication handler of the serial port with BscOpen function. After calling this function, communications can be done using the BscConnect function.

Mode Specification

This function specifies the Ethernet Server mode. The following modes are available:
Server Mode:
The network connection between the controller and application is ended after each command. Because of this, multiple applications can communicate simultaneously to the same controller via the network connection.
Exclusive Mode:
The network connection with the controller is exclusive to a single application. After the BscConnect function is called, the network connection is maintained until the BscDisConnect function is called.
Because the differences between these network connection modes are processed inside MOTOCOM32, it is not necessary to make any change to the connection method on application side, other than to appoint the mode with this function.

BscSetEther

FUNCTION: Sets parameters for Ethernet communications.

FORMAT: _declspec(dllexport)short APIENTRY BscSetEther(short nCid, char FAR *IPaddr, short mode, HWND hWnd);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
IPaddr	IP address of receiver
mode	Execution mode 0: Client, 1: Stand alone
hWnd	Window handle

OUT(Return)

None

Return Value

0: Error
1: Normal completion

REMARKS: Call Condition

Before calling this function, it is necessary to get the communication handler of the serial port with BscOpen function. After calling this function, communications can be done using the BscConnect function.

Execution Mode and IP Address of Receiver

Select the corresponding "mode" argument to the communications function to be used. That "mode" argument determines whether the application to be operated by personal computer is to be client or server.

Function	Mode (Personal Computer)	IPaddr
Host Control	0 (Client)	Must be always set.
DCI	1 (Server)	Can be omitted.
Stand Alone		

When the personal computer is set to server (mode = 1), setting NX100/XRC/MRC IP address to the IP address (IPaddr) determines that the server is a specified client server.

<Example>
Client:
BscSetEther(nCid, "192.168.10.10", 0, hWnd);
Specified client server (IP address must be always written.):
BscSetEther(nCid, "192.168.10.10", 1, hWnd);
Some client servers (IP address is not written.):
BscSetEther(nCid, "", 1, hWnd);

BscSetCondBSC

FUNCTION: Sets a communication control timer or retry counter.

FORMAT: _declspec(dllexport) short APIENTRY BscSetCondBSC(short nCid,short timerA,short timerB,short rtyR,short rtyW);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
timerA	Timer A (control timer, unit: msec)
timerB	Timer B (text timer, unit: msec)
rtyR	Sequence retry counter
rtyW	Text retry counter

OUT(Return)

None

Return Value

－1：Communication handler error
0：Normal completion

REMARKS: Initial Value

timerA	10000(msec)
timerB	30000(msec)
rtyR	3
rtyW	3

NOTE:
This function is used to change the parameters of MOTOCOM32 on the personal computer.
To change the robot controller transmission parameters (control timers, retry counter), use the programming pendant of the robot controller.

BscStatus

FUNCTION: Reads the status.

FORMAT: _declspec(dllexport) short APIENTRY BscStatus(short nCid,char *hpt,char *dpt,unsigned short sz,char *rbuf);

ARGUMENTS: IN(Transfer)

nCid	Communication handler ID number
*hpt	Header character string pointer
*dpt	Sending data character string pointer
sz	Sending data character string size
*rbuf	Received data character string pointer

OUT(Return)

*rbuf	Received data character string pointer

Return Value

0:Normal completion
Others:Error codes

7.7 DLL Functions Corresponding to Transmission-relatedKey Words

7.7.1 DLL Functions Related to Transmission Commands

Read/Monitoring System

RALARM

BscGetError2
BscGetFirstAlarm
BscGetNextAlarm
BscIsErrorCode

RPOS

BscIsLoc

RPOSJ

BscIsLoc

RSTATS

BscGetStatus
BscIsCycle
BscIsServo
BscIsTeachMode
BscIsPlayMode
BscIsRemoteMode
BscIsHold
BscIsAlarm
BscIsError

RJSEQ

BscIsJobName
BscIsJobLine
BscIsJobStep

RPOSC

BscIsRobotPos

JWAIT

BscJobWait

RGROUP

BscGetCtrlGroupXrc
BscIsCtrlGroupXrc
BscIsTaskInfXrc
BscGetCtrlGroup
BscIsCtrlGroup
BscIsTaskInf

Read/Data Access System

RJDIR

BscFindFirst
BscFindFirstMaster
BscFindNext
BscFindNextMaster

RUFRAME

BscGetUFrame

UPLOAD

BscUpLoad
BscUpLoadEx

SAVEV

BscGetVarData

BscGetVarData2
BscHostGetVarData

Operation System

HOLD

BscHoldOn
BscHoldOff

RESET

BscReset

CANCEL

BscCancel

MODE

BscSelectMode

CYCLE

BscSelStepCycle
BscSelOneCycle
BscSelLoopCycle

HLOCK

BscOPLock
BscOPUnLock

MDSP

BscMDSP

SVON

BscServoOn
BscServoOff

CGROUP

BscSetCtrlGroupXrc
BscSetCtrlGroup

CTASK

BscChangeTask

Editing System

DELETE

BscDeleteJob

WUFRAME

BscPutUFrame

CVTRJ

BscConvertJobP2R

DOWNLOAD

BscDownLoad
BscDownLoadEx

CVTSJ

BscConvertJobR2P

LOADV

BscPutVarData
BscPutVarData2
BscHostPutVarData

Job Selection System

SETMJ

BscSetMasterJob

JSEQ

BscSetLineNumber

Startup System

START

BscStartJob

BscContinueJob

MOVJ

BscMovj

BscMov

MOVL

BscMovl

BscMov

IMOV

BscImov

BscMov

PMOVJ

BscPMovj

BscPMov

PMOVL

BscPMovl

BscPMov

Other DLL Functions

BscCommand

BscStatus

7.7.2 DLL Functions Related to DCI Function

LOADJ

BscDCILoadSave

BscDCILoadSaveOnce

SAVEJ

BscDCILoadSave

BscDCILoadSaveOnce

LOADV

BscDCIGetPos

BscDCIGetPos2

BscDCIGetVarData

SAVEV

BscDCIPutPos

BscDCIPutPos2

BscDCIPutVarData

7.7.3 DLL Functions Related to I/O Read/Write

I/O Read

BscReadIO

BscReadIO2

I/O Write

BscWriteIO

BscWriteIO2

7.7.4 DLL Functions Related to Personal Computer Communications Port

Port Connection

BscOpen

BscSetCom

BscSetEServerMode

BscSetEther

BscConnect

Port Disconnection

BscClose

BscDisConnect

Transmission Parameter Setting

BscSetCondBSC

7.7.5 Other DLL Functions

BscDiskFreeSizeGet

BscGets

BscInBytes

BscOutBytes

BscPuts

BscSetBreak

8. List of Interlock for Commands of Host Control Function

The executability of each command differs depending on the status of the XRC as shown in the following table.

Command Name		Read/Write Enabled					Only Read Enabled	
		Non-alarm/Non-error				Alarm/ Error	Non-alarm/ Non-error	Alarm/ Error
		Teach Mode		Play Mode				
		Stop	Operating	Stop	Operating			
Read or Monitor	RALARM RPOSC RPOSJ RSTATS RJSEQ JWAIT RGROUP	❍	❍	❍	❍	❍ ❍ ❍ ❍ ❍ A ❍	❍	❍ ❍ ❍ ❍ ❍ A ❍
Read or Data Access	RJDIR RUFRAME UPLOAD SAVEV	❍	❍	❍	❍	❍ ❍ A A	C	
Operation	HOLD RESET CANCE MODE CYCLE SVON 0 (OFF) SVON 1 (ON) HLOCK MDSP CGROUP CTASK	❍	❍	❍	❍	❍ ❍ ❍ ❍/A*3 ❍/A*3 ❍ A ❍ ❍ ❍ ❍	C	
Activation	START MOVJ MOVL IMOV PMOVJ PMOVL	M	M	❍/H*1	MOVE/ ❍*2	A	C	
Editing	DELETE CVTRJ CVTSJ WUFRAME DOWNLOAD LOADV	❍	MOVE	M ❍	M MOVE	A	C	
Job selection	SETMJ JSEQ	❍	MOVE	❍	MOVE	A	C	

	<Interpreter message>
❍ : Possible to execute	
A : Alarm/error occuring	2060
M : Incorrect mode	2080
H : Hold	2020 to 2050
MOVE : Manipulator moving	2010
C : No command remote setting	2100

1 "❍" if not being held ; "H" if being held

2 "MOVE" if the manipulator is moving by operation other than command ; "❍" if the manipulator is moving by command since a single command can be accepted.

3 "❍" during an alarm ; "A" during error

The executability of each command differs depending on the status of the NX100 as shown in the following table.

Command Name		Read/Write Enabled					Only Read Enabled	
		Non-alarm/Non-error				Alarm/ Error	Non-alarm/ Non-error	Alarm/ Error
		Teach Mode		Play Mode				
		Stop	Operating	Stop	Operating			
Read or Monitor	RALARM	○	○	○	○	○	○	○
	RPOSC	○	○	○	○	○	○	○
	RPOSJ	○	○	○	○	○	○	○
	RSTATS	○	○	○	○	○	○	○
	RJSEQ	○	○	○	○	○	○	○
	JWAIT	○	○	○	○	A	○	A
	RGROUP	○	○	○	○	○	○	○
Read or Data Access	RJDIR	○	○	○	○	○	C	C
	RUFRAME	○	○	○	○	○	C	C
	UPLOAD	○	○	○	○	○	C	C
	SAVEV	○	○	○	○	○	C	C
Operation	HOLD	○	○	○	○	○	C	C
	RESET	○	○	○	○	○	C	C
	CANCE	○	○	○	○	○	C	C
	MODE	○	○	○	○	○/A*3	C	C
	CYCLE	○	○	○	○	○/A*3	C	C
	SVON 0 (OFF)	○	○	○	○	○	C	C
	SVON 1 (ON)	○	○	○	○	A	C	C
	HLOCK	○	○	○	○	○	C	C
	MDSP	○	○	○	○	○	C	C
	CGROUP	○	○	○	○	○	C	C
	CTASK	○	○	○	○	○	C	C
Activation	START	M	M	○/H*1	MOVE/○*2	A	C	C
	MOVJ	M	M	○/H*1	MOVE/○*2	A	C	C
	MOVL	M	M	○/H*1	MOVE/○*2	A	C	C
	IMOV	M	M	○/H*1	MOVE/○*2	A	C	C
	PMOVJ	M	M	○/H*1	MOVE/○*2	A	C	C
	PMOVL	M	M	○/H*1	MOVE/○*2	A	C	C
Editing	DELETE	○	MOVE	M	M	A	C	C
	CVTRJ	○	MOVE	M	M	A	C	C
	CVTSJ	○	MOVE	M	M	A	C	C
	WUFRAME	○	MOVE	M	M	A	C	C
	DOWNLOAD	○	○/MOVE*4	○	○/MOVE*4	A	C	C
	LOADV	○	○	○	○	A	C	C
Job selection	SETMJ	○	MOVE	○	MOVE	A	C	C
	JSEQ	○	MOVE	○	MOVE	A	C	C

	<Interpreter message>
❍ : Possible to execute	
A : Alarm/error occurring	2060
M : Incorrect mode	2080
H : Hold	2020 to 2050
MOVE : Manipulator moving	2010
C : No command remote setting	2100

1 "❍" if not being held ; "H" if being held

2 "MOVE" if the manipulator is moving by operation other than command ; "❍" if the manipulator is moving by command since a single command can be accepted.

3 "❍" during an alarm ; "A" during error *4 not running job and not jbr