FR-A 500

Frequency Inverter

Instruction Manual

FR-A5NP
Profibus DP Communications Option Unit

Art.No.: 71065
2001 03 02
VC7BNA00010-C

NOTES, CAUTIONS AND WARNINGS

NOTE: Notes are used to provide additional detail about a procedure. The Note will always precede the text that the Note refers to.

CAUTION: 

Cautions provide additional detail where failure to observe the Caution may result in damage to the equipment or slight injury to the user.

WARNING: 

Warning provide additional information, where failure to observe the Warning may result in death or severe injury

SAFETY INSTRUCTION

1. Electric Shock Prevention

WARNING: 

- Do not open or remove the front cover while the Variable Frequency Drive is running. You may get an electrical shock.
- When necessary to perform inspections or when wiring the unit, switch power off and wait at least 10 minutes and until the bus charge light is off. Check for residual voltage.
- Do not attempt to inspect or wire this unit unless fully competent to perform the work.
- Be sure hands are dry before operating any switches.
- Be sure cables do not have scratches, excessive stress, heavy loads or pinching to prevent electrical shock

2. Injury Prevention

CAUTION: 

- Be sure all connections are in accordance with instructions in this manual
- Check that cables are properly connected before turning equipment on.
- After turning equipment off, wait at least 10 minutes and until the bus charge light is off before removing cover. With cover removed, charged components may be exposed.

3. Additional Cautions and Warnings

CAUTION:

- Do not install the option unit if it is damaged or has parts missing
- Check that option unit is securely fastened to the variable frequency drive.
- Do not stand or rest heavy objects on top of unit.
- Do not allow metal fragments, conductive bodies, oil or other flammable substance to enter the variable frequency drive.
- Before starting operation, confirm and adjust the parameters. Failure to do so may cause the machines to make unexpected motions.
- When parameter clear or all parameter clear is performed, each parameter returns to the factory setting. Reset the required parameters before starting operation
- For prevention of damage caused by static buildup, touch a nearby metal object to remove static from your body.
- Dispose of this product as general industrial waste.

WARNING:

- Do not modify this equipment

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1. INTRODUCTION

GENERAL

The purpose of this manual is to provide general information, installation, and operation procedures for the FR-A5NP Profibus DP option, used with the FR-A500(L) Variable Frequency Drive, herein after referred to as the VFD. Read this manual completely before installing, operating or servicing the option unit.

This manual is intended for use by qualified personnel. Installation should only be performed by qualified personnel. You must be able to operate and program serial devices to use the equipment.

This option unit lets you connect an FR-A500(L) series VFD to a network adhering to the Profibus DP communications protocol. Profibus DP is the performance-optimized version of Profibus for time-critical operations.

Illustrations provided in this manual may have covers or safety guards removed to provide a clear view. Before starting operation of the product be sure to install covers and guards into the original position.

The following is a list of important features for the option unit

- Data Rates to 12,000,000 bps.
- Up to 126 stations supported on a single network
- Network access to all VFD parameters.
- Certified by Profibus Nutzer Organization in July 1998
- Designed and assembled in the U.S.A..

DESCRIPTION

The FR-A5NP option unit consists of two circuit boards as shown in Figure 1-1. The option unit is mounted in option port #3 on the VFD unit. The VFD top cover must be removed to install the option unit. After installation, the top cover is reinstalled and connection to the Profibus DP bus is completed through a connector accessible through the top cover. Two station switches, mounted on the top printed circuit board, allow the assigning of station numbers from 0 to 126. A LED status light mounted next to the connector provides status information on the communication link.

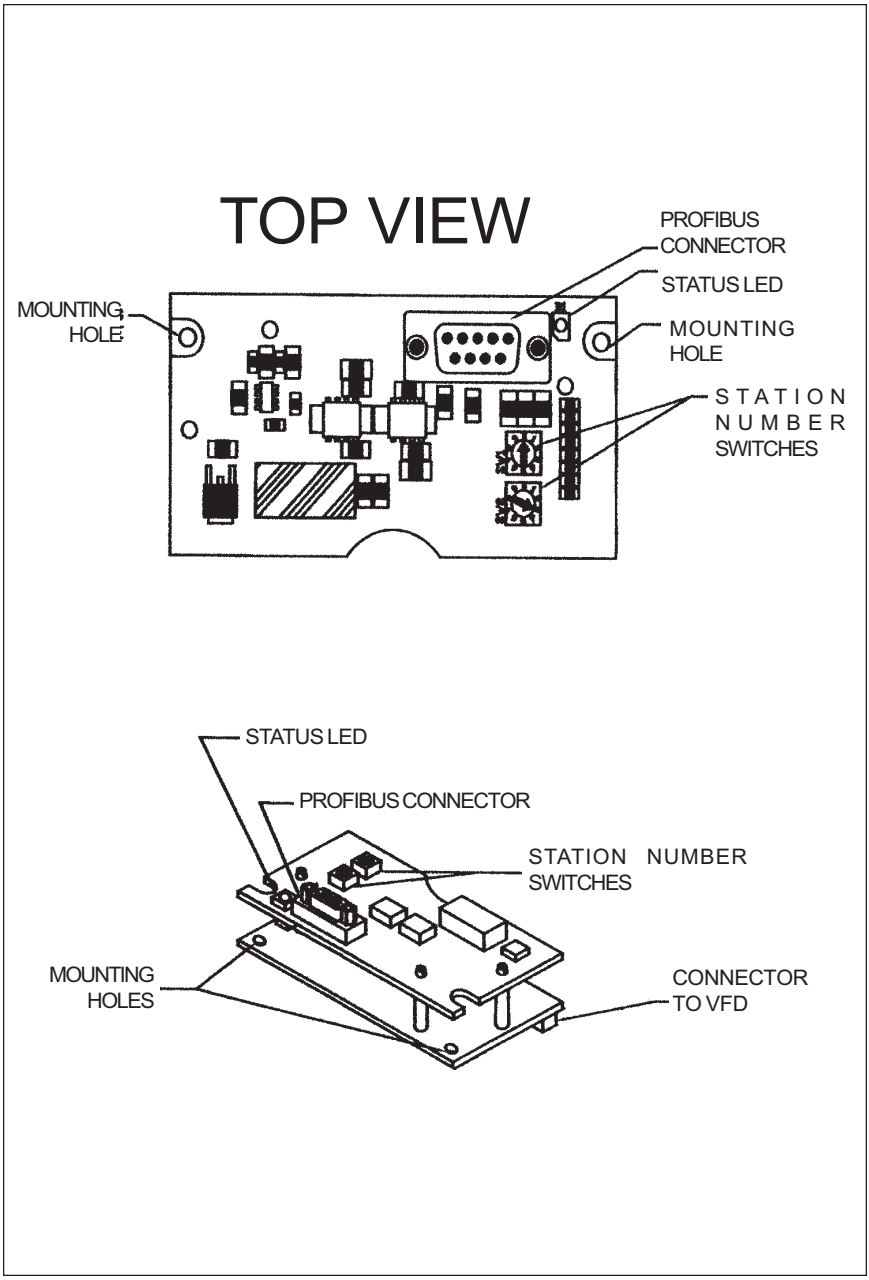


Figure 1-1. FR-A5NP Option Unit

2.0 INSTALLATION

Remove the drive cover following the VFD instruction manual and install the option unit using the following procedure:

2.1. Pre-installation Checks

(1) Check the VFD type.
Use the option unit only with an FR-A500(L) series VFD. Do not use it with any other series (e.g. A200E, A200, A100, Z and F series). These other series VFDs have a different option connector to prevent installation. If you force the connector, you may damage the VFD as well as the option unit.

(2) Make sure the VFD input power is off. The option unit can be damaged if installed with the input power on.

(3) Make sure the PLC master (or Profibus DP master) is properly grounded before continuing.

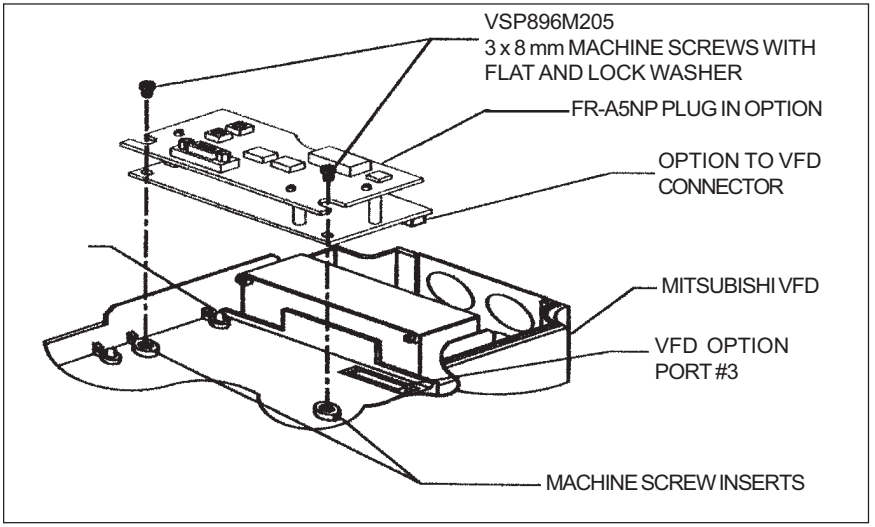
2.2. Mounting Procedure

WARNING: Hazardous voltage present.
Always isolate power from the VFD and wait 10 minutes until the bus charge light is off to ensure the charge lamp has gone out before inserting or removing this option unit or touching the terminals.

(1) Insert this option unit only into the OPTION PORT# 3 of the VFD.

(2) Carefully insert the connector of the option unit into the connector of the VFD as shown in Figure 2-1. Use the two mounting holes and the guide hole to align the bottom board with the matching machine screw inserts and the plastic guide pin on the VFD. Make sure that the VFD option is firmly seated in the VFD and the connector is fully plugged in.

(3) Secure the option unit to the VFD with two mounting screws. If the screw holes in the option unit do not line up with the VFD mounting holes, check that the connectors have been fitted correctly.



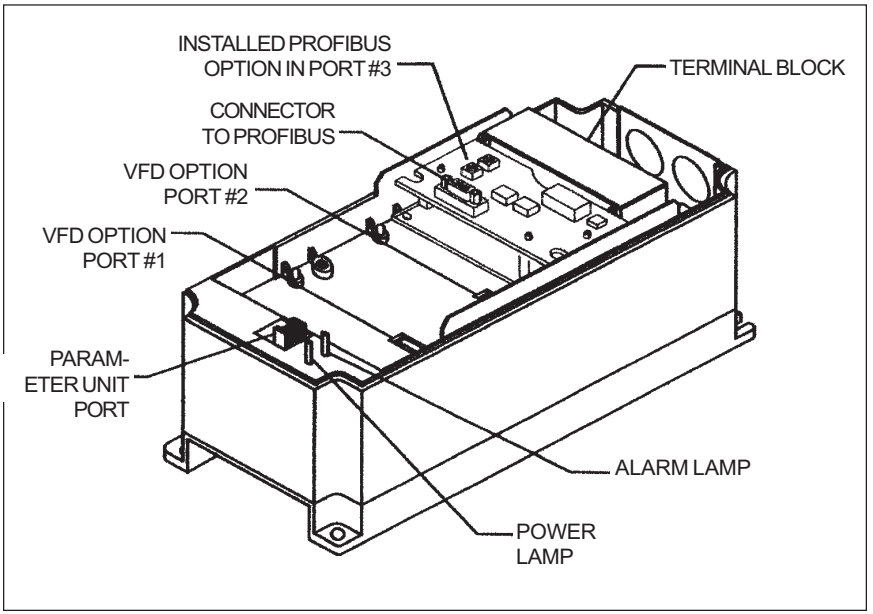


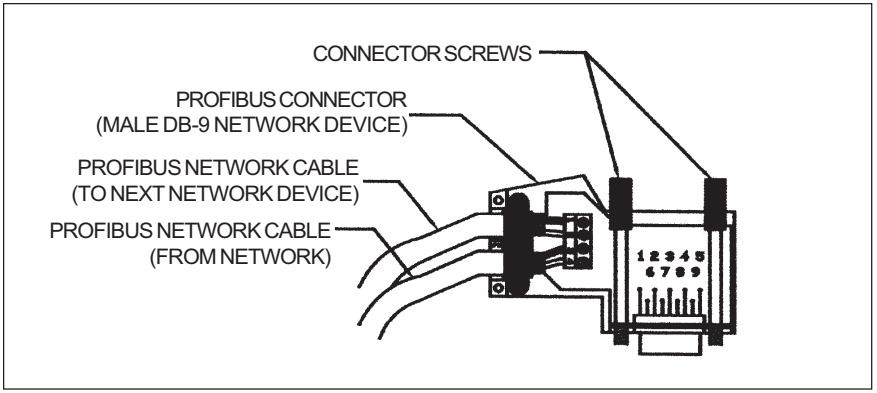
Figure 2-1. Option Unit Aligned with Option Port #3

(4) Option unit is now mechanically installed as shown is Figure 2-2.

Figure 2-2. Option Unit Installed In VFD

(5) Construct a short cable to connect the network to the VFD. On one end of the cable, install a connector compatible with the network. On the other end, install a DB9-style male connector. Make sure the cable can support 12.0 Mbps communications (as specified in the EEIA-RS-485 standard). This cable's connections are shown in Figure 2-3.

NOTE: Option unit Pins 6 and 5 supply +5Vdc (rated at 100 mA). Connection of Pins 6 and 5 is optional. Pin 4 may not be required for



your master. Connection of Pin 4 is also optional. Refer to the user's manual of your Profibus DP master.

Figure 2-3. Connection Cable

NOTE: The DB9 pinout described in the table below is defined by the Profibus Standard DIN-19-245 Part 1. The two data signals are named RXD/TXD+ and RXD/TXD-. However, manufacturers of RS-485 driver ICs typically refer to these signals as A and B'. The Profibus signal RXD/TXD+ is typically assigned to the RS-485 signal A and the RXD/TXD- to B'. Some Profibus-DP implementations confuse these two signals. If you are having trouble establishing communications from the FR-A5NP to your Profibus-DP master, verify that the proper data signal assignments are made. It may be necessary to swap these two signal lines.

DB-9 Pin	A5NP Internal Signal Name	Profibus-DP Signal Name	Comments
1	NC		No Connection
2	NC	RP	Reserved for Module Power
3	A	RxD/TxD+	Receive/Transmit-Data+
4	RTS	CNTR+	Control+ (Request to Send)
5	Isolated GND	DGND (V-)	Data Ground
6	Isolated +5Vdc Supply	V+	(+5Vdc) Voltage+
7	NC		No Connection
8	B'	RxD/TxD-	Receive/Transmit-Data-
9	NC	RP	Reserved for Module Power

NC — No Connection

(6) To terminate the network at the option unit, install termination resistors at the terminal block as shown in Figure 2-5. Each PROFIBUS network has two ends. Units at both of those ends must be properly terminated.

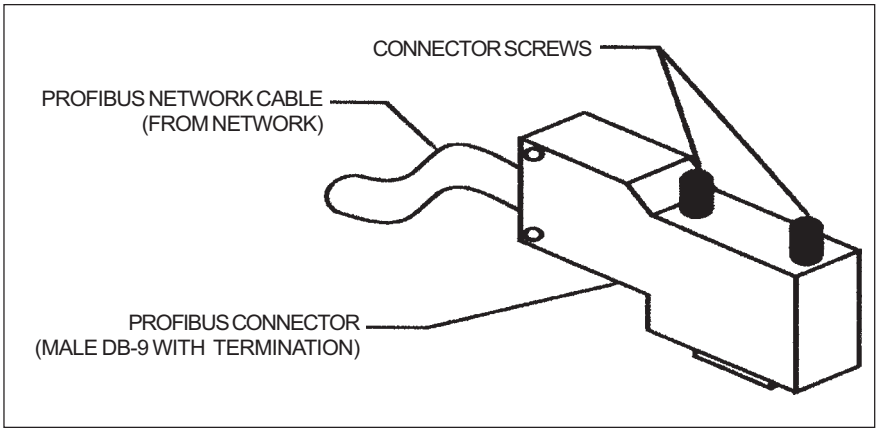


Figure 2-5. Connector with Termination Resistors

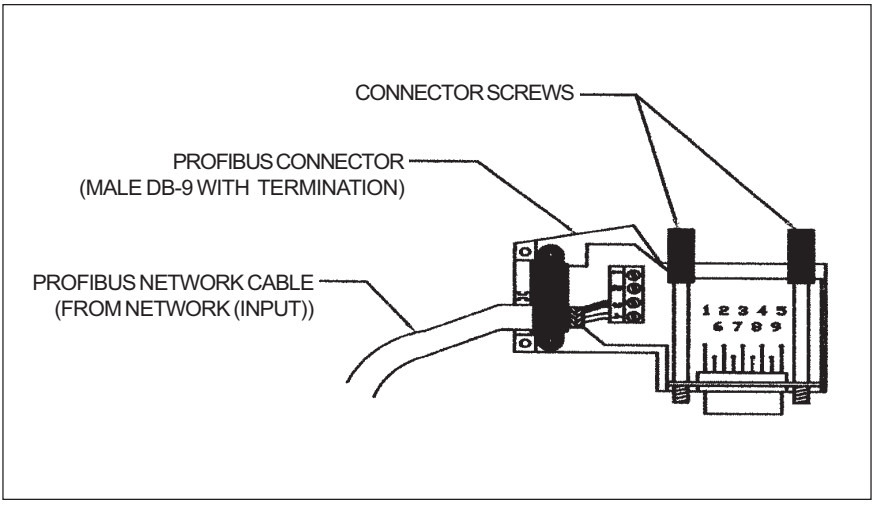


Figure 2-6. Connectors with Cover Removed

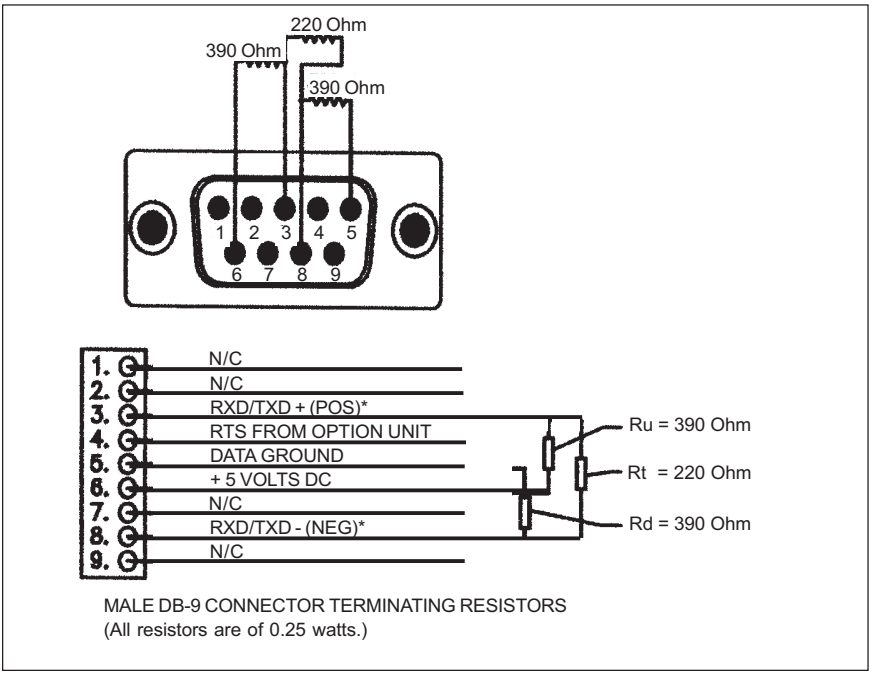


Figure 2-7. Termination Resistor Connections

NOTE: The option unit may be connected to a DB-9 connector that has these termination resistors built in.

(7) Remove the option data port insert from the VFD cover.

(8) Set the node address using the two rotary switches on the option unit. The valid addresses can range from 03 through 7B hex (123 decimal). The node address must be set to the value as configured when setting up your Profibus master. The master must be aware of the node addresses assigned to the FR-A5NP or communications will not be established. Refer to user documentation for master details.

WARNING: • Do NOT set the address from 7C to FF. If you do, the option unit and VFD will not operate correctly.

NOTE: Do NOT set more than one station to the same address on a single Profibus DP network.

SW1 is nearest to the LED as shown in Figure 1-1 and sets the most significant digit. For example, to set the node address to 7B hex (123 decimal), set SW1 to 7 and SW2 to B.

(9) Replace the VFD cover, while making sure that the Profibus connector is aligned with the option data port window.

(10) Connect the Profibus cable to the VFD by plugging the DB9-style male connector into DB9-style female connector of the option unit, which should be visible in the option port window.

2.3. Connecting To The Network

(1) Make sure the VFD is at rest with power off and the option unit is mounted in the VFD. Connect the Profibus cable created in section 2.2 to the network.

(2) It is now safe to apply power to the VFD and run it in PU, external, or net mode, provided that any external VFD control cables in addition to the Profibus network cable are installed correctly.

2.4. LED Status Indicator

After connecting the option unit to an active network, note the condition of the Operating Status Indicator LED. After power-up or reset, the LED can assume the following states:

2.5. Installing MEAU0865.GSD

Green	State Of System
Off	Module Is Not Powered Or Module Has Not Completed Power-up Sequence Or Module IsNOT In Data Exchange Mode Or Network Connectivity Is Time-out.
On	Module Is Operating Normally, Ready In Data Exchange Mode.

All setup, management, or configuration software programs for Profibus-DP require the use of a Device Data Base (GSD) file MEAU0865.GSD, please install MEAU0865.GSD properly before using any of the setup, management, or configuration software programs.

See Appendix A for more details.

3. OPERATION

The operation of the A500(L) VFD changes slightly when this option unit is installed. These changes are described in the following paragraphs.

3.1. Operating Modes

In the PU operating mode, the VFD is controlled by a Parameter Unit (PU).

In the External operating mode, the VFD is controlled by external signals connected to the VFD's terminal block.

In the Network (computer link) operating mode, the VFD is controlled by commands from a Profibus master.

3.2. Selecting the Operating Mode

The following table describes the actions required to change the operating mode:

Mode Change	Action Required
Ext Operation → PU Operation	User presses PU key on Parameter Unit.
PU Operation → Ext Operation	User presses EXT key on Parameter Unit.
Ext Operation → Net Operation	Profibus master writes 0014h to PNU 00Bh (IND=0100h).
Net Operation → Ext Operation	Profibus master writes 0010h to PNU 00Bh (IND=0100h)
Net Operation → PU Operation	Profibus master writes 0011h to PNU 00Bh (IND=0100h)

The following conditions must also be met before you can change the operating mode:

- the VFD is stopped
- the forward and reverse commands are off

PNU 128h (IND=2) allows you to select the Network operating mode on power-up and after a drive reset.

Once the Network operating mode is started, there must be Profibus activity at least once every 5 seconds. If the option unit does not sense valid Profibus activity for 5 seconds or more, it performs an option module alarm stop, the VFD display unit shows "E.OP3", and you must reset the VFD to clear this fault.

One way to ensure activity is to configure the Profibus master to enable response monitoring. Alternatively, you can have the Profibus master issue a null command (Command Word 1 = 0) or any other command. Refer to Section 5.

3.3. Functions Available in the Operating Modes

The functions available to the drive depend on the operating mode. The following table indicates the command types available according to the operating mode:

Control Type	Command Type	Net	Ext	PU
Profibus	Operating Command	Yes(1)	No	No
	Output Freq. Set.	Yes(1)	No	No
	Monitor	Yes	Yes	Yes
	Parameter Write	Yes(3)(*)	No(3)	No(3)
	Parameter Read	Yes	Yes	Yes
	VFD Reset	Yes(2)	No	No
External Terminals	Operating Command	Yes(1)	Yes	No
	Output Freq. Set.	Yes(1)	Yes	No
	VFD Reset	Yes	Yes	Yes

(1) Depends on value of PNU 126h and 127h.
(2) VFD can't be reset if a Profibus comm. error occurred.
(3) As set in PNU 4Dh.
(*) While stopped.

3.4. Input From Profibus to VFD

This option unit supports all Control Input Commands.

The output frequency setting may range from 0 to 400 Hz in increments of 0.01 Hz.

You can reset the VFD by having the Profibus master write a 0000h to PNU 001h (IND=0100h).

For parameter writing, all standard and special parameters are supported.

3.5. Output From VFD to Profibus

You can monitor the following items:

- Output Frequency
- Output Current
- Output Voltage
- Frequency Setting
- Running Speed (RPM)
- Motor Torque
- Converter Output Voltage
- Regenerative Brake Duty
- Electronic Overcurrent Protection Load Factor
- Output current peak value
- Peak Voltage
- Input Power
- Output Power
- Input Terminal
- Output Terminal

Refer to Section 6.1 for more details.

For parameter reading, all standard and special parameters are supported.

All available parameters are readable all the time, regardless of special settings that may be needed to read parameters using the PU or other communications option cards (e.g., PNU 3Dh~40h and C9~E6).

3.6. Operation When an Alarm Occurs.

The following table shows the behavior of the VFD and network when an alarm occurs:

Fault Type	Item	Net	Ext	PU
VFD *2	VFD Operation Network Comm.	Stop Continue	Stop Continue	Stop Continue
Profibus Comm.	VFD Operation Network Comm.	Stop Continue *1	Continue Continue *1	Continue Continue *1

*1: Depends on the type of communication fault.
*2: For examples, E.OP3, E.OC1.

CAUTION:

- Profibus-DP communication routines should check the " acknowledge bits (PKE-AK) returned by slave device to verify successful transmission of the command and acceptance by slave device. See Appendix C for details.

CAUTION:

- For your safety, the output frequency of the VFD should always be monitored via Profibus. The actual frequency of the VFD should match the frequency setting issued by the master. If the output frequency of the VFD is less than the frequency (RFR) set by the master, a STOP command has been issued.

4. PROFIBUS DEVICE DATA

The network master's configuration software uses a device data file to identify features and functionality of a Profibus DP device. The file (named MEAU0865.GSD) is an ASCII file that can be obtained from Mitsubishi or typed in directly by the user with the following data. Comments are not included in the ASCII file itself.

Parameter	Value	Comments
#Profibus_DP		File Header
Vendor_Name	= "Mitsubishi Electric Automation, Inc."	(3)
Model_Name	= "FR-A5NP"	A500(L) VFD Option
Ident_Number	= 0x0865	= 2149 Decimal
Revision	= "Revision #.##"	See HW & SW Release
Protocol_Ident	= 0	Profibus DP
Station_Type	= 0	
FMS_Supp	= 0	
Hardware_Release	= "Series **"	
Software Release	= "Revision #.##"	
9.6_supp	= 1	9600 bps supported
19.2_supp	= 1	19.2K bps supported
93.75_supp	= 1	93.75K bps supported
187.5_supp	= 1	187.5K bps supported
500_supp	= 1	500K bps supported
1.5M_supp	= 1	1.5M bps supported
3M_supp	= 1	3M bps supported
6M_supp	= 1	6M bps supported
12M_supp	= 1	12M bps supported
MaxTsdr_9.6	= 60	60 bit times
MaxTsdr_19.2	= 60	60 bit times
MaxTsdr_93.75	= 60	60 bit times
MaxTsdr_187.5	= 60	60 bit times
MaxTsdr_500	= 100	100 bit times
MaxTsdr_1.5M	= 150	150 bit times
MaxTsdr_3M	= 250	250 bit times
MaxTsdr_6M	= 450	450 bit times
MaxTsdr_12M	= 800	800 bit times
Redundancy	= 0	No redundancy
Repeater_Ctrl_Sig	= 2	Ctrl-P is TTL-Level
24V_Pins	= 0	Net 24VDC not connected
Freeze_Mode_supp	= 1	Freeze supported
Sync_Mode_supp	= 1	Sync mode supported

Parameter	Value	Comments
Auto_Baud_supp	= 1	Auto Baud Detect supported
Set_Slave_Add_supp	= 0	Set Slave Address not supported
User_Prm_Data_Len	= 0	No user parameter data
Min_Slave_Interval	= 1	
Modular_Station	= 0	No Modular unit(1)
Max_Module	= 1	1 ID Byte
Max_Input_Len	= 12	12 Input bytes
Max_Output_Len	= 12	12 Output bytes
Max_Data_Len	= 24	12+12 = 24
Module	= "6 Word Input/6 Word Output" 0x75	Code=117=0x75 for 6w I/O's (2)
EndModule		

NOTES: (1) Some master PLC's require that Modular_Station=1 &/ Min_Slave_Intervall=20.

(2) 0x75 = 117: code automatically generated for I/O's = 6W by COM ET 200.

(3) Some master devices require that vendor_name is at most 10 characters long, please use "Mitsubishi" in that case.

To view this file on disk, please use a text editor.

5. A500(L) VFD PROFIBUS DATA WORD DEFINITION

This chapter describes the basic structure of the Profibus DP data word and how it is implemented within the A500(L) VFD. For examples of commonly used commands and how they may be implemented, please refer to Appendix B in this manual.

(1) This option unit acts as a Profibus DP slave to a PLC or equivalent controller acting as a Profibus DP master class 1 on an RS-485 network. This means that the option unit:

- acknowledges messages received, and
- transmits messages at the request of a network master.

(2) The option unit can also act as a Profibus DP slave to a Profibus DP master, which can read the drive's I/O values, as well as configure the drive itself. Please refer to Profibus Specifications.

(3) The option unit cannot send messages on its own, and it has no bus access rights. It also cannot simultaneously act as a slave to network master and as a lead drive (master) to follower drives (slaves).

(4) To provide access to A500(L) drive data, this option unit uses a manufacturer-specific Profibus Profile (data buffer). This Profile consists of the following 6 words (12 bytes):

Word	Id	Definition
1	PKE	Parameter Number (PNU) and Task or response Id (AK)
2	IND	Parameter Index (category)
3	PWE1	Not used and must be set to 0
4	PWE2	Parameter Value
5	ZSW1	VFD Status word. Used for slave-to-master messages only. For master-to-slave messages, this word is not used and must be set to 0.
6	HIW	Not used and must be set to 0

NOTE: Messages from Master to Slave are called Command Requests. Messages from Slave to Master are called Command Responses.

(5) Some Master devices, such as the Mitsubishi A1SJ71PB92D Programmable Controller will require that this data be sent to the VFD in a "byte-swapped" configuration. In this case, the position of the high-order byte and the low-order byte are switched in the data string.

The FR-A5NP communications buffer memory map is illustrated in the following tables:

Bit No:	Parameter Id			(PKE)		Word #1
	15	12	11	10	0	
	AK		SPM	PNU		

Bit No:	Parameter Index		(IND)		Word #2
	15	8	7	0	
	Index		Value		

Bit No:	Parameter Value		(PWE)	
	15		0	
	Parameter Value HIGH		(PWE1)	Word #3
	Parameter Value LOW		(PWE2)	Word #4

Bit No:	Process Data				
	15	8	7	0	
	Command Count		Status	(ZSW1)	Word #5
	Reserved		(HIW)		Word #6

AK: Task or Response Id

SPM: Toggle bit for processing the parameter change report. (Not supported, should always be zero.)

PNU: Parameter number

(6) These 6 words (described in following subsections) are how the network master and slave (the option unit) communicate via the Profibus DP protocol. It is through this addressing scheme that the sender indicates which data word within the drive is being accessed and what that access is.

(7) This option unit does not support any other manufacturer-specific messages/parameters.

5.1. Word 1 (PKE)

Bits	Id	Definition
0-10	PNU	Parameter Number (PNU). Together, the PNU and the IND (word 2 of the Profibus Profile) define which data word is being accessed. Section 6 of this manual lists all of the parameters that you can access.
11		Not used and must be set to 0.
12-15	AK	Task or response Id value. For task telegrams from the network master to the slave, i.e. Cmd_Req, the AK can assume the following values: 0h = no task 1h = request parameter value, read 2h = change parameter value (word), write 3h~Fh = not supported For task telegrams from the slave to the network master, i.e. Cmd_Rsp, the AK can assume the following values: 0h = VFD busy. No data returned by VFD 1h = VFD ready to accept data transmission 2h~6h = not supported 7h = task cannot be executed (error number placed in PWE, word 4 of the Profibus Profile) 8h = no operation change rights 9h~Fh = not supported

NOTE: See appendix C for more information regarding communication coordination.

5.2. Word 2 (IND)

Bits	Id	Definition
0-7	*pp*	Page Index. Some special parameters require a page Index. If it is not needed it should be set to 0. If IND = 01, for system environment variables, the following cases specify different blocks of SEV's: 0 = sev_i, block I 1 = sev_ii, block ii, alarm history 2 = sev_iii, block iii
8-15	IND	Parameter Index. Specifies the area from which the Specific Parameter Number (PNU) is being accessed (see Section 6): 0h = real-time monitor area 1h = system environment variable area (3 blocks) 2h = normal parameter area 3h = 900f parameter area 4h = 900% parameter area 6h = Time/Prog Settings (frequency component) 7h = Time/Prog Settings (direction component) 8h = Time/Prog Settings (time component)

5.3. Word 3 (PWE1)

Bits	Id	Definition
0-15	PWE1	Reserved and should be set to 0

5.4. Word 4 (PWE2)

Bits	Id	Definition
0-15	PWE2	Parameter Value. The actual data transferred in a telegram. If a task could not be executed (AK response Id = 7), the PWE indicates the type of error detected: 0h = no error 1h = unsupported task (including busy writing state) 2h = invalid Index (IND) 3h = invalid Parameter Number (PNU) 4h = dual-port read failure 5h = dual-port write failure 6h = invalid page 41h = mode error 42h = instruction code error 43h = data range error

5.5. Word 5 (ZSW1)

For slave-to-master messages. Word 5 of the Profibus Profile is used to pass the VFD status word:

Bits	Definition
0	1 = running (RUN)
1	1 = forward running (FWD)
2	1 = reverse running (REV)
3	1 = up to frequency (SU)
4	1 = overload (OL)
5	1 = instantaneous power failure (IPF)
6	1 = frequency detection (FU)
7	1 = alarm (ABC)
8-14	Command count. The command count is an optional feature maintained by the Profibus master and can range from 00H-7FH. The option unit copies the command count from the command it receives to the same byte offset in the response it sends. The master may use this to synchronize commands and responses.
15	Reserved, must be 0.

For master-to-slave messages, Bits 0-7 are not used and must be set to 0. The bit-wise data here do not reflect Pr.s 190~195.

5.6. Word 6 (HIW)

Bits	Id	Definition
0-15	HIW	Reserved and should be set to 0

6. PARAMETER DEFINITIONS

6.1. IND = 0000h, Real-Time Monitor Area

PNU	Definition	A500	A500L
0h		0.01Hz	0.01Hz
1h	Output Current (0.01A)	0.01A	0.1A
2h	Output Voltage (0.1V)	0.1V	0.1V
4h	Frequency Setting (0.01Hz)	0.01Hz	0.01Hz
5h	Running Speed (1r/m)	1 rpm	1 rpm
6h	Motor Torque (0.1%)	0.01%	0.01%
7h	Converter Output Voltage (0.1V)	0.1V	0.1V
8h	Regenerative Brake Duty (0.1%)	0.1%	0.1%
9h	Electronic Overcurrent Protection Load Factor	0.1%	0.1%
Ah	Output Current Peak Value (0.01A)	0.01A	0.1A
Bh	Peak Voltage (0.1V)	0.1V	0.1V
Ch	Input Power (0.01kW)	0.01kW	0.1kW
Dh	Output Power (0.01kW)	0.01kW	0.1kW
Eh	Input Terminal		
Fh	Output Terminal		
10h	Load Meter		
11h	Motor Excite Current (0.01A)	0.01A	0.1A
12h	Position Pulse		
13h	Cumulative Energy Time (1h)	1 hour	1 hour
15h	Orientation Status		
16h	Actual Operation Time (1h)	1 hour	1 hour
17h	Motor Load Factor (0.1%)	0.1%	0.1%
18h	Cumulative Power (1kWh)	1kWh	1kWh

Bit-Map for PNU = Eh Input Terminal Monitor:

15..12	11	10	9	8	7	6	5	4	3	2	1	0
0	CS	RES	STOP	MRS	JOG	RH	RM	RL	RT	AU	STR	STF

Bit-Map for PNU = Fh Output Terminal Monitor:

15. .6	5	4	3	2	1	0
0	Relay	FU	OL	IPF	SU	RUN

NOTE: The bit-wise data here reflect Pr190~195. If the assignments for the terminals are changed, the bit-map may not be the same.

6.2 IND = 01*pp*h, System Environment Variable Area

6.2.1 IND = 0100h, *pp* = 00, SEV_I, Block I, SEV Interface

PNU		Definition
0h		UsrClrValSet
1h		WO:VFD Reset
2h		WO:PrClr, WriteVal = 965Ah
3h		WO:PrAllClr, WriteVal = 99AAh
4h		WO:PrUsrClr, WriteVal = 5A55h
5h		WO:PrClr (ExComPr), WrtieVal = 5A96h
6h		WO:PrAllClr (ExComPr), WriteVal = AA99h
7h		WO:PrUsrClr (ExComPr), WriteVal = 555Ah
Ah		VFD Status/CtrlInpCmd, WriteVal = XXh
	BIT	VFD Status_ Word, see p.20 for details
		Ctrl_Inp_Cmd_ Word (Note 1)
	0	Reserved. Must be set to 0
	1	1 = STF
	2	1 = STR
	3	1 = RH
	4	1 = RM
	5	1 = RL
	6	1 = JOG
	7	1 = RT
	8	1 = AU
	9	1 = CS
	10	1 = MRS
	11-15	Not used and always set to 0
		See Appendix B for examples.
Bh		OpMode/VFDConfig(Ext10h/Net14h), WriteVal = 1Xh
Dh		Running frequency (RAM) (Note 2)
Eh		WO:Running frequency (EEPROM) (Notes 2 & 3)

WO: Write only, No Read.

Note 1: Bits 3, 4, 5, 6, 7, 8, and 9 can also be accessed from Pr 182, 181, 180, 185, 183, 184, and 186 respectively.

Note 2: Writing to Pnu=Dh or Pnu=Eh can be read out from Pnu=Dh.

Note 3: Due to the data write operation limits inherent to EEPROM, it is recommended that running frequency be written to RAM whenever possible.

6.2.2 IND = 0101h, *pp* = 01, SEV_II, Block II, Alarm History

PNU	Definition
0h	Alarm 1 (1)
1h	Alarm 2
2h	Alarm 3
3h	Alarm 4
4h	Alarm 5
5h	Alarm 6
6h	Alarm 7
7h	Alarm 8

(1) Writing a value of 0000h to this parameter resets alarm history buffer for all alarms. All other parameters at this index are read only.

#	Code	#	Code	#	Code	#	Code
10h	OC1	80h	GF	D1h	OSd	F3h	E3
11h	OC2	81h	LF	D2h	ECT	F4h	E4
12h	OC3	90h	OHT	D3h	Od	F5h	E5
20h	OV1	A0h	OPT	D4h	ECA	F6h	E6
21h	OV2	A1h	OP1	D5h	Mb1	F7h	E7
22h	OV3	A2h	OP2	D6h	Mb2	F8h	E8
30h	THT	A3h	OP3	D7h	Mb3	F9h	E9
31h	THM	B0h	PE	D8h	Mb4	FAh	E10
40h	FIN	B1h	PUE	D9h	Mb5	FBh	E11
41h	FAN	B2h	RET	DAh	Mb6	FCh	E12
50h	IPF	C0h	CPU	DBh	Mb7	FDh	E13
51h	UVT	C1h	CTE	F0h	E0	FEh	E14
60h	OLT	C2h	P24	F1h	E1	FFh	E15
70h	BE	D0h	OS	F2h	E2		

NOTE: 1. Refer to VFD Instruction Manual for alarm code definitions
2. Alarm # FFh / Code E15 is valid for A500L only

6.3. IND = 0200h, Normal Parameter Area

Para	PNU	Definition	Range	Hex	A500	A500L
Pr0	0h	Torque Boost (Manual)	0-30	0-12C	0.1%	0.1%
Pr1	1h	Max frequency Limit	0-120	0-2EE0	0.01Hz	0.01Hz
Pr2	2h	Min frequency Limit	0-120	0-2EE0	0.01Hz	0.01Hz
Pr3	3h	Base frequency Limit	0-400	0-9C40	0.01Hz	0.01Hz
Pr4	4h	MultiSpeed Set (HiSpeed)	0-400	0-9C40	0.01Hz	0.01Hz
Pr5	5h	MultiSpeed Set (MiSpeed)	0-400	0-9C40	0.01Hz	0.01Hz
Pr6	6h	MultiSpeed Set (LoSpeed)	0-400	0-9C40	0.01Hz	0.01Hz
Pr7	7h	Acc t	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr8	8h	Dec t	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr9	9h	Electr Therml O/L Relay	0-500	0-C350	0.01A	0.1A
Pr10	Ah	DC Inj Brake Op f	0-120	0-2EE0	0.01Hz	0.01Hz
Pr11	Bh	DC Inj Brake Op t	0-10	0-64	0.1s	0.1s
Pr12	Ch	DC Inj Brake V	0-30	0-12C	0.1%	0.1%
Pr13	Dh	Startg frequency	0-60	0-1770	0.01Hz	0.01Hz
Pr14	Eh	Applied Load Pattern	0-5	0-5	1	1
Pr15	Fh	Jog frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr16	10h	Jog Acc/Dec t	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr17	11h	MRS Input Selection	0-2	0-2	1	1
Pr18	12h	HiSpeed Max frequency Limit	120-400	2EE0-9C40	0.01Hz	0.01Hz
Pr19	13h	Base frequency V	0-1000	0-2710	0.1V	0.1V
Pr20	14h	Acc/Dec Ref frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr21	15h	Acc/Dec time Increments	0-1	0-1	1	1
Pr22	16h	Pr22 Stall Prevention Op Level	0-200	0-7D0	0.1%	0.1%
Pr23	17h	Stall Prevention Op Level At DoubleSpeed	0-200	0-7D0	0.1%	0.1%
Pr24	18h	MultiSpeed Set (Speed4)	0-400	0-9C40	0.01Hz	0.01Hz
Pr25	19h	MultiSpeed Set (Speed5)	0-400	0-9C40	0.01Hz	0.01Hz
Pr26	1Ah	MultiSpeed Set (Speed6)	0-400	0-9C40	0.01Hz	0.01Hz
Pr27	1Bh	MultiSpeed Set (Speed7)	0-400	0-9C40	0.01Hz	0.01Hz
Pr28	1Ch	MultiSpeed Input Compensation	0-1	0-1	1	1
Pr29	1Dh	Acc/Dec Pattern	0-3	0-3	1	1
Pr30	1Eh	Regen Brake Duty Change	0-2	0-2	1	1
Pr31	1Fh	Frequency Jump 1A	0-400	0-9C40	0.01Hz	0.01Hz
Pr32	20h	Frequency Jump 1B	0-400	0-9C40	0.01Hz	0.01Hz
Pr33	21h	Frequency Jump 2A	0-400	0-9C40	0.01Hz	0.01Hz
Pr34	22h	Frequency Jump 2B	0-400	0-9C40	0.01Hz	0.01Hz
Pr35	23h	Frequency Jump 3A	0-400	0-9C40	0.01Hz	0.01Hz
Pr36	24h	Frequency Jump 3B	0-400	0-9C40	0.01Hz	0.01Hz
Pr37	25h	Speed Display	0-9998	0-270E	1	1
Pr38	26h	Special				
Pr39	27h	Special				

Para	PNU	Definition	Range	Hex	A500	A500L
Pr40	28h	Special				
Pr41	29h	Up-To- Frequency Sensitivity	0-100	0-3E8	0.1%	0.1%
Pr42	2Ah	Output Frequency Detection	0-400	0-9C40	0.01Hz	0.01Hz
Pr43	2Bh	Output Frequency Detection At REV rotation	0-400	0-9C40	0.01Hz	0.01Hz
Pr44	2Ch	2nd Acc/Dec time	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr45	2Dh	2nd Dec time	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr46	2Eh	2nd Torque Boost	0-30	0-12C	0.1%	0.1%
Pr47	2Fh	2nd V/F (Base frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr48	30h	2nd Stall Prevention Op I	0-200	0-7D0	0.1%	0.1%
Pr49	31h	2nd Stall Prevention Op frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr50	32h	2nd Outp frequency Detection	0-400	0-9C40	0.01Hz	0.01Hz
Pr51	33h	Special				
Pr52	34h	PU Main Display Data Selection	0-100	0-64	1	1
Pr53	35h	PU Level Display Data Selection	0-18	0-12	1	1
Pr54	36h	FM Termnl Func Selection	1-21	1-15	1	1
Pr55	37h	frequency Monitoring Ref	0-400	0-9C40	0.01Hz	0.01Hz
Pr56	38h	Current Monitorg Ref	0-500	0-C350	0.01A	0.1A
Pr57	39h	Restart Coasting Time	0-5	0-32	0.1s	0.1s
Pr58	3Ah	Restart Cushion Time	0-60	0-258	0.1s	0.1s
Pr59	3Bh	Remote Setting Function Selection	0-2	0-2	1	1
Pr60	3Ch	Intellgent Mode Selection	0-8	0-8	1	1
Pr61	3Dh	Ref Current For Intellgent Mode	0-500	0-C350	0.01A	O.1A
Pr62	3Eh	Ref Current For Intellgent Mode Acc	0-200	0-7D0	0.1%	0.1%
Pr63	3Fh	Ref Current For Intellgent Mode Dec	0-200	0-7D0	0.1%	0.1%
Pr64	40h	Starting frequency For Elevator Mode	0-10	0-3E8	0.01Hz	0.01Hz
Pr65	41h	Retry Selection	0-5	0-5	1	1
Pr66	42h	Stall Prevention Op Reduction Starting frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr67	43h	No. Of Retries At Alarm Occur	0-110	0-6E	1	1
Pr68	44h	Retry Waiting Time	0-10	0-64	0.1s	0.1s
Pr69	45h	Retry Count Display Erasure	0	0	1	1
Pr70	46h	Special Regen Brake Duty	0-30	0-12C	0.1%	0.1%
Pr71	47h	Applied Motor	0-24	0-18	1	1
Pr72	48h	PWM Frequency Selection	0-15	0-F	1	1
Pr73	49h	0 to 5V, 0 to 10V Selection	0-15	0-F	1	1
Pr74	4Ah	Response Time For Analog Signal	0-8	0-8	1	1
Pr75	4Bh	Reset/Disconnectd PU Detection/ PU Stop Selection	0-17	0-11	1	1
Pr76	4Ch	Alarm Code Output Selection	0-3	0-3	1	1
Pr77	4Dh	Pr Write Disable Selection	0-2	0-2	1	1
Pr78	4Eh	REV Rotation Prevention Selection	0-2	0-2	1	1
Pr79	4Fh	Operating Mode Selection	0-8	0-8	1	1

Para	PNU	Definition	Range	Hex	A500	A500L
Pr80	50h	Motor Capacity	.4-55	28-157C	0.01kW	0.1kW
Pr81	51h	No. Of Motor Poles	2-16	2-10	1	1
Pr82	52h	Excitation Current	0-9999	0-270F	0.01A	0.01A
Pr83	53h	Rated Motor Voltage	0-1000	0-2710	0.1V	0.1V
Pr84	54h	Rated Motor Frequency	50-120	1388-2EE0	0.01Hz	0.01Hz
Pr85	55h	Special				
Pr86	56h	Special				
Pr87	57h	Special				
Pr88	58h	Special				
Pr89	59h	Speed Control Gain	0-1000	0-2710	0.1%	0.1%
Pr90	5Ah	Motor Constant R1	0-9999	0-270F	0.01	0.01
Pr91	5Bh	Motor Constant R2	0-9999	0-270F	0.01	0.01
Pr92	5Ch	Motor Constant L1	0-9999	0-270F	0.01	0.01
Pr93	5Dh	Motor Constant L2	0-9999	0-270F	0.01	0.01
Pr94	5Eh	Motor Constant X	0-9999	0-270F	0.01	0.01
Pr95	5Fh	Online Auto Tuning	0-1	0-1	1	1
Pr96	60h	Autotuning Set/State	0-101	0-65	1	1
Pr97	61h	Special				
Pr98	62h	Special				
Pr99	63h	Special				
Pr100	64h	V/F 1 (1st Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr101	65h	V/F 1 (1st Frequency Voltage)	0-1000	0-2710	0.1V	0.1V
Pr102	66h	V/F 2 (2nd Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr103	67h	V/F 2 (2nd Frequency Voltage)	0-1000	0-2710	0.1V	0.1V
Pr104	68h	V/F 3 (3rd Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr105	69h	V/F 3 (3rd Frequency Voltage)	0-1000	0-2710	0.1V	0.1V
Pr106	6Ah	V/F 4 (4th Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr107	6Bh	V/F 4 (4th Frequency Voltage)	0-1000	0-2710	0.1V	0.1V
Pr108	6Ch	V/F 5 (5th Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr109	6Dh	V/F 5 (5th Frequency Voltage)	0-1000	0-2710	0.1V	0.1V
Pr110	6Eh	3rd Acc/Dec Time	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr111	6Fh	3rd Dec Time	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr112	70h	3rd Torque Boost	0-30	0-12C	0.1%	0.1%
Pr113	71h	3rd V/F (Base Frequency)	0-400	0-9C40	0.01Hz	0.01Hz
Pr114	72h	3rd Stall Prevention Op Current	0-200	0-7D0	0.1%	0.1%
Pr115	73h	3rd Stall Preventn Op Frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr116	74h	3rd Outp Frequency Detection	0-400	0-9C40	0.01Hz	0.01Hz
Pr117	75h	Station No.	0-31	0-1F	1	1
Pr118	76h	Comms Speed	48-192	30-C0	1	1
Pr119	77h	Stop Bit Length	0-11	0-B	1	1
Pr120	78h	Parity Check Presence / Absence	0-2	0-2	1	1
Pr121	79h	No. Of Comms Retries	0-10	0-A	1	1

Para	PNU	Definition	Range	Hex	A500	A500L
Pr122	7Ah	Comms Chk Time Interval	0-999.8	0-270E	0.1s	0.1s
Pr123	7Bh	Waiting Time Setting	0-150	0-96	1ms	10ms
Pr124	7Ch	CR,LF Presence/Absence Selection	0-2	0-2	1	1
Pr125	7Dh	Special				
Pr126	7Eh	Special				
Pr127	7Fh	Special				
Pr128	80h	PID Actn Selection	10-21	A-15	1	1
Pr129	81h	PID Proportionl Band	0.1-1000	0.1-2710	0.1%	0.1%
Pr130	82h	PID Integral Time	0.1-3600	1-8CA0	0.1s	0.1s
Pr131	83h	PID Upper Limit	0-100	0-3E8	0.1%	0.1%
Pr132	84h	PID Lower Limit	0-100	0-3E8	0.1%	0.1%
Pr133	85h	PID Actn Set Point For PU Op	0-100	0-3E8	0.1%	0.1%
Pr134	86h	PID Differentl Time	0.01-10	1-3E8	0.01s	0.01s
Pr135	87h	CPS-INV Switch-Over Sequence Output terminal Selection	0-2	0-2	1	1
Pr136	88h	MC Switch-Over Interlock Time	0-100	0-3E8	0.1s	0.1s
Pr137	89h	Starting Waiting Time	0-100	0-3E8	0.1s	0.1s
Pr138	8Ah	CPS-INV Switch-Over Selection at Alarm Occcur	0-1	0-1	1	1
Pr139	8Bh	Auto INV-CPS Switch-Over Frequency	0-60	0-1770	0.01Hz	0.01Hz
Pr140	8Ch	Backlash Acc Stopping Frequency Frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr141	8Dh	Backlash Acc Stopping Time	0-360	0-E10	0.1s	0.1s
Pr142	8Eh	Backlash Dec Stopping Frequency	0-400	0-9C40	0.01Hz	0.01Hz
Pr143	8Fh	Backlash Dec Stopping Time	0-360	0-E10	0.1s	0.1s
Pr144	90h	Speed Setting Switch-Over	0-110	0-6E	1	1
Pr145	91h	PU Language Switch	0-7	0-7	1	1
Pr146	92h	Special				
Pr147	93h	Special				
Pr148	94h	Stall Prevention Level At 0V Input	0-200	0-7D0	0.1%	0.1%
Pr149	95h	Stall Prevention Level At 10V Input	0-200	0-7D0	0.1%	0.1%
Pr150	96h	Output Current Detection Level	0-200	0-7D0	0.1%	0.1%
Pr151	97h	Output Current Detection Period	0-10	0-64	0.1s	0.1%
Pr152	98h	0-I Detection Level	0-200	0-7D0	0.1%	0.1%
Pr153	99h	0-I Detection Period	0-1	0-64	0.01s	0.01s
Pr154	9Ah	Voltage Reduction Selection During Stall Prevention Op	0-1	0-1	1	1
Pr155	9Bh	RT Activatd Condition	0-10	0-A	1	1
Pr156	9Ch	Stall Prevention Op Selection	0-100	0-64	1	1
Pr157	9Dh	OL Signal Waiting Timet	0-25	0-FA	0.1s	0.1s
Pr158	9Eh	AM Terminal Funtion Selection	1-21	1-15	1	1
Pr159	9Fh	Special				
Pr160	A0h	Usr Group Read Selection	0-11	0-B	1	1
Pr161	A1h	Special				
Pr162	A2h	Auto Restart After IPF Selection	0-1	0-1	1	1

Para	PNU	Definition	Range	Hex	A500	A500L
Pr163	A3h	1st Cushion Time For Restart	0-20	0-C8	0.1s	0.1s
Pr164	A4h	1st Cushion Voltage For Restart	0-100	0-3E8	0.1s	0.1s
Pr165	A5h	Restart Stall Prevention Op Level	0-200	0-7D0	0.1s	0.1s
Pr166	A6h	Special				
Pr167	A7h	Special				
Pr168	A8h	Special				
Pr169	A9h	Special				
Pr170	AAh	Watt-Hr Meter Clear	0	0	1	1
Pr171	ABh	Actl Op Hr Meter Clear	0	0	1	1
Pr172	ACh	Special				
Pr173	ADh	Usr Group 1	0-999	0-3E7	1	1
Pr174	AEh	Usr Group 1 Deletn	0-999	0-3E7	1	1
Pr175	AFh	Usr Group 2	0-999	0-3E7	1	1
Pr176	B0h	Usr Group 2 Deletn	0-999	0-3E7	1	1
Pr177	B1h	Special				
Pr178	B2h	Special				
Pr179	B3h	Special				
Pr180	B4h	RL Termnl Funct Select	0-99	0-63	1	1
Pr181	B5h	RM Termnl Func Selectn	0-99	0-63	1	1
Pr182	B6h	RH Termnl Func Select	0-99	0-63	1	1
Pr183	B7h	RT Termnl Func Select	0-99	0-63	1	1
Pr184	B8h	AU Termnl Func Select	0-99	0-63	1	1
Pr185	B9h	JOG Termnl Func Select	0-99	0-63	1	1
Pr186	BAh	CS Termnl Func Select	0-99	0-63	1	1
Pr187	BBh	Special				
Pr188	BCh	Special				
Pr189	BDh	Special				
Pr190	BEh	RUN Termnl Func Select	0-199	0-C7	1	1
Pr191	BFh	SU Termnl Func Select	0-199	0-C7	1	1
Pr192	C0h	IPF Termnl Func Select	0-199	0-C7	1	1
Pr193	C1h	OL Termnl Func Select	0-199	0-C7	1	1
Pr194	C2h	FU Termnl Func Select	0-199	0-C7	1	1
Pr195	C3h	ABC Termnl Func Select	0-199	0-C7	1	1
Pr196	C4h	Special				
Pr197	C5h	Special				
Pr198	C6h	Special				
Pr199	C7h	Usr's Initl Val Sett	0-999	0-3E7	1	1
Pr232	E8h	MultiSpd Sett (Spd8)	0-400	0-9C40	0.01Hz	0.01Hz
Pr233	E9h	MultiSpd Sett (Spd9)	0-400	0-9C40	0.01Hz	0.01Hz
Pr234	EAh	MultiSpd Sett (Spd10)	0-400	0-9C40	0.01Hz	0.01Hz
Pr235	EBh	MultiSpd Sett (Spd11)	0-400	0-9C40	0.01Hz	0.01Hz
Pr236	ECh	MultiSpd Sett (Spd12)	0-400	0-9C40	0.01Hz	0.01Hz
Pr237	EDh	MultiSpd Sett (Spd13)	0-400	0-9C40	0.01Hz	0.01Hz
Pr238	EEh	MultiSpd Sett (Spd14)	0-400	0-9C40	0.01Hz	0.01Hz

Para	PNU	Definition	Range	Hex	A500	A500L
Pr239	EFh	MultiSpd Sett (Spd15)	0-400	0-9C40	0.01Hz	0.01Hz
Pr240	F0h	Special				
Pr241	F1h	Special				
Pr242	F2h	Special				
Pr243	F3h	Special				
Pr244	F4h	Special				
Pr245	F5h	Special				
Pr246	F6h	Special				
Pr247	F7h	Special				
Pr248	F8h	Special				
Pr249	F9h	Special				
Pr250	FAh	Special				
Pr251	FBh	Special				
Pr252	FCh	Special				
Pr253	FDh	Special				
Pr254	FEh	Special				
Pr255	FFh	Special				
Pr256	100h	Special				
Pr257	101h	Special				
Pr258	102h	Special				
Pr259	103h	Special				
Pr260	104h	Special				
Pr261	105h	Power Failure Stop Func	0-1	0-1	1	1
Pr262	106h	Subtracted Frequency At Dec Start	0-20	0-7D0	0.01Hz	0.01Hz
Pr263	107h	Subtractn Starting Frequency	0-120	0-2EE0	0.01Hz	0.01Hz
Pr264	108h	Power-Failure Dec Time 1	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr265	109h	Power Failure Dec Time 2	0-3600/ 0-360	0-8CA0	0.1s/ 0.01s	0.1s/ 0.01s
Pr266	10Ah	Power Failure Dec Time Swc-Over f	0-400	0-9C40	0.01Hz	0.01Hz
Pr267	10Bh	Special				
Pr268	10Ch	Special				
Pr269	10Dh	Special				
Pr270	10Eh	Stop-On-Contact/ Load Torque HiSpeed Ctrl Selectn	0-3	0-3	1	1
Pr271	10Fh	HiSpeed Sett Max Current	0-200	0-7D0	0.1%	0.1%
Pr272	110h	HiSpeed Sett Min Current	0-200	0-7D0	0.1%	0.1%
Pr273	111h	Current Avg Range	0-400	0-9C40	0.01Hz	0.01Hz
Pr274	112h	Current Avg Filter Constant	1-4000	1-FA0	1	1
Pr275	113h	Stop-On-Contact Excitg Current LoSpeed Multiplier Factor	0-1000	0-3E8	1%	1%
Pr276	114h	Stop-On-Contact PWM Carrier Frequency	0-15	0-F	1	1
Pr277	115h	Special				
Pr278	116h	Brake Openg Frequency	0-30	0-BB8	0.01Hz	0.01Hz
Pr279	117h	Brake Openg Current	0-200	0-7D0	0.1%	0.1%

Para	PNU	Definition	Range	Hex	A500	A500L
Pr280	118h	Brake Openg Current Detect Time	0-2	0-14	0.1s	0.1s
Pr281	119h	Brake Op Time At Start	0-5	0-32	0.1s	0.1s
Pr282	11Ah	Brake Closg Frequency	0-30	0-BB8	0.01Hz	0.01Hz
Pr293	11Bh	Brake Op Time At Stop	0-5	0-32	0.1s	0.1s
Pr284	11Ch	Dec Detectn Func Selectn	0-1	0-1	1	1
Pr285	11Dh	Overspd Detectn Frequency	0-30	0-BB8	0.01Hz	0.01Hz
Pr330	11Eh	Special				
Pr331	11Fh	Special				
Pr332	120h	Special				
Pr333	121h	Special				
Pr334	122h	Special				
Pr335	123h	Special				
Pr336	124h	Special				
Pr337	125h	Special				
Pr338	126h	Op Cmd Source	0-1	0-1	1	1
Pr339	127h	Spd Cmd Source	0-1	0-1	1	1
Pr340	128h	Link Startup Mode Selectn	0-2	0-2	1	1
Pr341	129h	Special				
Pr342	12Ah	Special				
Pr360	13Ch	Special				
Pr361	13Dh	Special				
Pr362	13Eh	Special				
Pr363	13Fh	Special				
Pr364	140h	Special				
Pr365	141h	Special				
Pr366	142h	Special				
Pr367	143h	Special				
Pr368	144h	Special				

Notes:
1. Some default values depend on the size of the VFD.
2. 65535, 6553.5Unit, 655.35 Unit simply indicate the function is NOT active, its meaning is the same as 9999 on PU, or in the FR-A500(L) Manual.
3. Please refer to Mitsubishi FR-A500(L) Instruction Manual for more details.

6.4. IND = 0300h, 900f Parameter Area

PNU	Paramtr	Definition	A500	A500L
147h	Pr900	FM Terminal Calibration		
148h	Pr901	AM Terminal Calibration		
149h	Pr902f	Frequency Setting Voltage Bias, Frequency Component (f)	0.01Hz	0.01Hz
14Ah	Pr903f	Frequency Setting Voltage Gain, Frequency Component (f)	0.01Hz	0.01Hz
14Bh	Pr904f	Frequency Setting Current Bias, Frequency Component (f)	0.01Hz	0.01Hz
14Ch	Pr905f	Frequency Setting Current Gain, Frequency Component (f)	0.01Hz	0.01Hz

6.5. IND = 0400h, 900% Parameter Area

PNU	Paramtr	Definition
2h	Pr902%	Frequency Setting Voltage Bias, Percent Of Full Scale (%)
3h	Pr903%	Frequency Setting Voltage Gain, Percent Of Full Scale (%)
4h	Pr904%	Frequency Setting Current Bias, Percent Of Full Scale (%)
5h	Pr905%	Frequency Setting Current Gain, Percent Of Full Scale (%)

NOTE: The minimal increment for table 6.5 is 0.1%

6.6. Time/Program Settings: Frequency (f) Components (IND = 0600h)

PNU	Paramtr	Definition
0h	Pr201f	Program Setting 1 (Frequency)
1h	Pr202f	Program Setting 2 (Frequency)
2h	Pr203f	Program Setting 3 (Frequency)
3h	Pr204f	Program Setting 4 (Frequency)
4h	Pr205f	Program Setting 5 (Frequency)
5h	Pr206f	Program Setting 6 (Frequency)
6h	Pr207f	Program Setting 7 (Frequency)
7h	Pr208f	Program Setting 8 (Frequency)
8h	Pr209f	Program Setting 9 (Frequency)
9h	Pr210f	Program Setting 10 (Frequency)
Ah	Pr211f	Program Setting 11 (Frequency)
Bh	Pr212f	Program Setting 12 (Frequency)
Ch	Pr213f	Program Setting 13 (Frequency)
Dh	Pr214f	Program Setting 14 (Frequency)
Eh	Pr215f	Program Setting 15 (Frequency)
Fh	Pr216f	Program Setting 16 (Frequency)
10h	Pr217f	Program Setting 17 (Frequency)
11h	Pr218f	Program Setting 18 (Frequency)
12h	Pr219f	Program Setting 19 (Frequency)
13h	Pr220f	Program Setting 20 (Frequency)
14h	Prr21f	Program Setting 21 (Frequency)
15h	Pr222f	Program Setting 22 (Frequency)
16h	Pr223f	Program Setting 23 (Frequency)
17h	Pr224f	Program Setting 24 (Frequency)
18h	Pr225f	Program Setting 25 (Frequency)
19h	Pr226f	Program Setting 26 (Frequency)
1Ah	Pr227f	Program Setting 27 (Frequency)
1Bh	Pr228f	Program Setting 28 (Frequency)
1Ch	Pr229f	Program Setting 29 (Frequency)
1Dh	Pr230f	Program Setting 30 (Frequency)

NOTE: The minimal increment is 0.1Hz for all entries.

Pr201f to Pr230f range from 0 to 400, or 9999

6.7. Time/Program Settings: Motor Run Direction (D) Components (IND = 0700h)

PNU	Paramtr	Definition
0h	Pr201D	Program Setting 1 (Direction)
1h	Pr202D	Program Setting 2 (Direction)
2h	Pr203D	Program Setting 3 (Direction)
3h	Pr204D	Program Setting 4 (Direction)
4h	Pr205D	Program Setting 5 (Direction)
5h	Pr206D	Program Setting 6 (Direction)
6h	Pr207D	Program Setting 7 (Direction)
7h	Pr208D	Program Setting 8 (Direction)
8h	Pr209D	Program Setting 9 (Direction)
9h	Pr210D	Program Setting 10 (Direction)
Ah	Pr211D	Program Setting 11 (Direction)
Bh	Pr212D	Program Setting 12 (Direction)
Ch	Pr213D	Program Setting 13 (Direction)
Dh	Pr214D	Program Setting 14 (Direction)
Eh	Pr215D	Program Setting 15 (Direction)
Fh	Pr216D	Program Setting 16 (Direction)
10h	Pr217D	Program Setting 17 (Direction)
11h	Pr218D	Program Setting 18 (Direction)
12h	Pr219D	Program Setting 19 (Direction)
13h	Pr220D	Program Setting 20 (Direction)
14h	Pr221D	Program Setting 21 (Direction)
15h	Pr222D	Program Setting 22 (Direction)
16h	Pr223D	Program Setting 23 (Direction)
17h	Pr224D	Program Setting 24 (Direction)
18h	Pr225D	Program Setting 25 (Direction)
19h	Pr226D	Program Setting 26 (Direction)
1Ah	Pr227D	Program Setting 27 (Direction)
1Bh	Pr228D	Program Setting 28 (Direction)
1Ch	Pr229D	Program Setting 29 (Direction)
1Dh	Pr230D	Program Setting 30 (Direction)

NOTE: The minimal increment is 1 decimal

For Pr201d to Pr230d: 0 = STOP, 1 = Forward Rotation, and 3 = Reverse

6.8. Time/Prog Settings Time (t) Components (IND = 0800h)

Please refer to A500(L) VFD manuals for further information

PNU	Paramtr	Definition
C8h	Pr200	Program Min/Sec Select
C9h	Pr201t	Program Setting 1 (Time)
CAh	Pr202t	Program Setting 2 (Time)
CBh	Pr203t	Program Setting 3 (Time)
CCh	Pr204t	Program Setting 4 (Time)
CDh	Pr205t	Program Setting 5 (Time)
CEh	Pr206t	Program Setting 6 (Time)
CFh	Pr207t	Program Setting 7 (Time)
D0h	Pr208t	Program Setting 8 (Time)
D1h	Pr209t	Program Setting 9 (Time)
D2h	Pr210t	Program Setting 10 (Time)
D3h	Pr211t	Program Setting 11 (Time)
D4h	Pr212t	Program Setting 12 (Time)
D5h	Pr213t	Program Setting 13 (Time)
D6h	Pr214t	Program Setting 14 (Time)
D7h	Pr215t	Program Setting 15 (Time)
D8h	Pr216t	Program Setting 16 (Time)
D9h	Pr217t	Program Setting 17 (Time)
DAh	Pr218t	Program Setting 18 (Time)
DBh	Pr219t	Program Setting 19 (Time)
DCh	Pr220t	Program Setting 20 (Time)
DDh	Pr221t	Program Setting 21 (Time)
DEh	Pr222t	Program Setting 22 (Time)
DFh	Pr223t	Program Setting 23 (Time)
E1h	Pr224t	Program Setting 24 (Time)
E2h	Pr225t	Program Setting 25 (Time)
E3h	Pr226t	Program Setting 26 (Time)
E4h	Pr227t	Program Setting 27 (Time)
E5h	Pr228t	Program Setting 28 (Time)
E6h	Pr229t	Program Setting 29 (Time)
E7h	Pr230t	Program Setting 30 (Time)
E8h	Pr231	Program Setting 31 (Time)

NOTE: The minimal increment is 1 decimal

Pr200, Pr201t to Pr230t, and Pr231 range from 0 to 9959

Rotation

7. TROUBLESHOOTING

If a fault occurs and the VFD fails to operate properly, locate the cause of the fault and take proper corrective action by referring to the troubleshooting below. If the corresponding information is not found in the table, the VFD has problem, or the component parts are damaged, contact the nearest service representative.

7.1. Inspecting Display On Parameter Unit And Status LED On A5NP

VFD Display	LED on A5NP	Possible Causes	Corrective Actions
0.00	Off	FR-A5NP option module not functioning	Check proper installation of option module. Review instructions in Section 2
			Reset VFD / option module by cycling power to VFD
			Reset VFD to factory default settings via AllPrClr function and cycle power to VFD
		Network integrity compromised	Verify proper network cable connection
			Check network cable terminations
			Verify network configuration using Profibus DP network configuration software tool such as Mitsubishi MELSEC Profimap
			Check for network errors on other nodes
			Verify network cable continuity between nodes
		Network Master does not exist or is malfunctioning	Verify connection and operation of Profibus DP Master
E.XXX	Off/On	VFD is in fault mode - check VFD display	Refer to VFD Troubleshooting in A500(L) Manual(s)

In response to the occurrence of a fault, the display unit of the VFD automatically displays the code of the detected fault and the Status LED on A5NP shows the status of the detected fault.

8. REFERENCES

Mitsubishi *FR-A500(L) VFD Instruction Manual*

Mitsubishi *GSD Instruction Manual*
Document# VC7BNA00012

PNO *German Standard (English Version):*
DIN(E) 19 245 Part 3 (Profibus DP), April 1991

Technical Support# 1.800.950-7781

9. SPECIFICATIONS

(1) Current Consumption	From A500(L) drive: • 300 mA typ. @5 Vdc • 15 mA typ. @24 Vdc unloaded • 55 mA typ. @24 Vdc with 130 mA Load off +5 Vdc source to network Provided to Profibus network: • 100 mA @5 Vdc
(2) Backplane Isolation	• 500 Vdc min.
(3) Supported Data Rates	• ← 1200 m: 9,600 bps; 19,200 bps; 93,750 bps • ← 600 m: 187,500 bps • ← 200 m: 500,000 bps; 1,500,000 bps • ← 100 m: 3,000,000 bps 6,000,000 bps; 12,000,000 bps
(4) Operating Temperature	• –10 to 60 °C
(5) Storage Temperature	• –20 to 65 °C
(6) Relative Humidity	• ← 90% @60 °C, non-condensing
(7) Dimension	• 96 x 49 x 33 mm

Appendix A. Instruction For MEAU0865.GSD

MEAU0865.GSD package:

This package contains a Device Data Base(GSD) file for use with various Profibus network configuration software tools such as MELSEC Profimap. It allows the user to configure their Profibus-DP master to communicate with the FR-A500(L) drive via the FR-A5NP option. The purpose of the MEAU0865.GSD is to provide information on an external disk about configurable attributes and functionality for a Profibus-DP device. The GSD file MEAU0865.GSD may only be used with Mitsubishi A500(L) VFD models.

MELSEC ProfiMap software is a product of Mitsubishi Electric Corp. that serves as a central point for configuring and managing devices and monitoring device diagnostics.

Contact your Mitsubishi sales representative for more details. Please refer to the manual of the Profibus DP configuration software tool for instructions on the installation of the Mitsubishi GSD file.

The file MEAU0865.GSD may be purchased on floppy disk from your authorized Mitsubishi distributor. The file is also available for download, free of charge from the Profibus Trade Organization web site:

http://www.profibus.com

Note: ISP charges and connect time fees may apply.

Appendix B: Commonly used Profibus DP commands for the FR-A500(L) & FR-A5NP

The A500(L) can easily be controlled and monitored using a Profibus DP master. The controller sends a 6 word message string to the A500(L). The A500(L) will respond to each message with a 6 word string. Depending on the command sent, the A500(L) will respond with either a AK (word #1) and VFD status (word #5) or AK (word #1), response to message (word #4 - i.e. output current) and VFD status (word #5).

To enable Profibus DP communication with the A500(L), no parameter needs to be set, however, the first 6 word message sent from the controller must be the command to switch the A500(L) to NETWORK (NET) mode. Failure to do so will prevent communication between the A500(L) and the network master.

The following examples show how common messages are constructed. Please be aware that some Profibus DP masters or Programmable Logic Controllers (PLC) use high byte / low byte swapping when sending and receiving messages.

Mitsubishi's A1SJ71PB92D is an example that does implement byte swapping. Care must be taken when constructing and reading messages. These examples show constructed messages with and without byte swapping.

Parameter Id		(PKE)			Word #1
15	12	11	10	0	Bit No:
AK		SPM	PNU		

Parameter Index	(IND)	Word #2
15 8	7 0	Bit No:
Page Index	Parameter Value	

Parameter Value	(PWE)	
15	0	Bit No:
Parameter Value HIGH	(PWE1)	Word #3
Parameter Value LOW	(PWE2)	Word #4

Process Data		
15 8	7 0	Bit No:
Command Count	Status (ZSW1)	Word #5
Reserved	(HIW)	Word #6

AK: Task or Response Id

SPM: Toggle bit for processing the parameter change report. (Not supported, should always be zero.)

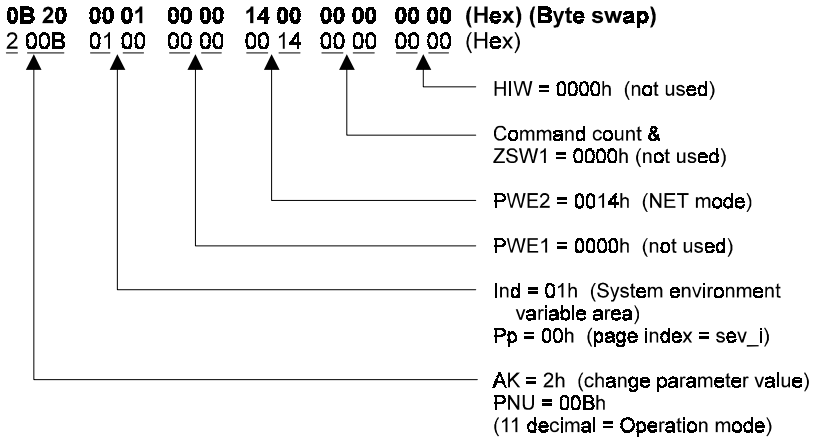
PNU: Parameter Number

1. Set A500(L) to NET Mode

Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

A) Set A500 to Net Mode:

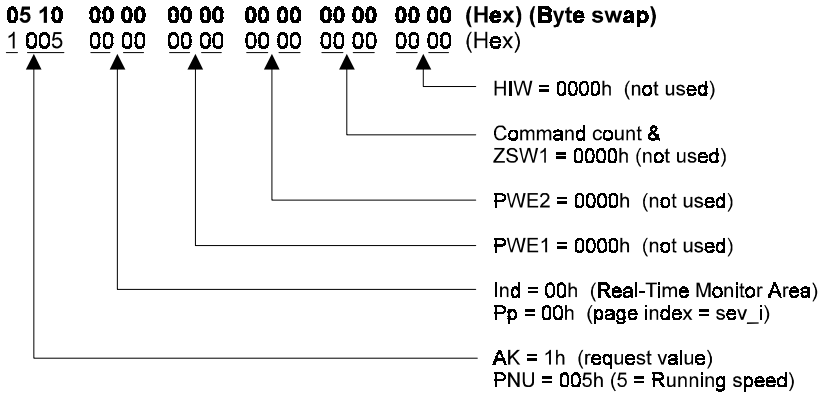


2. Real-Time Monitor

Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

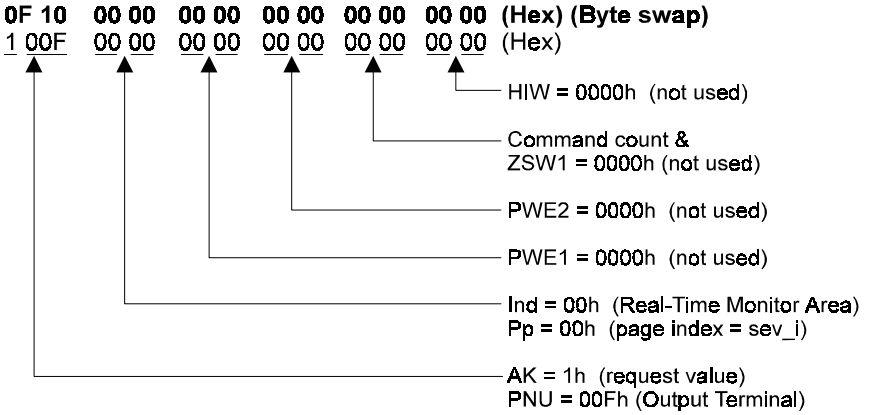
A) Set to read Running Speed:



Returned value will be in Hex located in WORD #4 and byte swapped.

Example: Return value = 0807h
Byte swap = 0708h
0708h = 1800 decimal (rpm)

B) Set to read Output Status:

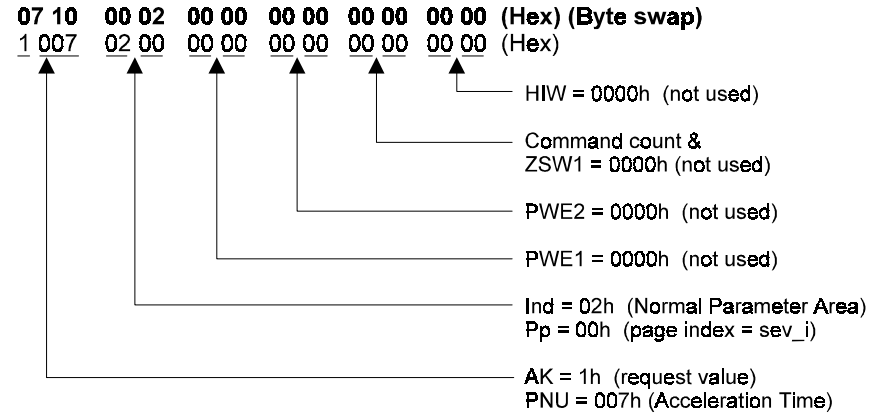


15...6	5	4	3	2	1	0
Not used	Relay	FU	OL	IPF	SU	RUN
0	0	1	0	0	1	1

Returned value will be in Hex located in WORD #4 and byte swapped.

Example: Return value = 1300h
Byte swap = 0013h RUN=ON, SU=ON, FU=ON

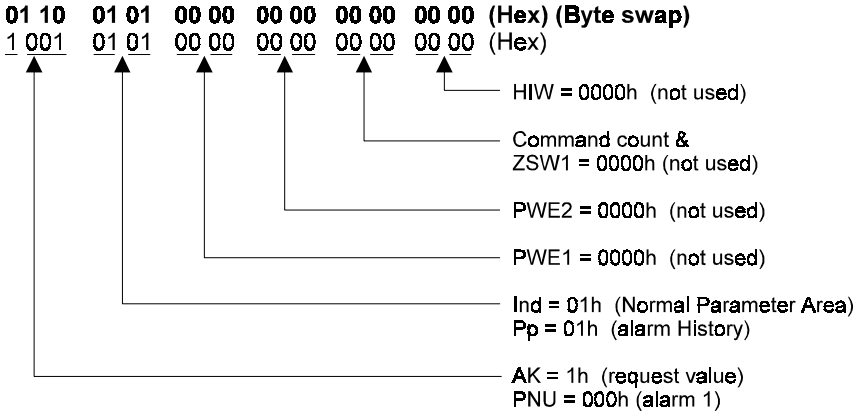
C) Set to read Acceleration Time (Pr. 7):



Returned value will be in Hex located in WORD #4 and byte swapped.

Example: Return value = 3200h (0032h byte swapped), which is 500 decimal or 5.00s

D) Set to read Alarm History:



(scaling for acceleraton time is 0.01s)
0032h = 5.0 seconds (decimal) (note: scaling for acceleration time is in 0.1 sec)

Returned value will be in Hex located in WORD #4 and byte swapped.

Example: Return value = A300h = OP3 ALARM (00A3 byte swapped)

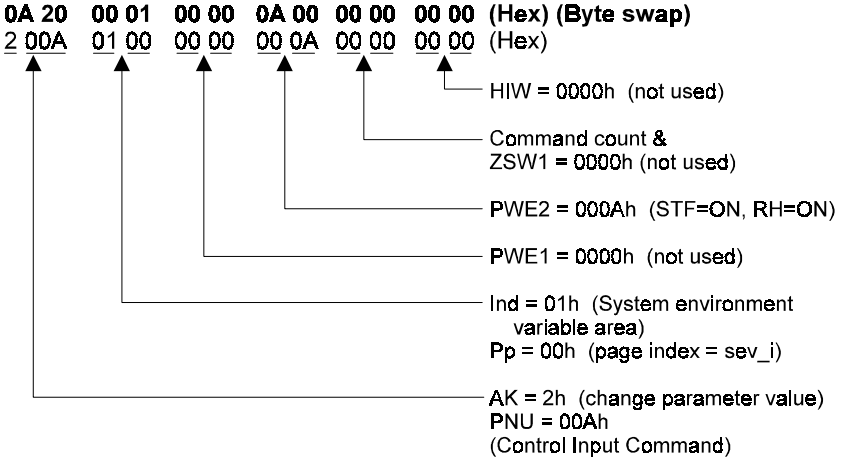
See Section 6.2.2 for error code descriptions.

3. Setting Inputs

Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

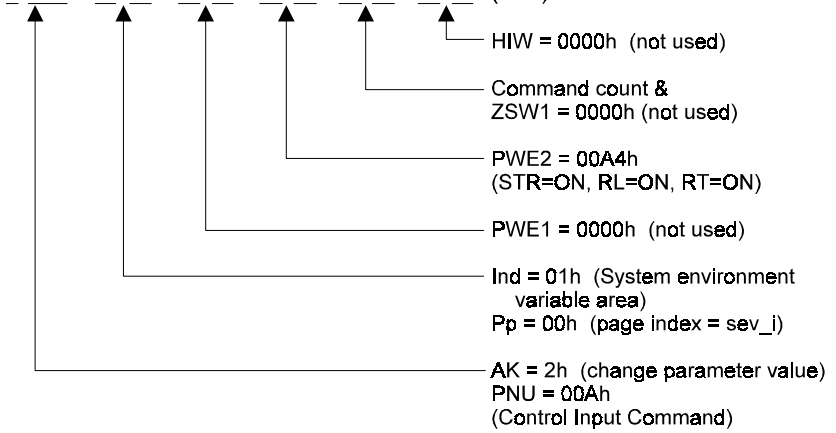
A) Set A500(L) to Run Forward at High Speed (STF, RH):



Not used					MRS	CS	AU	RT	JOG	RL	RM	RH	STR	STF	Not used	Description
0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0=off, 1=on
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit #2
0				0				0				A				Hex Code

B) Set A500(L) to Run Reverse at Low Speed using 2nd Accel/Decel time (STR, RL, RT):

0A 20 00 01 00 00 A4 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 A4 00 00 00 00 (Hex)



Not used					MRS	CS	AU	RT	JOG	RL	RM	RH	STR	STF	Not used	Description
0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0=off, 1=on
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit #2
0					0			A				4				Hex Code

C) Forward at Middle Speed:

0A 20 00 01 00 00 12 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 12 00 00 00 00 (Hex)

D) Forward at Low Speed:

0A 20 00 01 00 00 22 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 22 00 00 00 00 (Hex)

E) Reverse at High Speed:

0A 20 00 01 00 00 0C 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 0C 00 00 00 00 (Hex)

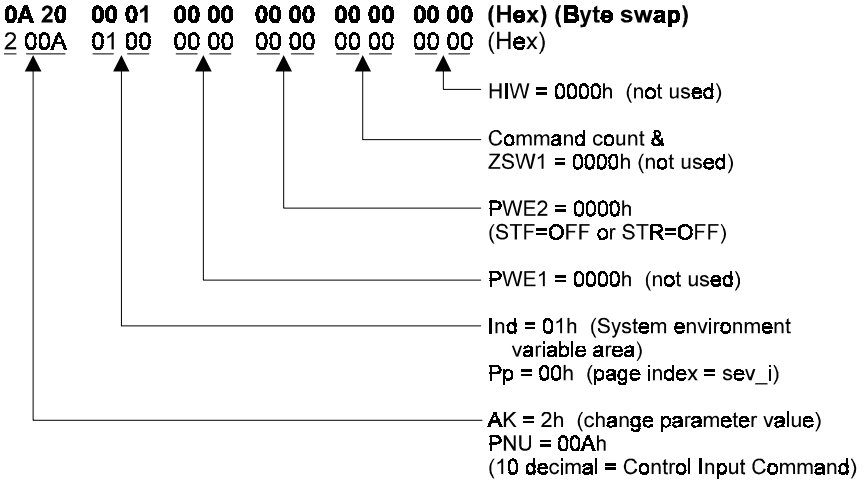
F) Reverse at Middle Speed:

0A 20 00 01 00 00 14 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 14 00 00 00 00 (Hex)

G) Reverse at Low Speed:

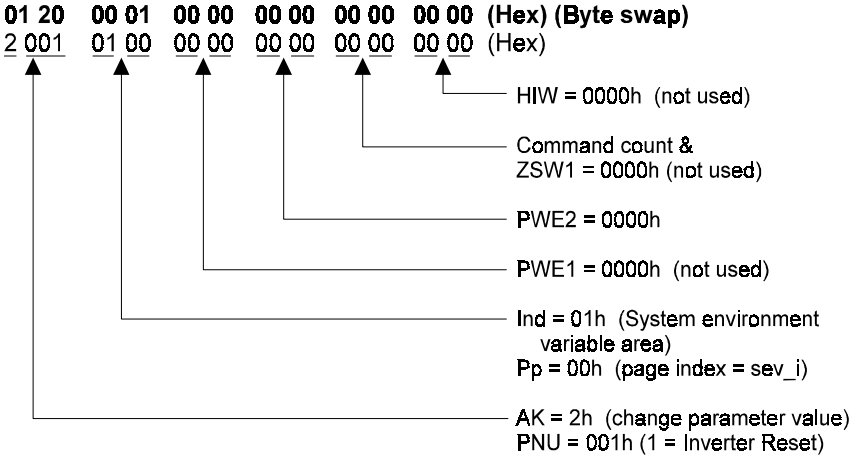
0A 20 00 01 00 00 24 00 00 00 00 00 (Hex) (Byte swap)
2 00A 01 00 00 00 00 24 00 00 00 00 (Hex)

H) Set A500(L) to Stop:



Not used					MRS	CS	AU	RT	JOG	RL	RM	RH	STR	STF	Not used	Description
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0=off, 1=on
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit #2
0					0			0				0				Hex Code

I) Reset the A500(L):



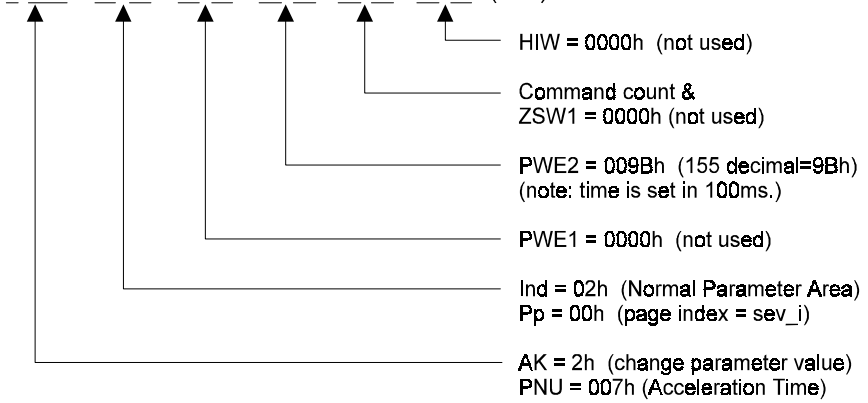
4. Writing to Parameters

Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

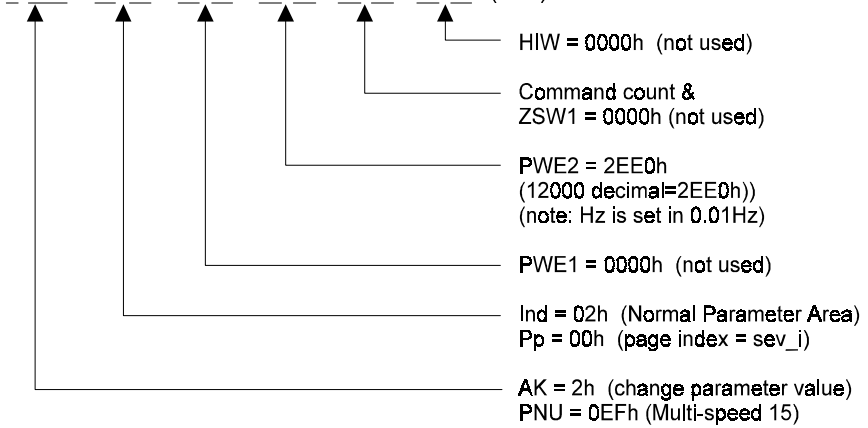
A) Set Acceleration Time (Pr. 7) to 15.5 seconds:

07 20 00 02 00 00 9B 00 00 00 00 00 (Hex) (Byte swap)
2 007 02 00 00 00 00 9B 00 00 00 00 (Hex)

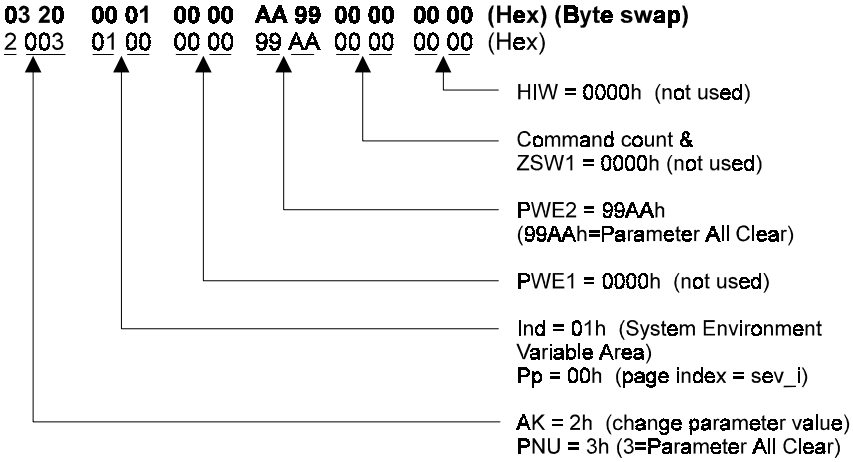


B) Set Multi-speed 15 (Pr. 239) to 120Hz:

EF 20 00 02 00 00 E0 2E 00 00 00 00 (Hex) (Byte swap)
2 0EF 02 00 00 00 2E E0 00 00 00 00 (Hex)



C) Parameter All Clear:



5. Response back from A500(L)

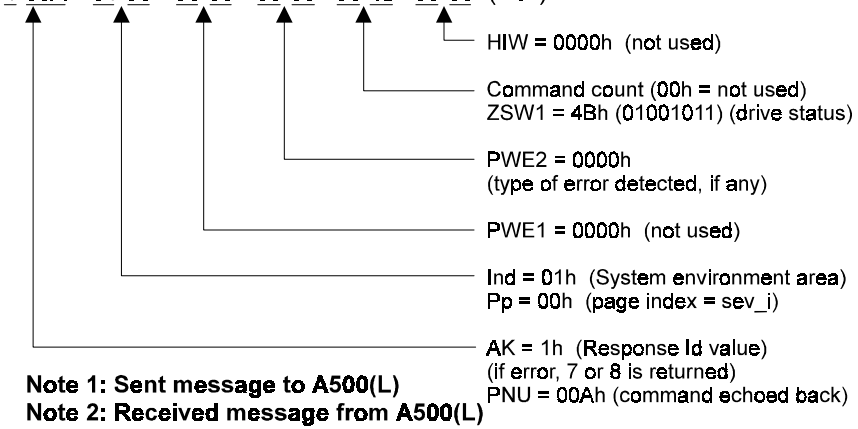
Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

A) Response from a message of STF and RH:

0A 20 00 01 00 00 0A 00 00 00 00 00 (Hex) (Byte swap) Note 1
2 00A 01 00 00 00 00 0A 00 00 00 00 (Hex)

0A 10 00 01 00 00 00 00 4B 00 00 00 (Hex) (Byte swap) Note 2
1 00A 01 00 00 00 00 00 00 4B 00 00 (Hex)



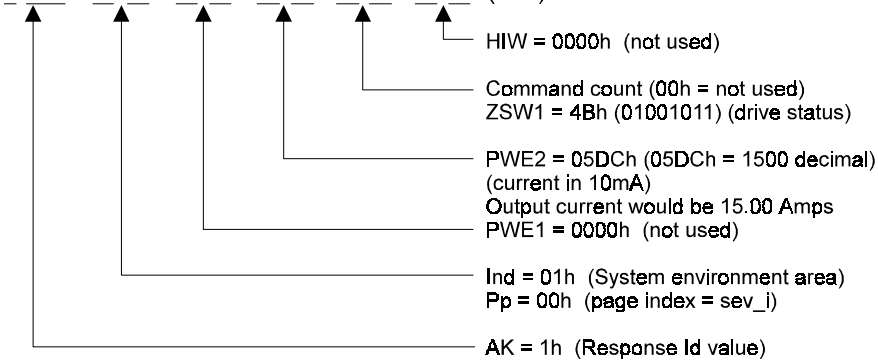
Note 1: Sent message to A500(L)
Note 2: Received message from A500(L)
When A500 is at desired speed.

Bits	Definition
0	1 = running (RUN)
1	1 = forward (FWD)
2	1 = reverse (REV)
3	1 = up to frequency (SU)
4	1 = overload (OL)
5	1 = instantaneous power failure (IPF)
6	1 = frequency detection (FU)
7	1 = alarm (ABC)
8-14	Command count 0-126 dec. (00h-7Fh)

B) Response from a request to read output current:

01 10 00 00 00 00 00 00 00 00 (Hex) (Byte swap) Note 1
1 001 00 00 00 00 00 00 00 00 00 00 (Hex)

01 10 00 00 00 00 DC 05 4B 00 00 00 (Hex) (Byte swap) Note 2
1 001 00 00 00 00 05 DC 00 4B 00 00 (Hex)



Note 1: Sent message to A500(L)
Note 2: Received message from A500(L)

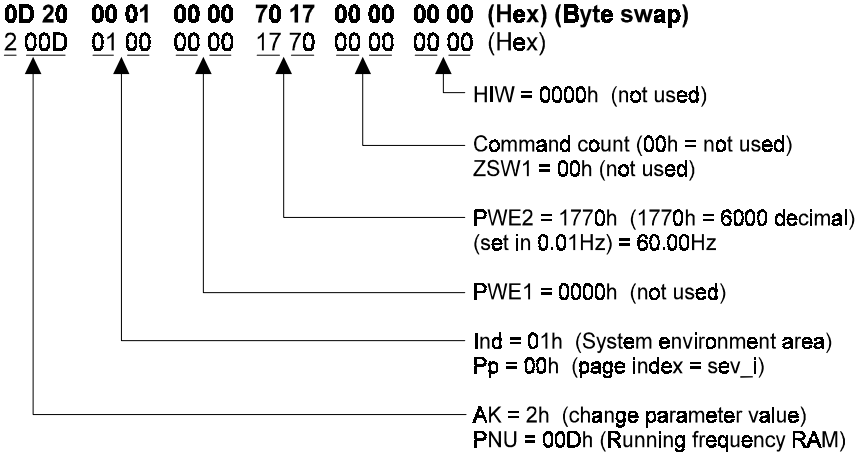
Bits	Definition
0	1 = running (RUN)
1	1 = forward (FWD)
2	1 = reverse (REV)
3	1 = up to frequency (SU)
4	1 = overload (OL)
5	1 = instantaneous power failure (IPF)
6	1 = frequency detection (FU)
7	1 = alarm (ABC)
8-14	Command count 0-126 dec. (00h-7Fh)

6. Using RAM Frequency as running speed

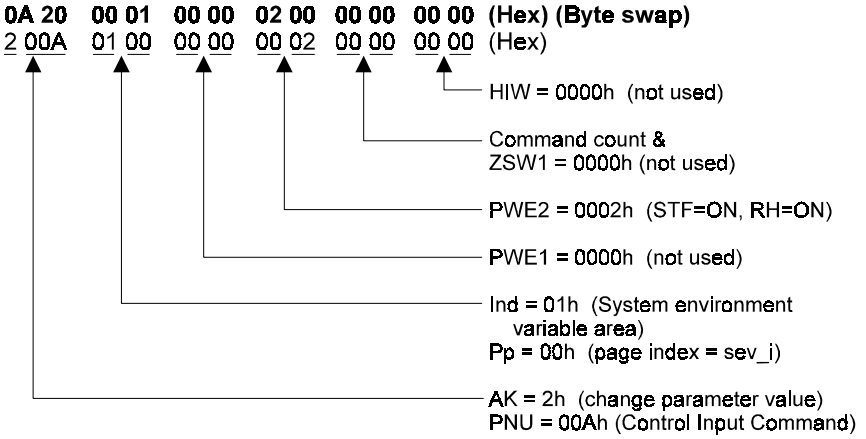
Note: Bold indicates byte swapping code required for ladder logic using AISJ71PB92 module.

Wd#1 Wd#2 Wd#3 Wd#4 Wd#5 Wd#6

A) Setting desired output frequency to 60Hz:



Next, Set A500 to Run Forward (STF):



Not used					MRS	CS	AU	RT	JOG	RL	RM	RH	STR	STF	Not used	Description
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0=off, 1=on
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit #2
0					0			0				2				Hex Code

Appendix C: Network Communication Coordination using the FR-A5NP Profibus DP Option Module.

When a command message is sent to the VFD via the FR-A5NP, the VFD enters a “busy” mode while the command is executed. When a command message is sent while the VFD is in “busy” mode, that command is stored in a queue in the FR-A5NP until the VFD finishes execution of the current command and exits “busy” mode. At that time, the queued command is issued to the VFD.

If however, a second command message is sent before the queued command message is accepted by the VFD, the queued message will be replaced by the succeeding message. In this way, it is possible to “lose” command messages during network communication. Refer to the following diagrams for further clarification.

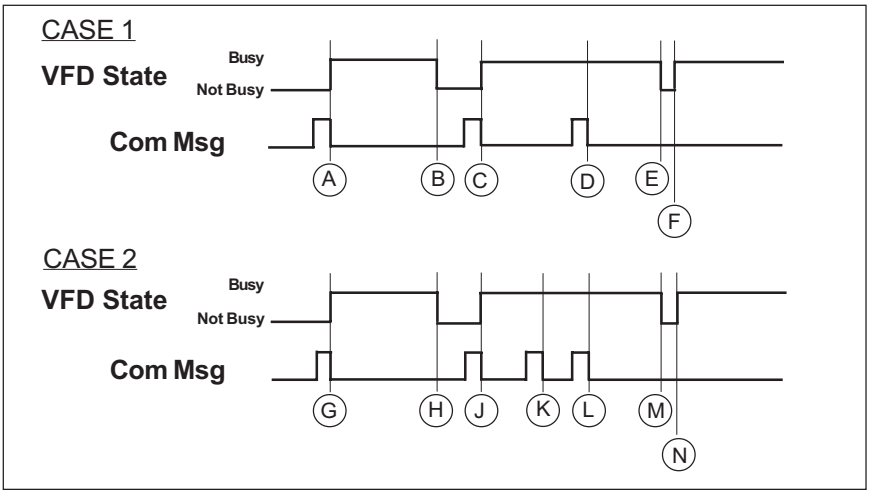


Figure C-1

Legend:

Case 1

A. VFD ready, Command Message 1 received, VFD begins executing Command 1 and enters busy mode.

B. VFD completes execution of Command 1 and exits busy mode.

C. Command Message 2 received, VFD begins executing Command 2 and enters busy mode.

D. VFD in busy mode, Command Message 3 received and buffered by FR-A5NP module.

E. VFD completes execution of Command 2 and exits busy mode.

F. VFD accepts buffered Command 3, begins execution and enters busy mode.

Case 2

G. VFD ready, Command Message 1 received, VFD begins executing Command 1 and enters busy mode.

H. VFD completes execution of Command 1 and exits busy mode.

I. Command Message 2 received, VFD begins executing Command 2 and enters busy mode.

J. VFD in busy mode, Command Message 3 received and buffered by FR-A5NP module.

K. VFD in busy mode, Command Message 4 received and buffered by FR-A5NP module. Command Message 3 is overwritten and, therefore, lost.

L. VFD completes execution of Command 2 and exits busy mode.

M. VFD accepts buffered Command 4, begins execution and enters busy mode.

To avoid losing data in this manner, it is recommended that the user take advantage of the "VFD Ready / Busy" message built into the FR-A5NP Profibus DP option module. Communication coordination is accomplished using a "VFD Busy" signal available via data word number 1, designated "PKE word," as defined in the Profibus-DP network protocol. The user should design the process control such that VFD commands are not sent while this signal indicates that the VFD is in busy mode.

The length of time the VFD remains in "busy" mode is dependent entirely upon the amount of time required to completely execute a given command. This period, therefore, is dependent upon the complexity of the command sent to the VFD.

The VFD's communication state can be determined by reading PKE word. PKE-AK (Profibus-DP Word 1, bits 12-15) will contain status data as described below:

PKE-AK (Word 1, Bits 12-15) VALUE	VFD COMMUNICATION STATE	NOTES
0h	VFD Busy	VFD is executing a previous command and is unable to accept additional commands and/or data.
1h	VFD Ready	VFD is prepared to receive data.
7h	Command Error	VFD received invalid command. May be due to command syntax error or communication handshaking error.

Appendix D: Other Option Specific Parameters

The following tabel lists 3 paraameters, specific to the option, which are used for external or network control of direction or speed references in the VFD.

Parameter Number	Function	Setting Range	Minimum Increment	Default Setting
338	Direction Command Source	0, 1	1	0
339	Speed Command Source	0, 1	1	0
340	Start Up Mode Selection	0, 1	1	0

Parameter		Functions											
338 Dir	339 Speed	STF	STR	STOP	JOG	RT	Freq	RH--RM--RL	AU	RES	MR-S	OH	CS
0	0	P	P	P	-	-	P	-	-	both	E	E	E
0	1	P	P	P	-	-	E	E	E	both	E	E	E
1	0	E	E	E	E	E	P	-	-	both	E	E	E
1	1	E	E	E	E	E	E	E	E	E	E	E	E

NOTE: P = Profibus

E = External

“-” = Control is Niether from Profibus DP or External Mode

both = Control is either from Profibud DP or External Mode

The following table explains the value settings for parameter 340.

Value	Function
0	The VFD goes to EXT mode after power up or Reset
1	The VFD goes to Net mode after power up or Reset
2	The VFD goes to Net mode after power up or Reset, but keeps the previous frequency setting after IPF

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