TOSVERT VF-MB1/S15/AS3

PROFIBUS-DP Option Function Manual

PDP003Z

TOSHIBA INDUSTRIAL PRODUCTS AND SYSTEMS CORPORATION

NOTICE

1. Read this manual before installing or operating. Keep this instruction manual on hand of the end user, and make use of this manual in maintenance and inspection.
2. All information contained in this manual will be changed without notice. Please contact your Toshiba distributor to confirm the latest information.

Contents

1. Introduction

Thank you for purchasing the PROFIBUS-DP option "PDP003Z" for the VF-MB1/S15/AS3. Before using the PROFIBUS-DP option, please familiarize yourself with the product and be sure to thoroughly read the instructions and precautions contained in this manual. This option needs the option adaptor to connect VF-S15 which type form is SBP009Z. Please match here and buy it when SBP009Z is not at hand yet.

In addition, please make sure that this manual and "Installation Manual" is delivered to the customer, and keep this function manual in a safe place for future reference or drive/interface inspection.

This manual describes the supported functions for the "PDP003Z".
In conjunction with this manual, the following manuals are supplied by Toshiba, and they are essential both for ensuring a safe, reliable system installation as well as for realizing the full potential of the "PDP003Z":

- TOSVERT VF-MB1 Instruction Manual E6581697
- TOSVERT VF-S15 Instruction Manual E6581611
- TOSVERT VF-AS3 Instruction Manual ·· E6582062
- TOSVERT VF-MB1/S15/AS3 PROFIBUS option Precautions Manual ········· E6582158

Safety precautions

On the drive and in its instruction manual, important information is contained for preventing injuries to users and damages to assets and for proper use of the device. Read the instruction manual attached to VF-MB1/S15/AS3 along with this instruction manual for completely understanding the safety precautions and adhere to the contents of these manuals.

Explanation of markings

Marking	Meaning of marking
⚠Warning	Indicates that errors in operation may lead to death or serious injury.
⚠Caution	Indicates that errors in operation may lead to injury (*1) to people or that these errors may cause damage to physical property. (*2)

(*1) Such things as injury, burns or shock that will not require hospitalization or long periods of outpatient treatment.
(*2) Physical property damage refers to wide-ranging damage to assets and materials.

Meanings of symbols

Marking	Meaning of marking
🚫	Indicates prohibition (Don't do it). What is prohibited will be described in or near the symbol in either text or picture form.
❗	Indicates something mandatory (must be done). What is mandatory will be described in or near the symbol in either text or picture form.
△	Indicates warning. What is warned will be described in or near the symbol in either text or picture form. Indicates caution. What the caution should be applied to will be described in or near the symbol in either text or picture form.

■ General Operation

⚠**Warning**	
🚫 Disassembly prohibited	▼ Never disassemble, modify or repair. Doing so could result in electric shock, fire and injury. For repairs, call your sales agency.
🚫 Prohibited	▼ Do not attach this option to any drive other than the VF- MB1/S15/AS3. Doing so could result in electric shock or fire. ▼ When the drive is energized, never detach the this option from the VF- MB1/S15/AS3. Doing so could result in electric shock. ▼ Don't place or insert any kind of object into the PDP003Z (electrical wire cuttings, rods, wires). Doing so could result in electric shock or fire. ▼ Do not allow water or any other fluid to come in contact with the PDP003Z. Doing so could result in electric shock or fire.
❗ Mandatory	▼ Turn off the VF- MB1/S15/AS3 when installing and wiring this option. ▼ If the drive begins to emit smoke or an unusual odor, or unusual sounds, immediately turn power off. If the equipment is continued in operation in such a state, the result may be fire. Call your local sales agency for repairs.

■ Transportation & installation

⚠**Warning**	
🚫 Prohibited	▼ Do not operate the drive if it is damaged or any component is missing. Doing so could result in electric shock or fire. Call your local sales agency for repairs. ▼ Do not place any inflammable substances near the VF- MB1/S15/AS3 drive. If an accident occurs in which flame is emitted, this could lead to fire. ▼ Do not install in any location where the drive could come into contact with water or other fluids. Doing so could result in electric shock or fire. ▼ When installing this option, be careful not to touch the leads from parts on the reverse side of its circuit board. Doing so could result in injury.
❗ Mandatory	▼ Operate under the environmental conditions prescribed in the instruction manual. Operations under any other conditions may result in malfunction.

■ Wiring

<table>
<tr><td colspan="2" align="center">⚠**Warning**</td></tr>
<tr><td rowspan="2" align="center">🚫
Mandatory</td><td>▼ Shut off power when installing and wiring this option.
Wait at least 15 minutes and check to make sure that the charge lamp (VF-MB1/S15/AS3) is no longer lit.</td></tr>
<tr><td>▼ Electrical construction work must be done by a qualified expert.
Installation or connection of input power by someone who does not have that expert knowledge may result in fire or electric shock.</td></tr>
</table>

■ Operations

<table>
<tr><td colspan="2" align="center">⚠**Warning**</td></tr>
<tr><td rowspan="2" align="center">🚫
Prohibited</td><td>▼ Do not touch switches when the hands are wet and do not try to clean the drive with a damp cloth.
Doing so could result in electric shock.</td></tr>
<tr><td>▼ Do not pull on any cable itself.
Doing so could result in damage or malfunction.</td></tr>
</table>

■ Cautions for the communication

<table>
<tr><td colspan="2" align="center">⚠**Warning**</td></tr>
<tr><td align="center">🚫
Prohibited</td><td>▼ Do not set the value that exceeds an effective range as data.
The motor may suddenly restart or stop and that could result in injury.</td></tr>
<tr><td align="center">🚫
Mandatory</td><td>▼ Check PROFIBUS state (using below status word bit) when the option unit is deactivated by an unusual event such as an operating error, power outage, failure, etc.
   - ZSW Status Word Bit 3 (Fault), Bt 7 (Warning)
    (The communication error occurs when "1" as value or this value cannot be read.)
Deactivated option unit may cause an accident, if the PROFIBUS state is not checked.
▼ Make sure that the operation signals are STOP before clearing the drive's fault.
The motor may suddenly start and that may result in injuries.</td></tr>
</table>

■ Disposal

<table>
<tr><td colspan="2" align="center">⚠ **Caution**</td></tr>
<tr><td align="center">🚫
Mandatory</td><td>▼ For safety's sake, do not dispose of the disused drive yourself but ask an industrial waste disposal agent (*).
If the collection, transport and disposal of industrial waste are done by someone who is not licensed for that job, it is a punishable violation of the law. (Laws in regard to cleaning and processing of waste materials)
(*) Persons who specialize in the processing of waste and known as "industrial waste product collectors and transporters" or "industrial waste disposal persons."</td></tr>
</table>

■ Cautions for parameters

	⚠ **Warning**
🚫 Prohibited	▼ Do not use application of writing into same parameter more than 100,000 times. The Life of EEPROM is approximately 100,000 times. Frequent writing to the EEPROM of inverter will cause a memory corruption.

Notes on use

	Notes
	▼ Do not install the drive where the temperature or the humidity will change rapidly.
	▼ Keep a distance of 20cm or more between the drive 's power cable and the data transmission cable. Or the drive might malfunction because of noise.
	▼ Insert a magnetic contactor or similar device between the drive and the power supply to ensure that power is turned off if an emergency stop command is entered through the network.

1. Product version

It shows the differences by product version below.

TYPE-FORM	Suffix	Applicable model	Ident number	Manufacturer-ID
PDP003Z	"-2	VF-MB1	0x0C24	0x0190
		VF-S15		
		VF-MB1		
		VF-S15		
		VF-AS3	0x0F88	

Suffix can be checked by the labels on the product and the package.

Product label
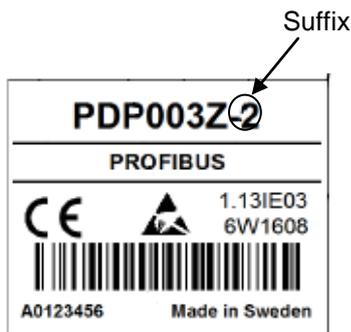
Package label
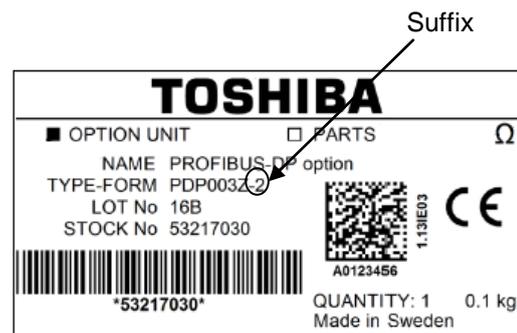
The following GSD files can be used for this PROFIBUS option.

VF-MB1 VF-S15	TSIC0C24.gsd
VF-AS3	TSIC0F88.gsd

2. Overview

This product is PROFIBUS communication module that can be used in a PROFIBUS network.

2.1. **Specification**

Module specifications

Item	Specification
Type-form	PDP003Z
Applicable inverter	VF-MB1 VF-S15 with SBP009Z VF-AS3
Connector	9 pin D-sub
Supported network	PROFIBUS V0, V1
Indicator	2 LEDs indicating the Status and the Data exchange.
Protection degree	IP20
Environments	Correspond to inverter.

Network specifications

Item		Specification
PROFIBUS	Baud rate	12Mbit/s, 6Mbit/s, 3Mbit/s, 1.5Mbit/s, 500kbit/s, 187.5kbit/s, 93.75kbit/s, 19.2kbit/s, 9.6 kbit/s, 45.45 kbit/s (Only for the VF-AS3)
	Cyclic communication	PROFIdrive V.4.1 (Telegram1)
		4PKW and 2 PZD vendor format (Telegram100)
		4PKW and 6 PZD vendor format (Telegram101)
		6 PZD vendor format (Telegram102)
	Acyclic communication	Reading the PROFIdrive parameter
		Reading/writing the inverter parameters
	Configuration	Configured by PROFIBUS master
	I&M	I&M function 0
	Response time	*Cyclic communication About 10ms

*Response time is the time until the inverter is operated by RUN command on the cyclic communication

3. Connection Information

This option allows the VF-MB1/S15/AS3 drive to be communicated with the cyclic command transmission and monitoring of the original profile ("Vendor spec.", refer to Section 7) of our company other than application profile "Profile for Variable Speed Drives PROFIdrive (3.072), refer to Section 6" which PROFIBUS defines.

When you use VF-MB1, the shielding is connected to the drive ground. When you use VF-S15, the shielding is connected to the grounding terminal of option adapter.

3.1. Exterior features

Status LED indicator
(Refer to Section 3.2)

Release Tab

PROFIBUS connector
(D-Sub 9pin)
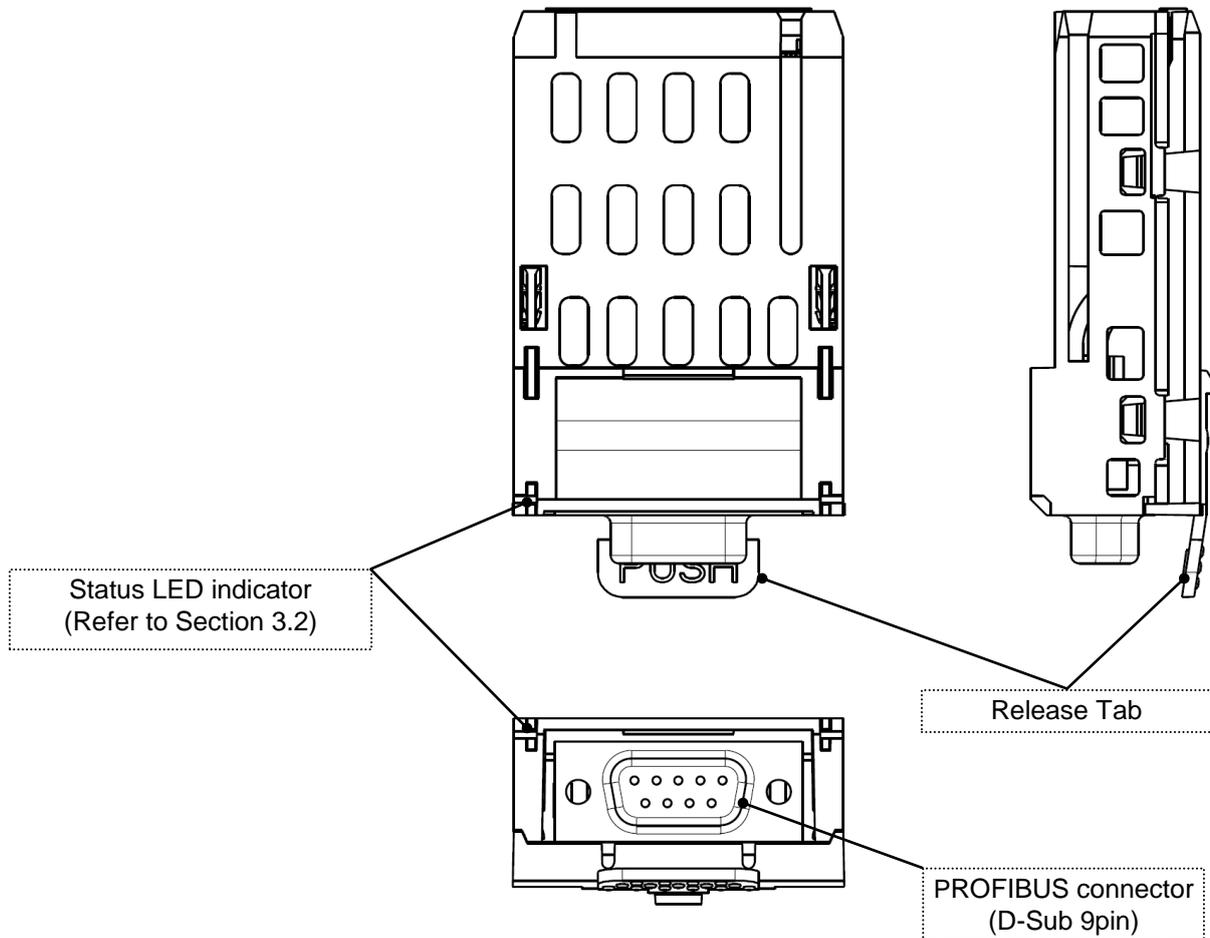
To align VF-MB1/S15/AS3 side-by-side horizontally, "Vertical" type PROFIBUS connector is necessary.
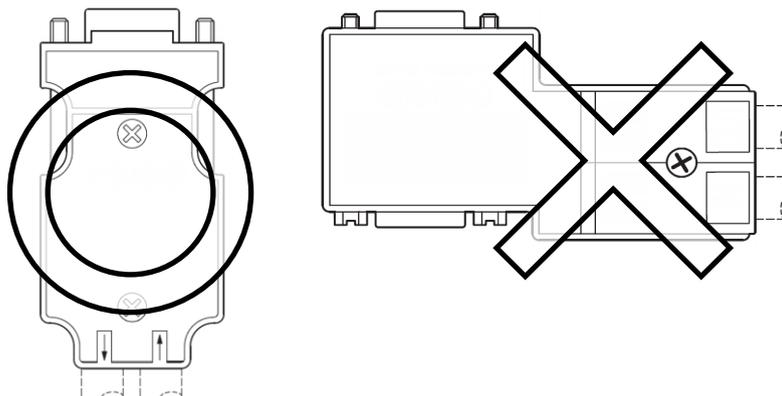
3.2. **Status indicator**

3.2.1. On the option

The PDP003Z has two LEDs, ST (Status) and DX (Data exchange) to indicate the statuses of PROFIBUS-DP and the PDP003Z itself.

ST (Status)

DX (Data exchange)
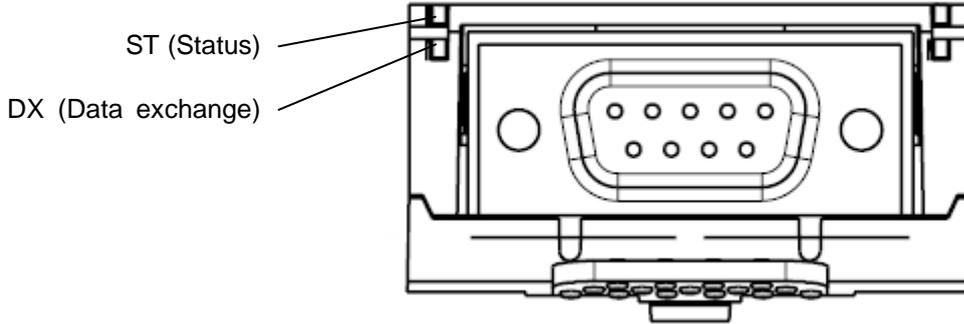
ST (Status): Red LED

LED	Meanings
Off	No diagnostics present

Flashes	8 Hz (Blinking 4 times/1sec.):
	  Waiting for parameterization or configuration
	2 Hz (Blinking 1 times/1sec.):
	  PDP003Z station address is "126".
	  (Refer to 5 section.)

Lights	DP status error * For example, a station address is not set correctly.

DX (Data exchange): Green LED.
The status of the PROFIBUS network is indicated.
It lights when the PDP003Z is on-line and data exchange is possible.

3.2.2. On the inverter

When PROFIBUS option is used, please attach the LED label for PROFIBUS option to lower side of communication indicator of VF-AS3.

ST (Status) is displayed to the NET2-LED together on communication indicator.
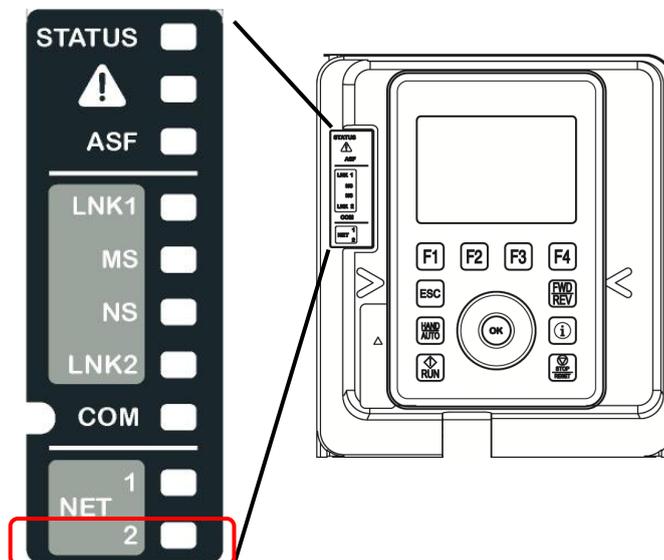
4. Hardware Setup

When using this product with VF-S15, sold separately VF-S15 option adapter (SBP009Z) is required.

4.1. **Mounting and removing**

⚠️ **Warning**	
! Mandatory action	▼ The mounting/removing of option must be performed without supplying power (Turn off all input power, wait at least 15 minutes, confirm that the charge lamp of inverter is no longer lit). The inverter and option can become damaged. ▼ Do not use tool for the mounting/removing of option. The inverter and option can become damaged.

4.1.1.   Mounting and removing of option for VF-MB1

Way for mount and remove the option, refer to [Optional external devices] of E6581697.

4.1.2.   Mounting and removing of option for VF-S15

Way for mount and remove the option, refer to [Optional external devices] of E6581611.

4.1.3.   Mounting and removing of option for VF-AS3

Way for mount and remove the option, refer to [Mounting/removing insert type options] of E6582062.

5. VF-MB1/S15/AS3 Communication parameters

In a network, VF-MB1/S15/AS3 (PDP003Z) serves as a PROFIBUS slave device.
PDP003Z configuration is set by the following parameters.

Parameter	Function	Adjustment range	Default setting
C150	PDP003Z Station address	2 to 126 The station address "126" cannot exchange data.	126
C151	PDP003Z Baud rate Monitor	0: 12 Mbit/s 1: 6 Mbit/s 2: 3 Mbit/s 3: 1.5 Mbit/s 4: 500 kbit/s 5: 187.5 kbit/s 6: 93.75 kbit/s 7: 19.2 kbit/s 8: 9.6 kbit/s 9: 45.45 kbit/s (Only for the VF-AS3)	-
C152	PDP003Z Profile Monitor	0 : Telegram 1 (PROFIdrive) 1 : Telegram 100 (Vender Spec. 1) 2 : Telegram 101 (Vender Spec. 2) 3 : Telegram 102 (Vender Spec. 3)	-
C154	JOG1 Frequency (STW.8)	0.0 to 20.0Hz	5.0Hz
C155	JOG2 Frequency (STW.9)	0.0 to 20.0Hz	5.0Hz
C156	Tmax (ZSW.8)	0.1 to 60.0s	10.0s
C157	Tolerance (ZSW.8)	0.1 to 99.0%	50.0%
C100	Communication error detection delay time	0.0 to 100.0 sec	0.0
C101	Drive operation at the communications loss action (Network wire breaks)	0: Stop and Communication release * (follows *CMOd* and *FMOd* setting) 1: None 2: Deceleration stop 3: Coast stop 4: Emergency stop 5: Preset speed operation command (Operating at the preset speed operation frequency set with *C102*)	4
C102	Preset speed operation selection	0: None 1 to 15: Preset speed (*Sr1 - Sr7, F287 - F295*)	0
C103 **	Communication time-out condition selection	0: Disconnection detection 1: When communication mode enable (Both *CMOd* and *FMOd* are set CANopen or COM option) 2: 1+Driving operation	1
F899	Network option reset setting	0: None 1: Resetting the PDP003Z and the drive	0
Fd67	PDP003Z version	PDP003Z firmware version (ex. 0x1101 means "V1.01")	–

* Do not set at VF-MB1 **V1.00**.

** It is necessary to enable "Watchdog" function with the configurator.

*** When the parameters are changed or to reset *Err8*, the power must be cycled (or set *F899* to 1). After reset, the parameter changes become effective.
Set *1* to *F899* by the PROFIBUS communication might not be able to be set.

**** When *FMOd* or *CMOd* is set to "Communication option", VF-MB1/S15/AS3 drives without Net Reference (STW Bit 13) or Net Control (STW Bit 12) at PROFIdrive.

⚠ Caution Please note that drive keeps driving when the communication is lost if *1* (None) is set to the parameter *C101* (Drive operation at the communications loss action).

6. PROFIdrive Profile

Transmission frame of each Telegram of this product is configured as shown below.

PKW: Parameter ID/value

PZD: Process Data, cyclically transferred

PKW				PZD					
PKW1	PKW2	PKW3	PKW4	Cyclic data1	Cyclic data2	Cyclic data3	Cyclic data4	Cyclic data5	Cyclic data6

Telegram 1

				Cyclic data1	Cyclic data2				

Telegram 100

PKW1	PKW2	PKW3	PKW4	Cyclic data1	Cyclic data2				

Telegram 101

PKW1	PKW2	PKW3	PKW4	Cyclic data1	Cyclic data2	Cyclic data3	Cyclic data4	Cyclic data5	Cyclic data6

Telegram 102

				Cyclic data1	Cyclic data2	Cyclic data3	Cyclic data4	Cyclic data5	Cyclic data6

Telegram 102: Vendor Spec. (PPO TYPE 4, 6 ZD)

Telegram 101: Vendor Spec. (PPO TYPE 2, 4PKW / 6PZD)

Telegram 100: Vendor Spec. (PPO TYPE 1, 4PKW / 2PZD)

Telegram 1: PROFIdrive (PPO TYPE 3, 2PZD)

6.1. **Telegram 1: PROFIdrive**

PROFIdrive standard

This telegram complies with PROFIdrive standard

	PLC → INV	INV → PLC
Cyclic data 1	STW	ZSW
Cyclic data 2	HSW	HIW

INV: Inverter

STW: Control word

HSW: Main setpoint

ZSW: Status word

HIW: Main actual value

Notes

▼ When you use this telegram, the value is written to the RAM.

6.2. **STW Control Word Data**

PDP003Z supports only speed control mode.

Bit	Value	Name	Note
0	1	ON	"Switched on" condition
	0	OFF	Normal stop.
1	1	No Coast Stop	All "Coast Stop (OFF2)" commands are withdrawn
	0	Coast Stop (OFF 2)	Coast stop.
2	1	No Quick Stop	All "Quick Stop (OFF3)" commands are withdrawn.
	0	Quick Stop (OFF 3)	Quick Stop
3	1	Enable Operation	The drive then runs-up to the setpoint.
	0	Disable Operation	Normal stop.
4***	1	Enable Ramp Generator	-
	0	Reset Ramp Generator	Output of the RFG is set to 0.
5***	1	Unfreeze Ramp Generator	-
	0	Freeze Ramp Generator	Freeze the actual setpoint entered by the RFG *.
6	1	Enable Setpoint	The value selected at the input of the RFG is switched-in.
	0	Disable Setpoint	The value selected at the input of the RFG is set to 0.
7	1	Fault Acknowledge	Fault reset (0 -> 1)
	0	No meaning	-
8	1	JOG 1 ON **	VF-MB1/S15/AS3 drives with JOG 1 speed 1 ($C\ 154$).
	0	JOG 1 OFF	Jogging stop, if "JOG 1" was previously ON. Stop drive according to VF-MB1/S15/AS3 setting parameter.
9	1	JOG 2 ON **	VF-MB1/S15/AS3 drives with JOG 2 speed 2 ($C\ 155$).
	0	JOG 2 OFF	Jogging stop, if "JOG 2" was previously ON. Stop drive according to VF-MB1/S15/AS3 setting parameter.
10	1	Control By PLC	Activate control by STW.
	0	No Control By PLC	Inactivate control by STW.
11	---	Device-specification	(Reserved.)
12****	1	Net Control	PDP003Z control is enabled.
	0	Local Control	PDP003Z control is disabled.
13****	1	Net Reference	PDP003Z reference is enabled.
	0	Local Reference	PDP003Z reference is disabled.
14	---	Device-specification	(Reserved.)
15	---	Device-specification	(Reserved.)

*   RFG: Ramp Function Generator
**   Operation is enabled, drive is in standstill and STW1 bit 4, 5, 6 = 0.

<u><Notes when replacing inverter from the VF-AS1 to the VF-AS3></u>
***   In order to enable the state of the 'RFG: ENABLE', bit4 and bit5 of STW1 should be set to '1'.
****   If the bit10 of STW1 is used for enabling the PROFIBUS command and reference in the VF-AS1, bit12 and bit13 of STW1 should be also set to '1'.

ZSW Status Word Data

Bit	Value	Name	Note
0	1	Ready To Switch-on	Power supply is switched on
	0	Not Ready To Switch-on	-
1	1	Ready To Operate	Refer to control word, bit 1.
	0	Not Ready To Operate	-
2	1	Operation Enabled	Drive follows setpoint. (Refer to control word 1, bit 3)
	0	Operation Disabled	-
3	1	Fault Present	VF-MB1/S15/AS3 tripped.
	0	No Fault	VF-MB1/S15/AS3 is not tripped.
4	1	Coast Stop Not Activated	-
	0	Coast Stop Activated (OFF 2)	"Coast Stop (OFF 2)" command is present.
5	1	Quick Stop Not Activated	-
	0	Quick Stop Activated (OFF 3)	"Quick Stop (OFF 3)" command is present
6	1	Switching On Inhibited	Control word bit1 or 2 is set to 0 or fault trip has been acknowledged.
	0	Switching On Not Inhibited	-
7	1	Warning Present	Drive still operational: Alarm in service parameter: No acknowledgement.
	0	No Warning	Alarm not present or alarm has disappeared again
8	1	Speed Error Within Tolerance Range	Refer to section 6.2.1.
	0	Speed Error Out Of Tolerance Range	
9	1	Control Requested	VF-MB1/S15/AS3 is controlled by PROFIBUS master.
	0	No Control Requested	VF-MB1/S15/AS3 is controlled by another interface.
10	1	f Or n Reached Or Exceeded	Actual value ≥ Comparison value (setpoint)
	0	f Or n Not Reached	-
11	----	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** FP terminal monitor	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** FP output terminal monitor
12	----	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** FL terminal monitor	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** FL output terminal monitor
13	----	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** R1 terminal monitor	**(VF-MB1/S15)** Factory specific bit **(VF-AS3)** R1 output terminal monitor
14	----	**(VF-MB1/S15)** (Reserved) **(VF-AS3)** R2 terminal monitor	**(VF-MB1/S15)** (Reserved) **(VF-AS3)** R2 output terminal monitor
15	----	**(VF-MB1/S15)** (Reserved) **(VF-AS3)** DQ11 terminal monitor	**(VF-MB1/S15)** (Reserved) **(VF-AS3)** DQ11 output terminal monitor

Note: The bit described "(Reserved) and "Factory specific bit" are unstable. Don't use the bit for the judgment.

6.2.1. Tolerance Range (ZSW Bit 8)

If the setpoint is changed:
1. ZSW Bit 8 is set 0
2. Calculate the tolerance.
3. Start the timer which will time-out based on parameter Tmax.

PDP003Z checks that the timer (Tmax) has not timed-out and if the actual value is within the tolerance. If both conditions are fulfilled ZSW Bit 8 is set 1 and the timer is stopped.

The figure shows ZSW 8 when Tolerance ($F15.7$) is 50% and Tmax ($F15.1$) is 3s.
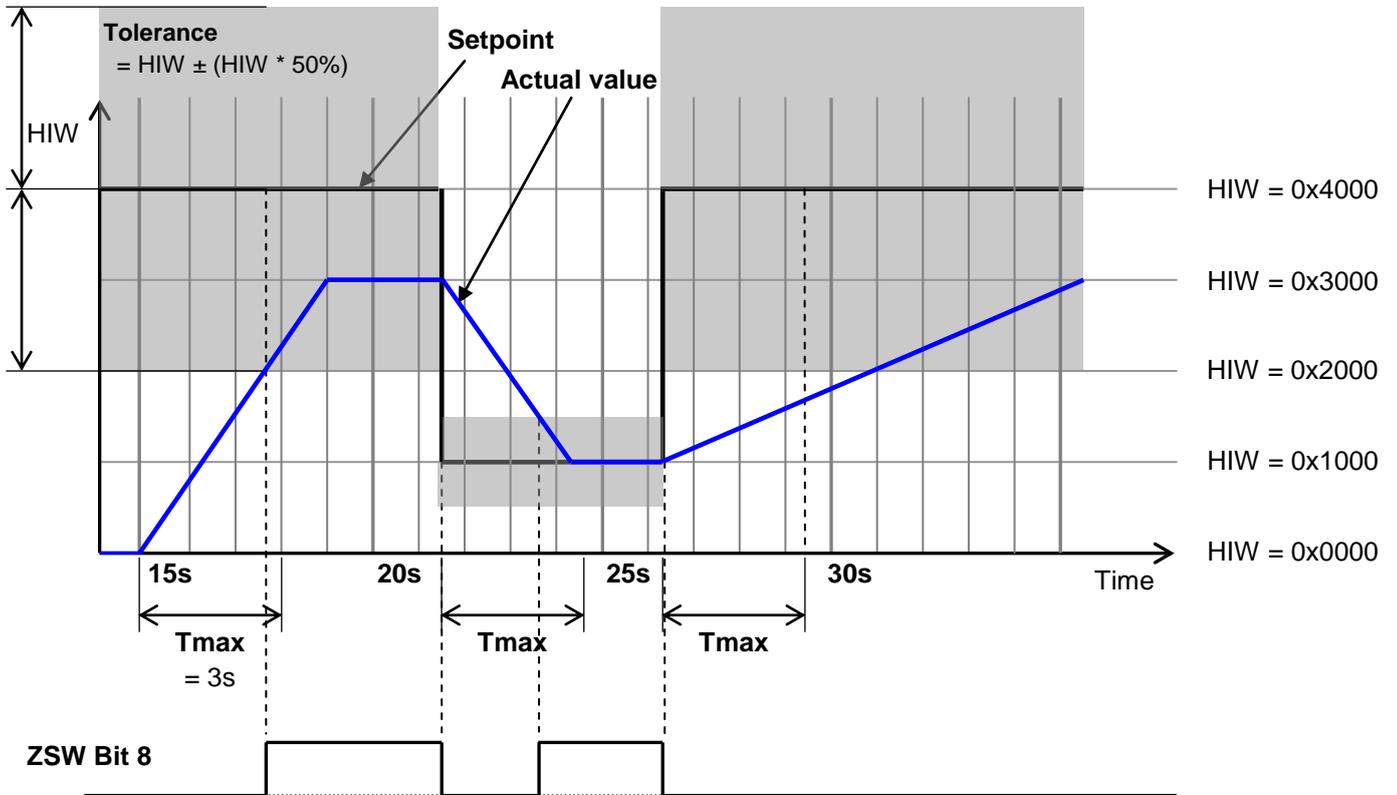
Note: The status of this bit is NOT defined when immediately after the power is turned ON.

6.3. State Machine

STW: Control Word
ZSW: Status Word

☐ : State

— : Condition
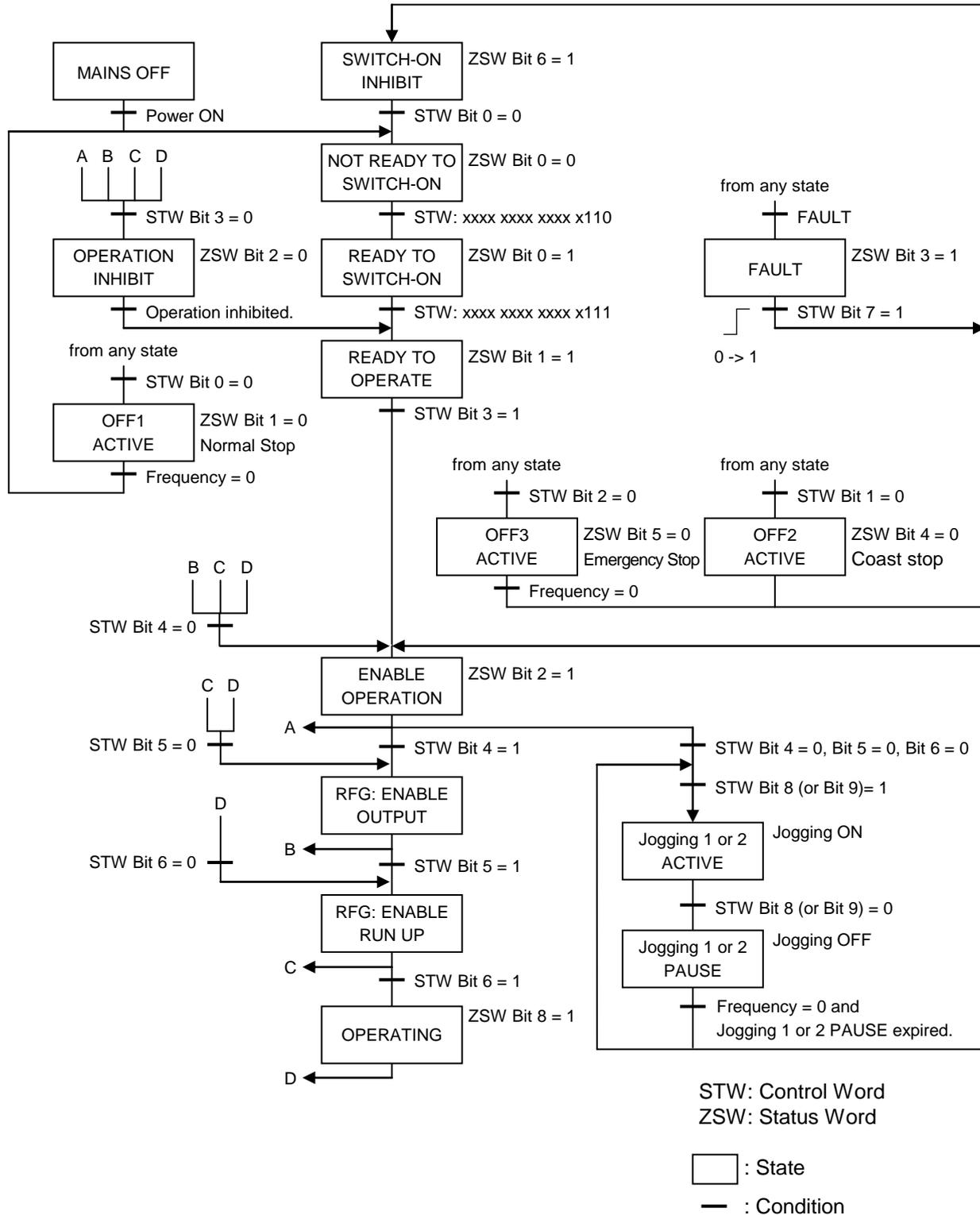
<table>
<tr><td colspan="2">Notes</td></tr>
<tr><td></td><td>▼ STW Bit 10, 12 = 1 or CПOd = 4 is needed for above control.
▼ I If CПOd is set to Local (0, 1, 2 or 3), set 1 to STW Bit10 and 12 first after turning on the power supply of VF-MB1/S15/AS3.
▼ Check ZSW always and take care to give the command to STW.</td></tr>
</table>

6.3.1. Examples of driving by the State Machine

When using the PROFIdrive profile, the frequency reference is set to HSW. The setting value "0x0000" - "0x4000" is equivalent to "0" - "Base frequency (parameter FH)".
In order to the reverse operation, the frequency reference is set with two's complement of the forward frequency reference. During running, HIW shows an output frequency.
* $FMOd$ or $CMOd$ is set to "Communication option" on these examples.

6.3.1.1. Example 1. 60Hz Forward running and Deceleration stop

Set "0x4000" to HSW and the following is set to STW in order.

① 0000 0100 0000 0110 (= 0x0406)
↓
"READY TO SWITCH-ON"
↓
② 0000 0100 0000 0111 (= 0x0407)
↓
"READY TO OPERATE"
↓
③ 0000 0100 0111 1111 (= 0x047F)
↓
"OPERATION"
↓
④ 0000 0100 0111 1110 (= 0x047E)
↓
"OFF1 ACTIVE (Normal Stop)"
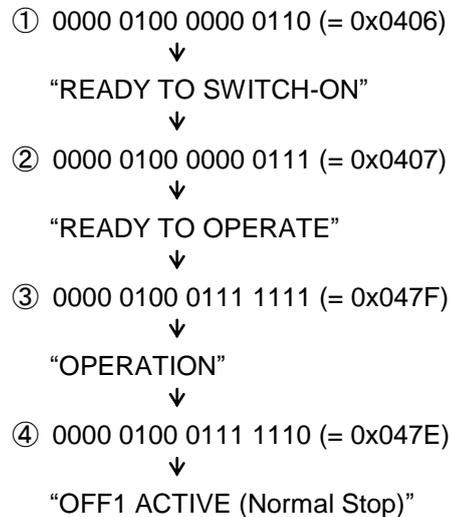
6.3.1.2. Example 2. 30Hz Reverse running

In order to the reverse operation, "0xE000" is set to HSW. "0xE000" is two's complement of the "0x2000" as the forward frequency reference 30Hz.
The Setup to STW is same as the Example 1.

6.3.1.3. Example 3. Inching and pause

The following is set to STW in order.

① 0000 0100 0000 0110 (= 0x0406)
↓
"READY TO SWITCH-ON"
↓
② 0000 0100 0000 0111 (= 0x0407)
↓
"READY TO OPERATE"
↓
③ 0000 0101 0000 1111 (= 0x050F)
↓
"Jogging 1 ACTIVE"
↓
④ 0000 0100 0100 1111 (= 0x040F)
↓
"Jogging 1 PAUSE"
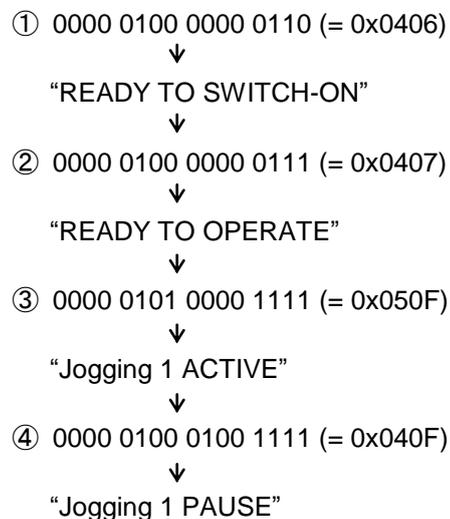
* The inching frequency is according to the parameter $C154$, $C155$ on VF-MB1/S15/AS3.

6.4. **Access to the PROFIBUS parameter**

In the cyclic PROFIBUS-DP communication, the parameter data is transferred via Telegram 100, 101. If the requirement is not executed, the cause is distinguished by octet 7 and 8.

PKW (Parameter ID/value)			PZD Process data (cyclically)	
PKE	IND	PWE	PZD1 STW ZSW	PZD2 HSW HIW

Octet 1   Octet 2   Octet 3   Octet 4   Octet 5   Octet 6   Octet 7   Octet 8

PKE (Parameter ID)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

AK
(Task ID/Response ID)

SPM

PNU
(Parameter number)
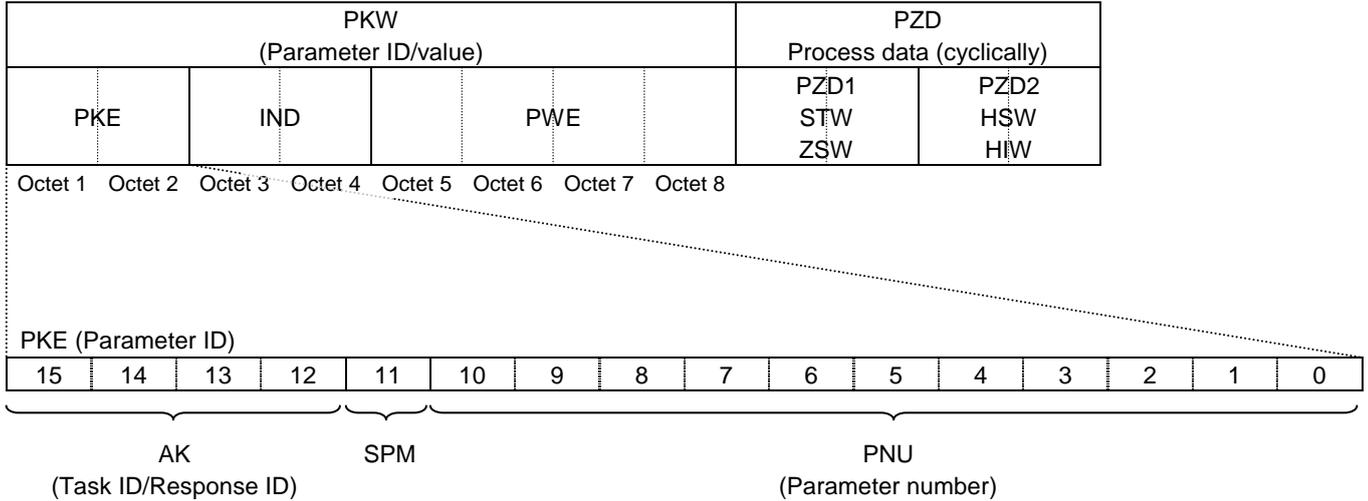
AK (Request from Master to PDP003Z）

Request ID	Function	Note
0	No task	
1	Request parameter value	for PNU access
2	Change parameter value (word)	for PNU access
6	Request parameter value (array)	for PNU access, VF-MB1/S15/AS3 parameter access
7	Change parameter value (array)	for PNU access, VF-MB1/S15/AS3 parameter access

AK (Response from PDP003Z to Master)

Response ID	Function
0	No response
1	Transfer parameter value (word)
4	Transfer parameter value (array)

7	Task cannot be executed, followed by error number
	   0 = Illegal parameter number
	   1 = Parameter value cannot be changed
	   2 = Lower or upper limit violated
	   3 = Erroneous sub index
	  11 = No parameter change rights
	  17 = Task cannot be executed due to operating status
	     (e.g. parameter is currently read-only)
	  18 = Other error
	 102 = Request not supported

SPM: always 0.

6.5. **PROFIBUS parameter (PNU)**

PNU	R/W	data type	Note
915	R	Array [6] Unsigned16	PNU 915, IND 0 = the drive parameter $\mathit{C001}$ PNU 915, IND 1 = the drive parameter $\mathit{C002}$ PNU 915, IND 2 = the drive parameter $\mathit{C003}$ PNU 915, IND 3 = the drive parameter $\mathit{C004}$ PNU 915, IND 4 = the drive parameter $\mathit{C005}$ PNU 915, IND 5 = the drive parameter $\mathit{C006}$
916	R	Array [6] Unsigned16	PNU 916, IND 0 = the drive parameter $\mathit{C021}$ PNU 916, IND 1 = the drive parameter $\mathit{C022}$ PNU 916, IND 2 = the drive parameter $\mathit{C023}$ PNU 916, IND 3 = the drive parameter $\mathit{C024}$ PNU 916, IND 4 = the drive parameter $\mathit{C025}$ PNU 916, IND 5 = the drive parameter $\mathit{C026}$
918	R	Unsigned16	Station address monitor (same as the drive parameter $\mathit{C150}$).
922	R	Unsigned16	Telegram selection 1, 100, 101, 102
927	R/W	Unsigned16	Operator control rights (parameter identification, PKW). Value: Mode 0: Parameters cannot be written, only read (927 can be written). 1: Parameters can be written and read (default).
928	R	Unsigned16	Control rights (process data, PZD). 1: PZD part is enabled.
930	R	Unsigned16	Operating mode 1：supports the speed control mode and the speed setpoint channel comprises RFG functionality.
939	R/W	Unsigned16	**(VF-MB1/S15)** Factory specific PNU **(VF-AS3)** FP output terminal selection (same as $\mathit{F130}$). Monitor is enabled using Status word bit 11.
940	R/W	Unsigned16	**(VF-MB1/S15)** Factory specific PNU **(VF-AS3)** FL relay output terminal selection (same as $\mathit{F132}$). Monitor is enabled using Status word bit 12.
941	R/W	Unsigned16	**(VF-MB1/S15)** Factory specific PNU **(VF-AS3)** R1 relay output terminal selection (same as $\mathit{F133}$) Monitor is enabled using Status word bit 13.
942	R/W	Unsigned16	**(VF-MB1/S15)** No function **(VF-AS3)** R2 relay output terminal selection (same as $\mathit{F134}$) Monitor is enabled using Status word bit 14.
943	R/W	Unsigned16	**(VF-MB1/S15)** No function **(VF-AS3)** DQ11 output terminal selection (same as $\mathit{F159}$) Monitor is enabled using Status word bit 15.
944	R	Unsigned16	Fault message counter
947	R	Array [1] Unsigned16	Fault number
963	R	Unsigned16	Detected baud rate: 0 = 9.6 kbit/s 1 = 19.2 kbit/s 2 = 93.75 kbit/s 3 = 187.5 kbit/s 4 = 500 kbit/s

			6 = 1.5 Mbit/s
			7 = 3 Mbit/s
			8 = 6 Mbit/s
			9 = 12 Mbit/s
			11= 45.45 kbit/s (Only for the VF-AS3)

964	R	Array [5]
		Unsigned16
			Drive Unit identification
			(VF-MB1/S15)
			  IND 0 = PDP003Z ID (0x0C24)
			(VF-AS3)
			  IND 0 = PDP003Z ID (0x0F88)
			
			  IND 1 = Manufacturer-ID (0x0190)
			  IND 2 = VF-MB1/S15/AS3 CPU1 version
			  IND 3 = VF-MB1/S15/AS3 firmware release year (yyyy)
			  IND 4 = VF-MB1/S15/AS3 firmware release date (ddmm)

965	R	Octet String2	Profile number of the PDP003Z (Profidrive, V4.1)
967	R	Unsigned16	**(VF-MB1/S15)** Factory specific PNU **(VF-AS3)** Control word
968	R	Unsigned16	**(VF-MB1/S15)** Factory specific PNU **(VF-AS3)** Status word

6.5.1. Examples of reading the PROFIdrive parameter

6.5.1.1. Example 1. Reading the PNU 922 (Telegram)

AK = 1 (Request parameter value)
SPM = 0
PNU = 922 (0x039A)

PKE

0	0	0	1	0	0	1	1	1	0	0	1	1	0	1	0
1				3				9				A			

Requirement

PKW								PZD	
PKE	IND		PWE						
13	**9A**	00	00	00	00	00	00	· · ·	· · ·

Response (Value: 0x0065 = 101)

13	**9A**	00	00	00	00	00	65	· · ·	· · ·
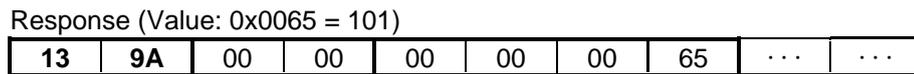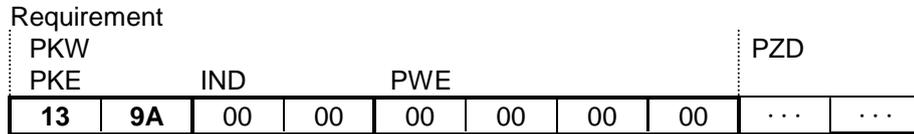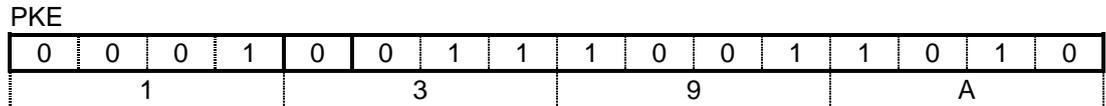
6.5.1.2. Example 2. Reading the PNU 964, IND 0

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 964 (0x03C4)
IND = 0 (PDP003Z ID)

PKE

0	1	1	0	0	0	1	1	1	1	0	0	0	1	0	0
6				3				C				4			

Requirement

PKW								PZD	
PKE	IND		PWE						
63	**C4**	**00**	**00**	00	00	00	00	· · ·	· · ·

Response (Value: 0x0C24 = PDP003Z ID)

43	**C4**	**00**	**00**	00	00	**0C**	**24**	· · ·	· · ·
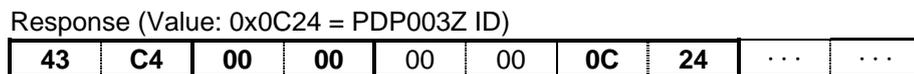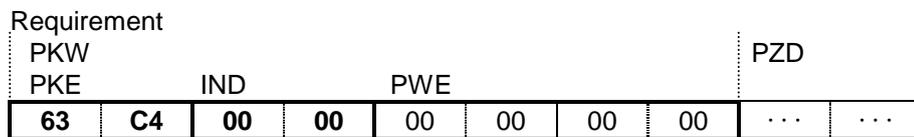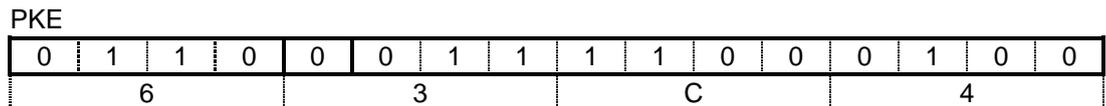
6.6. Access to VF-MB1/S15/AS3 parameter

When access to VF-MB1/S15/AS3 parameter, set "1" to the PNU. The communication number of the drive parameter is set to the sub-index IND.
Refer to the drive instruction manual about the communication number and unit.
* This procedure changes the value of VF-MB1/S15/AS3 EEPROM.

Notes

▼ When you use this method for parameter writing, the value is written to the EEPROM.

6.6.1. Examples of reading or changing VF-MB1/S15/AS3 parameter

---

6.6.1.1. Example 1. Reading the basic parameter (C∩Ūd (command mode selection))

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 1
IND = 0x0003 (C∩Ūd communication number)
PKE

0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	6				0				0				1		

Requirement

PKW								PZD	
PKE		IND		PWE					
60	**01**	**00**	**03**	00	00	00	00	· · ·	· · ·

Response (Value: 0x0001 = Operation panel))

40	**01**	**00**	**03**	00	00	**00**	**01**	· · ·	· · ·

6.6.1.2. Example 2. Reading the extended parameter (F2¡9 (VIC(MB1,S15) / II(AS3) input point 2 frequency))

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 1
IND = 0x0219 (F2¡9 communication number)
PKE

0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	6				0				0				1		

Requirement

PKW								PZD	
PKE		IND		PWE					
60	**01**	**02**	**19**	00	00	00	00	· · ·	· · ·

Response (Value: 0x1770 (= 6000 -> 60.00Hz *))

40	**01**	**02**	**19**	00	00	**17**	**70**	· · ·	· · ·

* "0x1770" as reading value of "VIC(VF-MB1,VF-S15) / II(VF-AS3) input point 2 frequency"
is 0x1770 = 6000 (decimal number)
Since the unit of "VIC(VF-MB1,VF-S15) / II(VF-AS3) input point 2 frequency" is 0.01Hz,
set the following value. 6000×0.01 = 60.00Hz

6.6.1.3. Example 3. Reading the status monitor parameter ($FE02$ (The operation frequency))

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 1
IND = 0xFE02($FE02$ communication number)

PKE

0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	6				0				0				1		

Requirement

PKW								PZD	
PKE		IND		PWE					
60	**01**	**FE**	**02**	00	00	00	00	⋯	⋯

Response (Value: 0x03E8 (= 1000 -> 10.00Hz))

40	**01**	**FE**	**02**	00	00	**03**	**E8**	⋯	⋯

* The status monitor parameter cannot be changed.

6.6.1.4. Example 4. Changing the basic parameter (ACC (acceleration time))

AK = 7 (Change parameter value (array))
SPM = 0
PNU = 1
IND = 0x0009 (ACC communication number)

PKE

0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1
	7				0				0				1		

Requirement (ACC = 7.0 sec. -> 70 (= 0x0046) *)

PKW								PZD	
PKE		IND		PWE					
70	**01**	**00**	**09**	00	00	**00**	**46**	⋯	⋯

Response

40	**01**	**00**	**09**	00	00	**00**	**46**	⋯	⋯

* When the "Acceleration time" is set to 7.0 sec., set the following value.
   (The unit of the "Acceleration time" is according to the parameter $F519$.)
        7.0/0.1 = 70 = 0x0046 (hexadecimal number)

Notes	
	▼ When the control power is shut off by the instantaneous power failure, communication will be unavailable for a while. ▼ The Life of EEPROM is approximately 100,000 times. Avoid writing a command more than 100,000 times to the same parameter of the drive and the communication board.

7. Vendor Spec. Profile

Cyclic command transmission (the value of the parameter $C001 - C006$) and monitoring (the value of the parameter $C021 - C026$) are possible for PDP003Z by the original profile

Select the "Telegram 100", "Telegram 101" or "Telegram 102" as the profile on the configuration. Refer to the PLC configurator documents.

VF-MB1/S15 profile

Scanner input $C001 - C006$	Scanner output $C021 - C026$
0: No action	0: No action
1: $FA06$ (Communication command 1)	1: $Fd01$ (Status information 1)
2: $FA23$ (Communication command 2)	2: $Fd00$ (Output frequency, 0.01Hz)
3: $FA07$ (Frequency command, 0.01Hz)	3: $Fd03$ (Output current, 0.01%, With filter)
5: $FA50$ (Terminal output data)	4: $Fd05$ (Output voltage, 0.01%, With filter)
6: $FA51$ (FM analog output)	5: $FC91$ (Alarm information)
8: $F601$ (Stall prevention level, %)	6: $Fd22$ (PID feedback value, 0.01Hz)
13: ACC (Acceleration time 1, 0.1s)*	7: $Fd06$ (Input terminal board status)
14: dEC (Deceleration time 1, 0.1s) *	8: $Fd07$ (Output terminal status)
15: UL (Upper limit,0.01Hz)	9: $FE36$ (VIB input, 0.01%)
16: ub (Torque boost value 1,0.1%)	10: $FE35$ (VIA input, 0.01%)
17: uLu (Base frequency voltage 1, 0.1V)	11: $FE37$ (VIC input, 0.01%)
	12: $Fd04$ (Input voltage (DC detection), 0.01%, With filter)
	13: $Fd16$ (Estimated speed (real-time value), 0.01Hz)
	14: $Fd18$ (Torque, 0.01%, With filter)
	19: $F880$ (Free notes)
	20: $Fd29$ (Input power, 0.01kW, With filter)
	21: $Fd30$ (Output power, 0.01kW, With filter)
	22: $FE14$ (Cumulative operation time, hour)
	23: $FE40$ (FM terminal output monitor, 0.01%)
	25: $Fd20$ (Torque current, 0.01%, With filter)
	26: $Fd23$ (Motor overload factor, 0.01%)
	27: $Fd24$ (Drive overload factor, 0.01%)
	28: $Fd25$ (PBR overload factor, %)
	29: $Fd26$ (Motor load factor, %)
	30: $Fd27$ (Drive load factor, %)
	31: $FE56$ (Pulse train input, pps)
	32: $FE70$ (Drive rated current, 0.1A)
	33: $FE76$ (Input Watt-hour, 0.1kWh $\times 10^{F749}$) **
	34: $FE77$ (Output Watt-hour, 0.1kWh $\times 10^{F749}$) **
	35: $Fd83$ (IGBT temperature, degree C)

* The unit of ACC, dEC is according to the parameter $F519$.
** The unit of $FE76$, $FE77$ is according to the parameter $F749$.
*** The value which is transferred by the cyclic command transmission will not be stored to EEPROM.

VF-AS3 profile

Scanner input $C001 - C006$	Scanner output $C021 - C026$
0: No action	0: No action
1: $FR06$ (Communication command 1)	1: $Fd01$ (Status information 1)
2: $FR23$ (Communication command 2)	2: $Fd00$ (Output frequency, 0.01Hz)
3: $FR07$ (Frequency command, 0.01Hz)	3: $Fd03$ (Output current, 0.01%, With filter)
4: $FR33$ (Torque command 0.01%)	4: $Fd05$ (Output voltage, 0.01%, With filter)
5: $FR50$ (Terminal output data)	5: $FC91$ (Inverter alarm)
6: $FR51$ (Analog output(FM) data from comm.)	6: $Fd22$ (PID feedback value, 0.01Hz)
7: $FR52$ (Analog output(AM) data from comm.)	7: $Fd06$ (Input terminal status)
8: $F601$ (Stall prevention level, %)	8: $Fd07$ (Output terminal status)
9: $F441$ (Power running torque limit 1, level,0.01%)	9: $FE35$ (RR input, 0.01%)
10: $F443$ (Regenerative braking torque limit 1, level 0.01%)	10: $FE36$ (RX input, 0.01%)
11: $F460$ (Speed loop proportional gain)	11: $FE37$ (II input, 0.01%)
12: $F461$ (Speed loop stabilization coefficient)	12: $Fd04$ (Input voltage (DC detection), 0.01%, With filter)
13: RCC (Acceleration time 1, 0.1s) *	13: $Fd15$ (Estimated speed (real-time value), 0.01Hz)
14: dEC (Deceleration time 1, 0.1s) *	14: $Fd18$ (Torque, 0.01%, With filter)
15: UL (Upper limit, 0.01Hz)	15: $FE60$ (My monitor)
16: ub (Torque boost value 1, 0.01%)	16: $FE61$ (My monitor)
17: uLu (Base frequency voltage 1, 0.1V)	17: $FE62$ (My monitor)
	18: $FE63$ (My monitor)
	19: $F880$ (Free notes)
	20: $Fd29$ (Input power, 0.01kW, With filter)
	21: $Fd30$ (Output power, 0.01kW, With filter)
	22: $FE14$ (Cumulative operation time, 1hour)
	23: $FE40$ (FM terminal output monitor, 0.01%)
	24: $FE41$ (AM terminal output monitor, 0.01%)
	25: $Fd20$ (Torque current, 0.01%, With filter)
	26: $Fd23$ (Motor overload factor, 0.01%)
	27: $Fd24$ (Drive overload factor, 0.01%)
	28: $Fd25$ (PBR overload factor, %)
	29: $Fd26$ (Motor load factor, %)
	30: $Fd27$ (Drive load factor, %)
	31: $FE56$ (Pulse train input, pps)
	32: $FE70$ (Drive rated current, 0.1A)
	33: $FE76$ (Input Watt-hour, 0.1kWh $\times 10^{F749}$) **
	34: $FE77$ (Output Watt-hour, 0.1kWh $\times 10^{F749}$) **
	35: $Fd83$ (IGBT temperature, degree C)

* The unit of RCC, dEC is according to the parameter $F519$.

** The unit of $FE76$, $FE77$ is according to the parameter $F749$.

*** The value which is transferred by the cyclic command transmission will not be stored to EEPROM.

7.1. **Telegram 100: Vendor specific**

The parameter access via PKW, and the transmission of two commands and monitors via cyclic data are supported by Telegram 100.

	PLC → INV	INV → PLC
PKW1	PKW1(PKE)	PKW1(PKE)
PKW2	PKW2(IND)	PKW2(IND)
PKW3	PKW3(PWE1)	PKW3(PWE1)
PKW4	PKW4(PWE2)	PKW4(PWE2)
Cyclic data 1	$C001$	$C021$
Cyclic data 2	$C002$	$C022$

INV: Inverter

PKW: Parameter ID/value

PKE: Parameter ID (1st and 2nd octet)

IND: Sub-index (3rd octet),

4th octet is reserved

PWE: Parameter value (5th until 8th octet)

7.2.   **Telegram 101: Vendor specific**

The parameter access via PKW, and the transmission of six commands and monitors via cyclic data are supported by Telegram 101.

	PLC → INV	INV → PLC
PKW1	PKW1(PKE)	PKW1(PKE)
PKW2	PKW2(IND)	PKW2(IND)
PKW3	PKW3(PWE1)	PKW3(PWE1)
PKW4	PKW4(PWE2)	PKW4(PWE2)
Cyclic data 1	*C001*	*C021*
Cyclic data 2	*C002*	*C022*
Cyclic data 3	*C003*	*C023*
Cyclic data 4	*C004*	*C024*
Cyclic data 5	*C005*	*C025*
Cyclic data 6	*C006*	*C026*

INV: Inverter

PKW: Parameter ID/value

PKE: Parameter ID (1st and 2nd octet)

IND: Sub-index (3rd octet),
   4th octet is reserved

PWE: Parameter value (5th until 8th octet)

7.3.   **Telegram 102: Vendor specific**

The transmission of six commands and monitors via cyclic data is supported by Telegram 102.

	PLC → INV	INV → PLC
Cyclic data 1	*C001*	*C021*
Cyclic data 2	*C002*	*C022*
Cyclic data 3	*C003*	*C023*
Cyclic data 4	*C004*	*C024*
Cyclic data 5	*C005*	*C025*
Cyclic data 6	*C006*	*C026*

INV: Inverter

7.4. **How to use**

The purposes are adjustment by real time command transmission, and the monitor of an operation state by using cyclic communication of PROFIBUS.

Example 1: Command transmitting
When you want to set "0xC400" to parameter $F A 0 6$, set "1 ($F A 0 6$)" to parameter $C 0 0 1$.
And since 0 and 1 byte of the PZD1 supports the parameter $C 0 0 1$, if "0xC400" is set up here, "0xC400" will be set as $F A 0 6$.

VF-MB1/S15/AS3		PDP003Z	PROFIBUS Master

Parameter	Value
$C 0 0 1$	1 (FA06)
$C 0 0 2$	...
$C 0 0 3$	...
...	...

"0xC400" is set as parameter $F A 0 6$

PZD1		PZD2		PZD3	
C4	00	...	...	...	...
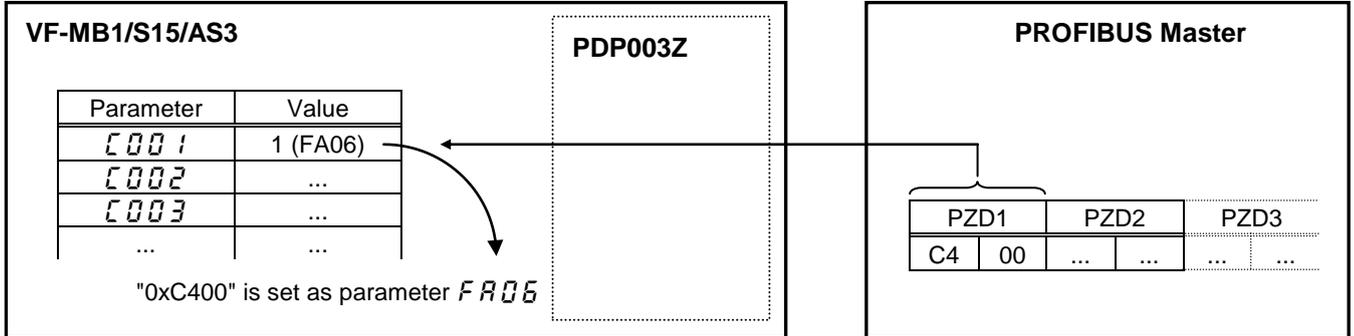
Example 2: State monitoring
When you want to monitor the output current, set "3 (FD03)" to parameter $C 0 2 1$.
The value of the parameter $F d 0 3$ specified as 0 and1 byte of the PZD1 with the parameter $C 0 2 1$ is inputted.

VF-MB1/S15/AS3		PDP003Z	PROFIBUS Master

Parameter	Value
$C 0 2 1$	3 (FD03)
$C 0 2 2$	...
$C 0 2 3$	...
...	...

The value of a parameter $F d 0 3$ is outputted.

PZD1		PZD2		PZD3	
xx	xx	...	...	...	...
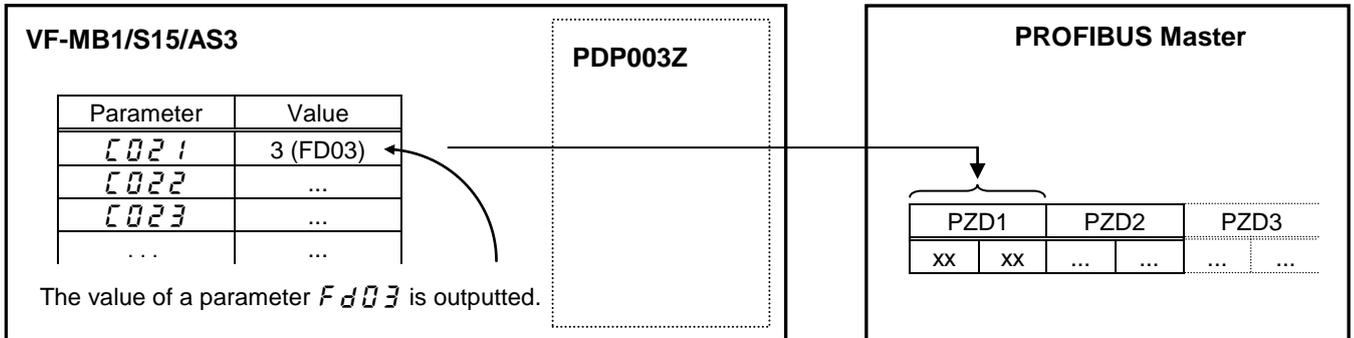
7.5. The overview of the VF-MB1/S15/AS3 parameter

7.5.1. *F A O 6* (Communication command1)

VF-MB1/S15

bit	Function	0	1	Note
0	Preset speed operation frequencies 1	Preset speed operation is disabled or preset speed operation frequencies (1-15) are set by specifying bits for preset speed operation frequencies 1-4. (0000: Preset speed operation OFF*, 001-1111: Setting of preset speed operation frequencies (1-15)		
1	Preset speed operation frequencies 2			
2	Preset speed operation frequencies 3			
3	Preset speed operation frequencies 4			
4	Motor selection (1 or 2) (THR 2 selection)	Motor 1 (THR 1)	Motor 2 (THR 2)	THR1: *P t* = setting value, *u L*, *u L u*, *u b*, *t H r* THR2: *P t* = *0*, *F 170*, *F 171*, *F 172*, *F 173*
5	PI D control	Normal operation	PI D off	-
6	Acceleration/deceleration pattern selection (1 or 2) (AD2 selection)	Acceleration/deceleration pattern 1 (AD1)	Acceleration/deceleration pattern 2 (AD2)	AD1: *A C C*, *d E C* AD2: *F 500*, *F 501*
7	DC braking	OFF	Forced DC braking	-
8	Jog run	OFF	Jog run	-
9	Forward/reverse run selection	Forward run	Reverse run	-
10	Run/stop	Stop	Run	-
11	Coast stop command	Standby	Cost stop	-
12	Emergency stop	OFF	Emergency stop	Always enable, "E" trip
13	Fault reset	OFF	Reset	No data is returned from the drive
14	Frequency priority selection	OFF	Enabled	Enabled regardless of the setting of *F M O d*
15	Command priority selection	OFF	Enabled	Enabled regardless of the setting of *C M O d*

* VF-S15: When 14(*5 r 0*) is set to *F M O d*, preset speed operation frequency 0 is selected.

VF-AS3

bit	Function	0	1	Note
0	Preset speed switching 1	0000: Preset speed operation OFF (*1) 0001-1111: Setting of preset speed operation frequencies (1-15)		Preset speed operation is disabled or preset speed operation frequencies (1-15) are set by specifying bits for preset speed operation frequencies 1-4.
1	Preset speed switching 2			
2	Preset speed switching 3			
3	Preset speed switching 4			
4	V/f switching 1 (*2)	V/f 1	V/f 2	V/f 1: *P t* = setting value, *u L*, *u L u*, *u b*, *t H r A* V/f 2: *P t* = "*0*", *F 170*, *F 171*, *F 172*, *F 182*
5	PID control	Normal operation	PID off	-
6	Acc/Dec switching 1 (*3)	AD mode 1	AD mode 2	AD mode 1: *A C C*, *d E C* AD mode 2: *F 500*, *F 501*
7	DC braking	OFF	Forced DC braking	-
8	Jog run	OFF	Jog run	-
9	Forward/Reverse	Forward run	Reverse run	-

10	Run/Stop	Stop	Run	-
11	Coast stop	Standby	Cost stop	-
12	Emergency off	OFF	Emergency off	Always enable, [E] trip
13	Fault reset	OFF	Reset	Trip reset
14	Frequency priority	OFF	Enabled	Enabled regardless of the setting of $FПOd$
15	Command priority	OFF	Enabled	Enabled regardless of the setting of $CПOd$

(*1): When set "12($5r0$)" to $FПOd$, preset speed operation frequency 0 is selected.
(*2): The V/f switching ORs with Bit 10 of [$FR23$].
(*3): The Acc/Dec switching ORs with Bit 8 of [$FR23$]

7.5.2. $FR23$ (Communication command 2)

VF-MB1/S15

bit	Function	0	1	Note
0	(Reserved)	-	-	-
1	Electric power quantity reset	OFF	Reset	Electric power quantity ($FE76$, $FE77$) reset
2	(Reserved)	-	-	-
3	(Reserved)	-	-	-
4	(Reserved)	-	-	-
5	(Reserved)	-	-	-
6	(Reserved)	-	-	-
7	Maximum deceleration forced stop	Normal	Enabled	-
8	Acceleration/deceleration selection 1	00: Acceleration/deceleration 1 01: Acceleration/deceleration 2 10: Acceleration/deceleration 3		Select acceleration/deceleration 1-4 by combination of two bits. AD1: ACC,dEC
9	Acceleration/deceleration selection 2			AD2: $F500,F501$ AD3: $F510,F511$
10	(Reserved)	-	-	-
11	(Reserved)	-	-	-
12	OC stall level switch	OC stall 1	OC stall 2	OC stall 1: $F601$ OC stall 2: $F185$
13	(Reserved)	-	-	-
14	(Reserved)	-	-	-
15	(Reserved)	-	-	-

Note: Set 0 to reserved bit.

VF-AS3

bit	Function	0	1	Note
0	Control switching	Speed control	Torque control	-
1	Electric power quantity reset	OFF	Reset	Electric power quantity ($FE76$, $FE77$) reset
2	(Reserved)	-	-	-
3	Braking request (BC)	Normal	Forcibly braked	-
4	Preliminary excitation	Normal	Enabled	-
5	(Reserved) (*3)	-	-	-
6	Braking answer (BA)	Brake applied	Brake released	-
7	Quick deceleration 2	Normal	Enabled	-
8	Acc/dec switching 1 (*1)	00: AD mode 1 01: AD mode 2		Select Acc/Dec mode 1 - 4 by combination of two bits. AD mode 1: ACC,dEC
9	Acc/dec switching 2	10: AD mode 3 11: AD mode 4		AD mode 2: $F500.F501$ AD mode 3: $F510,F511$ AD mode 4: $F514,F515$
10	V/f switching 1 (*2)	00: V/f 1 01: V/f 2 10: V/f 3		Select V/f pattern 1 - 4 by combination of two bits V/f 1: Pt = setting value, $uL,uLu,$

11	V/f switching 2	11: V/f 4		$ub, tHrA$ V/f 2: Pt = "0", $F170, F171,$ $\qquad F172, F182$ V/f 3: Pt = "0", $F174, F175,$ $\qquad F176, F183$ V/f 4: Pt = "0", $F178,$ $\qquad F179, F180, F184$
12	OC stall level switching and Torque limit switching 1	00: Torque limit 1 / OC stall 1 01: Torque limit 2 / OC stall 2 10: Torque limit 3 / OC stall 1 11: Torque limit 4 / OC stall 2		OC stall 1: $F601$ OC stall 2: $F185$ Select torque limit 1 - 4 by combination of two bits Torque limit 1: $F441, F443$ Torque limit 2: $F444, F445$ Torque limit 3: $F446, F447$ Torque limit 4: $F448, F449$
13	Torque limit switching 2			
14	Speed gain switching	Gain 1	Gain 2	Gain 1: $F460, F461, F462$ Gain 2: $F463, F464, F465$
15	(Reserved)	-	-	-

Note: Set 0 to reserved bit.

(*1): The Acc/Dec switching ORs with Bit 6 of [FA06]. When changing Acc/Dec in four types, set Bit 6 of [$FA06$] to "0" and use [$FA23$].

(*2): The V/f switching ORs with Bit 4 of [$FA06$]. When changing V/f in four types, set Bit 4 of [$FA06$] to "0" and use [$FA23$].

<u><Notes when replacing inverter from the VF-AS1 to the VF-AS3></u>

(*3): Bit 5 of the FA23 is used to then Brake open command in the VF-AS1. But this bit was changed to reserved bit in the VF-AS3. Therefore DO NOT use this bit in the VF-AS3.

7.5.3. $FA07$ (frequency reference from internal option)

Frequency reference is set up by 0.01Hz unit and the hexadecimal number.
For example, when "Frequency reference" is set up to 80Hz, since the minimum unit is 0.01Hz,
$\qquad$ 80 / 0.01 = 8000 = 0x1F40 (Hex.)

7.5.4. $FA33$ (Torque command) (Only for the VF-AS3)

Torque reference is set up by 0.01% unit and the hexadecimal number.
For example: when "torque command" is set up to "50%", since the minimum unit is 0.01%,
50%=50÷0.01=5000=1388H

7.5.5. $FA50$ (Terminal output data from communication)

By setting up the data of the bit 0 - 1 of terminal output data ($FA50$) from communication, setting data (OFF or ON) can be outputted to the output terminal.

[VF-MB1/S15]
Please select the functional number 92 - 95 as the selection ($F130 - F138$) of the output terminal function before using it.

[VF-AS3]
Please select the functional number 92 - 105 as the selection ($F130 - F134, F159 - F163$) of the output terminal function before using it.

bit	Output TB function name	0	1
0	Specified data output 1 (Output terminal No.: 92, 93)	OFF	ON
1	Specified data output 2 (Output terminal No.: 94, 95)	OFF	ON

2	**[VF-MB1/S15]** (Reserved) **[VF-AS3]** Specified data output 3 (Output terminal No.: 96, 97）	OFF	ON
3	**[VF-MB1/S15]** (Reserved) **[VF-AS3]** Specified data output 4 (Output terminal No.: 98, 99)	OFF	ON
4	**[VF-MB1/S15]** (Reserved) **[VF-AS3]** Specified data output 5 (Output terminal No.: 100, 101)	OFF	ON
5	**[VF-MB1/S15]** (Reserved) **[VF-AS3]** Specified data output 6 (Output terminal No.: 102, 103）	OFF	ON
6	**[VF-MB1/S15]** (Reserved) **[VF-AS3]** Specified data output 7 (Output terminal No.: 104, 105）	OFF	ON
7-15	(Reserved)	-	-

Note: Set 0 to reserved bit

7.5.6.　 $FAS1$ (Analog output (FM) data from communication)
　　　　 $FAS2$ (Terminal AM output data) (Only for the VF-AS3)

Use this function, set the Terminal FM function ($FM5L$) or Terminal AM function ($F670$) to communication data output (18 for VF-S15 / 31 for VF-AS3).
It possible to send out the data specified as FM/AM analog output data ($FAS1/FAS2$) though the FM/AM analog output terminal. Data can be adjusted in a range of 0 to 100.0% (resolution of 10 bit).

Please refer to "Meter setting and adjustment" Section of the VF-S15/MB1 instruction manual for details.
Please refer to "Adjusting the meter connected to the inverter" Section of the VF-AS3 instruction manual for more details.

7.5.7.　 $F441$ Power running torque limit level 1(Only for the VF-AS3)
　　　　 $F443$ Regenerative torque limit level 1(Only for the VF-AS3)

Torque limit level is set up by 0.01% unit and the hexadecimal number.
For example: when "Torque limit level " is set up to "250%", since the minimum unit is 0.01%,
250%=250÷0.01=25000=61A8H

7.5.8.　 $F460$ Speed control response 1(Only for the VF-AS3)

Speed control response is set up by 0.01% unit and the hexadecimal number.
For example: when "Speed control response " is set up to "1.0%", since the minimum unit is 0.1%,
1%=1÷0.1=10=000AH

7.5.9.　 $F461$ Speed control stabilization coefficient 1(Only for the VF-AS3)

Speed control stabilization coefficient is set up by 0.01% unit and the hexadecimal number.
For example: when "Speed control stabilization coefficient " is set up to "1.00%", since the minimum unit is 0.01%,
1%=1÷0.01=100=0064H

7.5.10. $Fd01$ (Inverter operating status 1 (real time))

VF-MB1/S15

bit	Function	0	1	Note
0	Failure FL	No output	Under in progress	-
1	Failure	Not tripped	Tripped	Trip status includes $rtry$ and the trip retention status are also regarded as tripped statuses.
2	Alarm	No alarm	Alarm issued	-
3	Under voltage ($MOFF$)	Normal	Under voltage	-
4	Motor selection (1 or 2) (THR 2 selection)	Motor 1 (THR1)	Motor 2 (THR2)	THR1: Pt = setting value, uL, uLu, ub, tHr THR2: $Pt = 0$, $F170$, $F171$, $F172$, $F173$
5	PID control off	PID control permitted	PID control prohibits	-
6	Acceleration/deceleration pattern selection (1 or 2)	Acceleration/deceleration pattern 1 (AD1)	Acceleration/deceleration pattern 2 (AD2)	AD1: ACC, dEC AD2: $F500$, $F501$
7	DC braking	OFF	Forced DC braking	-
8	Jog run	OFF	Jog run	-
9	Forward / reverse run	Forward run	Reverse run	-
10	Run/stop	Stop	Run	-
11	Coast stop (ST = OFF)	ST=ON	ST=OFF	-
12	Emergency stop	No emergency stop status	Emergency stop status	-
13	Standby ST=ON	Start-up process	Standby	Standby: Initialization completed, not failure stop status, not alarm stop status ($MOFF$, LL forced stop), ST=ON, and RUN=ON
14	Standby	Start-up process	Standby	Standby: Initialization completed, not failure stop status and not alarm stop status ($MOFF$, LL forced stop)
15	(Undefined)	-	-	-

Note: The bit described "Undefined" is unstable. Don't use the bit for the judgment.

VF-AS3

bit	Function	0	1	Note
0	Failure FL	No output	Under in progress	-
1	Failure	Not tripped	Tripped	Trip status includes [$rtry$] and the trip retention status is also regarded as tripped statuses.
2	Alarm	No alarm	Alarm issued	When DeviceNet network is disconnected, this bit becomes "1"
3	Under voltage ($MOFF$)	Normal	Under voltage	-
4	V/f switching status	V/f 1	V/f 2	V/f 1: Pt = setting value, uL, uLu, ub, $tHrA$ V/f 2: $Pt = 0$, $F170$, $F171$, $F172$, $F182$
5	PID control off	PID control permitted	PID control prohibits	-
6	Acc/Dec switching status	AD mode 1	AD mode 2	AD mode 1: ACC, dEC AD mode 2: $F500$, $F501$
7	DC braking	OFF	Forced DC braking	-
8	Jog run	OFF	Jog run	-
9	Forward / reverse run	Forward run	Reverse run	-
10	Run/stop	Stop	Run	-

11	Coast stop (ST = OFF)	ST=ON	ST=OFF	-
12	Emergency stop	No emergency stop status	Emergency stop status	-
13	Standby ST=ON	Start-up process	Standby	Standby: Initialization completed, not failure stop status, not alarm stop status (moff], , [$C\,O\,F\,F$], [$C\,O\,F\,F$], [$L\,5\,E\,P$]), ST =ON and RUN=ON
14	Standby	Start-up process	Standby	Standby: Initialization completed, not failure stop status and not alarm stop status ([MOFF], [$C\,O\,F\,F$], [$C\,O\,F\,F$], [$L\,5\,E\,P$])
15	HAND/AUTO (LOC/REM)	AUTO (LOC)	HAND (REM)	Enabled with [$F\,7\,5\,O$]="2" HAND: Panel operation is enabled AUTO: Operation method selected [$C\,\Pi\,O\,d$] and [$F\,\Pi\,O\,d$] are enabled. Enabled with [$F\,7\,3\,2$]="0" LOC: Panel operation is enabled REM: Operation method selected [$C\,\Pi\,O\,d$] and [$F\,\Pi\,O\,d$] are enabled.

7.5.11. $F\,d\,O\,O$ (Output frequency (real time))

The current output frequency is read into 0.01Hz of units and by the hexadecimal number.
For example, when the output frequency is 80Hz, 0x1F40 (hexadecimal number) are read.

Since the minimum unit is 0.01%,
   0x1F40 (Hex.) = 8000(Dec.) * 0.01 = 80 (Hz)

Also about the following parameters, these are the same as this.
  - $F\,d\,2\,2$ (Feedback value of PID (real time))............................. Unit: 0.01Hz
  - $F\,d\,1\,6$ (Estimated speed (real time)) .... Unit: 0.01Hz
  - $F\,d\,2\,9$ (Input power (real time)) .... Unit: 0.01kW
  - $F\,d\,3\,O$ (Output power (real time)) .... Unit: 0.01kW

7.5.12. $F\,d\,O\,3$ (Output current (real time))

The output current is read into 0.01% of units and by the hexadecimal number.
For example, when the output current of the rated current 4.8A drive is 50% (2.4A), 0x1388 (hexadecimal number) is read out.

Since the minimum unit is 0.01%,
   0x1388 (Hex.) = 5000 (Dec.) * 0.01 = 50 (%)
Also about the following parameters, these are the same as this.
  - $F\,d\,O\,5$ (Output voltage (real time)) .... Unit: 0.01% (V)
  - $F\,d\,O\,4$ (Voltage at DC bus (real time)) .... Unit: 0.01% (V)
  - $F\,d\,1\,8$ (Torque) .... Unit: 0.01% (Nm)*

* When the motor information connected to the drive set to the parameter ($F\,4\,O\,5$ - $F\,4\,1\,5$), torque monitor value "100%" is same as the rated torque of a motor in general.

7.5.13. $F\,E\,3\,5$, $F\,E\,3\,6$, $F\,E\,3\,7$ (Monitoring of the analog input)

VF-MB1/S15
  VIA input value: "Communication Number $F\,E\,3\,5$"
  VIB input value: "Communication Number $F\,E\,3\,6$"
  VIC input value: "Communication Number $F\,E\,3\,7$"

These monitors can also be used as A/D converters irrespective of the inverter's control.

VIA / VIC input value monitor is capable of reading the data from external devices in a range of 0.00 to 100.00% (unsigned data: 0x0000 to 0x2710).

VIB input value monitor is capable of reading the data from external devices in a range of -100.00 to 100.00% (signed data: 0xD8F0 to 0x2710).

If analog input mode is selected with the frequency setting mode selection parameter, however, keep in mind that any data entered via an analog terminal is regarded as a frequency command.

VF-AS3
RR input value: "Communication Number 𝐹𝐸 𝟹 𝟻"
RX input value: "Communication Number 𝐹𝐸 𝟹 𝟼"
II input value: "Communication Number 𝐹𝐸 𝟹 𝟽"

These monitors can also be used as A/D converters irrespective of the inverter's control.

RR / II input value monitor is capable of reading the data from external devices in a range of 0.00 to 100.00% (unsigned data: 0x0000 to 0x2710).

RX input value monitor is capable of reading the data from external devices in a range of -100.00 to 100.00% (signed data: 0xD8F0 to 0x2710).

If analog input mode is selected with the frequency setting mode selection parameter, however, keep in mind that any data entered via an analog terminal is regarded as a frequency command.

7.5.14.　 𝐹𝐸 𝟷𝟺 (Cumulative run time)

The operated cumulative time is read by the hexadecimal number.
For example, when cumulative operation time is 18 hours, 0x12 (18 hours) is read.
　　0x12 (Hex.) = 18 (Dec., hour)

7.5.15.　 𝐹𝐸 𝟺𝟶 (Analog output (FM))
　　　　　 𝐹𝐸 𝟺 𝟷 (AM output monitor) (Only for the VF-AS3)

The output value of FM/AM terminal is read.
The value range is set to 0 to 10000 (0x2710).

For example, when FM/AM output value is 50.00%, 0x1388 (Hex.) is read.
 0x1388 (Hex) = 50.00 (Dec %)

* If the parameter 𝐹 𝟼 𝟾 𝟷 (Analog output) is set to 0, FM output monitor cannot be used.
 Please set 1 or 2 to 𝐹 𝟼 𝟾 𝟷.

7.5.16. $F C 9 1$ (Alarm code)

VF-S15/MB1

bit	Function	0	1	Remarks (Code displayed on the panel)
0	Over-current alarm	Normal	Alarming	C flicking
1	Inverter over load alarm	Normal	Alarming	L flicking
2	Motor over load alarm	Normal	Alarming	L flicking
3	Over heat alarm	Normal	Alarming	H flicking
4	Over voltage alarm	Normal	Alarming	P flicking
5	Main circuit undervoltage alarm	Normal	Alarming	-
6	main device overheat alarm	Normal	Alarming	L flicking
7	Under current alarm	Normal	Alarming	-
8	Over-torque alarm	Normal	Alarming	-
9	Braking resistor overload alarm	Normal	Alarming	-
10	Cumulative operation hours alarm	Normal	Alarming	-
11	Option communication alarm	Normal	Alarming	-
12	Serial communication alarm	Normal	Alarming	-
13	MOFFMS (MS-relay off or MOFF)	Normal	Alarming	-
14	Stop after instantaneous power off	-	Dec., Under stop	Refer to $F 3 0 2$ value
15	Stop after LL continuance time	-	Dec., Under stop	Refer to $F 2 5 6$ value

VF-AS3

bit	Function	0	1	Panel display
0	Over-current alarm	Normal	Alarming	[C] flicking
1	Inverter over load alarm	Normal	Alarming	[L] flicking
2	Motor over load alarm	Normal	Alarming	[L] flicking
3	Overheat alarm	Normal	Alarming	[H] flicking
4	Overvoltage alarm	Normal	Alarming	[P] flicking
5	(Undefined)	-	-	-
6	Inverter overheat alarm	Normal	Alarming	[L] flicking
7	Undercurrent alarm	Normal	Alarming	-
8	Over-torque alarm	Normal	Alarming	-
9	Braking resistor overload alarm	Normal	Alarming	-
10	Cumulative run time alarm	Normal	Alarming	-
11	Communication option alarm	Normal	Alarming	[t] flicking
12	Serial communication alarm	Normal	Alarming	[t] flicking
13	Power circuit under voltage alarm	Normal	Alarming	[$MOFF$] flicking
14	Stop after instantaneous power off	-	Dec., Under stop	[$StOP$] flicking
15	During sleep	-	Dec., Under stop	[$StOP$] flicking

7.5.17. $Fd06$ (Input TB Status)

VF-S15/MB1

bit	TB Name	Function (Parameter)	0	1
0	F	Input terminal function selection 1 ($F111$)		
1	R	Input terminal function selection 2 ($F112$)		
2	RES	Input terminal function selection 3 ($F113$)		
3	S1	Input terminal function selection 4 ($F114$)	OFF	ON
4	S2	Input terminal function selection 5 ($F115$)		
5	S3	Input terminal function selection 6 ($F116$)		
6	VIB*1	Input terminal function selection 7 ($F117$)		
7	VIA*1	Input terminal function selection 8 ($F118$)		
5 to 15	(Undefined)	-	-	-

Note: The bit described "Undefined" is unstable. Do not use the bit for the judgment.

*1: VIA/ VIB are input terminal function when $F109$ is logic input.

*The input terminal function is selected by each parameter.

VF-AS3

bit	TB Name	Function (Parameter)	0	1
0	F	$F111$: Input terminal function selection 1		
1	R	$F112$: Input terminal function selection 2		
2	RES	$F113$: Input terminal function selection 3		
3	S1	$F114$: Input terminal function selection 4		
4	S2	$F115$: Input terminal function selection 5		
5	S3	$F116$: Input terminal function selection 6		
6	S4*1	$F117$: Input terminal function selection 7		
7	S5*2	$F118$: Input terminal function selection 8	OFF	ON
8	DI11*3	$F119$: Input terminal function selection 9		
9	DI12*3	$F120$: Input terminal function selection 10		
10	DI13*3	$F121$: Input terminal function selection 11		
11	DI14*3	$F122$: Input terminal function selection 12		
12	DI15*3	$F123$: Input terminal function selection 13		
13	DI16*3	$F124$: Input terminal function selection 14		
14 to 15	(Undefined)	-	-	-

Note: The bit described "Undefined" is unstable. Do not use the bit for the judgment.

*1: Only when the contact input has been selected with $F147$ (Digital/ Pulse train/PG input), it is an effective value.

*2: Only when the contact input has been selected with $F148$ (Digital/ Pulse train/PG input), it is an effective value.

*3: DI11 – DI16 are the terminals of I/O extension.

7.5.18. $Fd07$ (Output TB Status)

VF-S15/MB1

bit	TB Name	Function (Parameter)	0	1
0	RY-RC	Output terminal function selection 1A ($F130$)	OFF	ON
1	OUT	Output TB Function select 2A ($F131$)	OFF	ON
2	FL	Output TB Function select 3 ($F132$)	OFF	ON
3 - 15	(Undefined)	-	-	-

Note: The bit described "Undefined" is unstable. Do not use the bit for the judgment.

VF-AS3

bit	TB Name	Function (Parameter)	0	1
0	FP	$F130$: Terminal FP function 1	OFF	ON
1	(Undefined)	-	-	-
2	FL	$F132$: Terminal FL function	OFF	ON
3	R1	$F133$: Terminal R1 function 1	OFF	ON
4	R2	$F134$: Terminal R2 function	OFF	ON
5	DQ11[1]	$F159$: Terminal DQ11 function	OFF	ON
6	DQ12[1]	$F160$: Terminal DQ12 function	OFF	ON
7	R4[1]	$F161$: Terminal R4 function	OFF	ON
8	R5[1]	$F162$: Terminal R5 function	OFF	ON
9	R6[1]	$F163$: Terminal R6 function	OFF	ON
10	R4(B)[1]	$A201$: Terminal R4 (B) function	OFF	ON
11	R5(B)[1]	$A202$: Terminal R5 (B) function	OFF	ON
12	R6(B)[1]	$A203$: Terminal R6 (B) function	OFF	ON
13 to 15	(Undefined)	-	-	-

Note: The bit described "Undefined" is unstable. Do not use the bit for the judgment.

[1]: DQ11, DQ12, R4, R5, R6, R4(B), R5(B) and R6(B) are the terminal of I/O extension.

8. Diagnostic

When the communication loss occurs, PDP003Z returns the diagnosis telegram including the following information.

Byte　1: Station Status 1
Byte　2: Station Status 2
Byte　3: Station Status 3
Byte　4: Master station address

(VF-MB1/S15)
Byte　5: PDP003Z Ident Number high byte (0x0C)
Byte　6: PDP003Z Ident Number low byte (0x24)
(VF-AS3)
Byte　5: PDP003Z Ident Number high byte (0x0F)
Byte　6: PDP003Z Ident Number low byte (0x88)

Byte　7: Diagnostic data length
Byte　8: Status Type (Status message = 0x81)
Byte　9: Slot Number (Slot number = 0x00)
Byte 10: Specifier (0=No further diff, 1=Status comes, 2=Status goes)

Byte 11: External diagnostic data length
Byte 12: PDP003Z Station Address
Byte 13: PDP003Z Profile
Byte 14: Drive CPU1 Major version
Byte 15: Drive CPU1 Minor version
Byte 16: PDP003Z software version
Byte 17: PDP003Z communication network Fault
Byte 18: PDP003Z internal link Fault

* It is necessary to set the parameter $C101$ to "4".
* It is necessary to set it by the configuration to include Byte 7 or more in the response.
  (The figure below is a setting for SIMATEC Step7.)
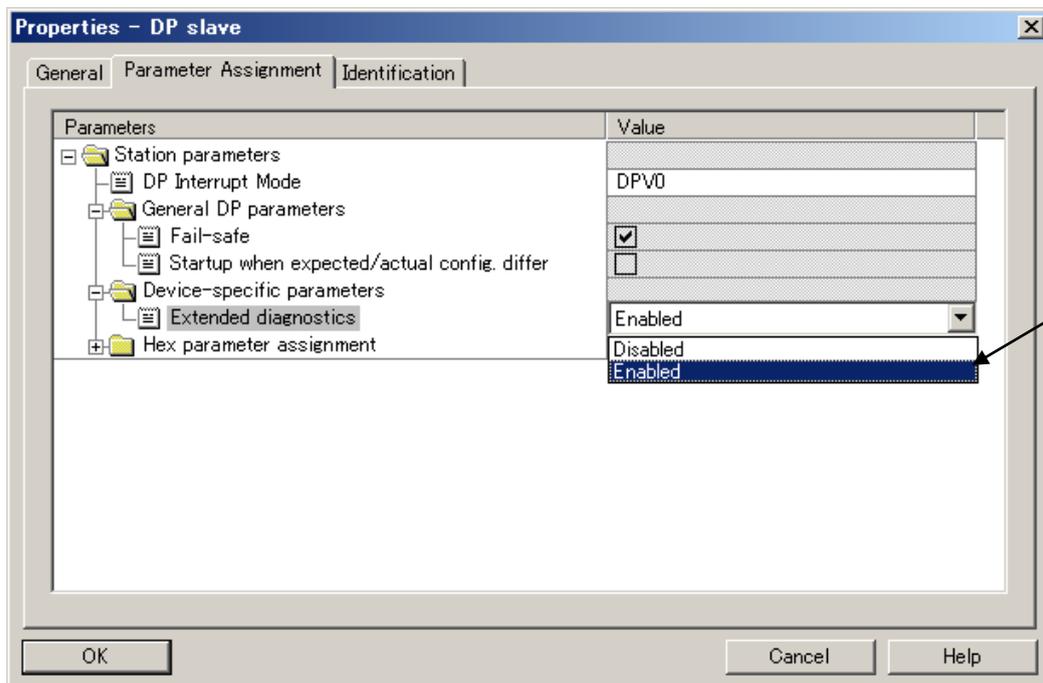
9. PROFIdrive acyclic parameter access

DP-V1 acyclic communication is mainly used to read/write the parameter.
VF-MB1/S15/AS3 parameter and the PROFIBUS parameter can be read/written using PDP003Z.

The following setting is necessary in the configuration to communicate DP-V1.
(The figure below is a setting for SIMATEC Step7.)
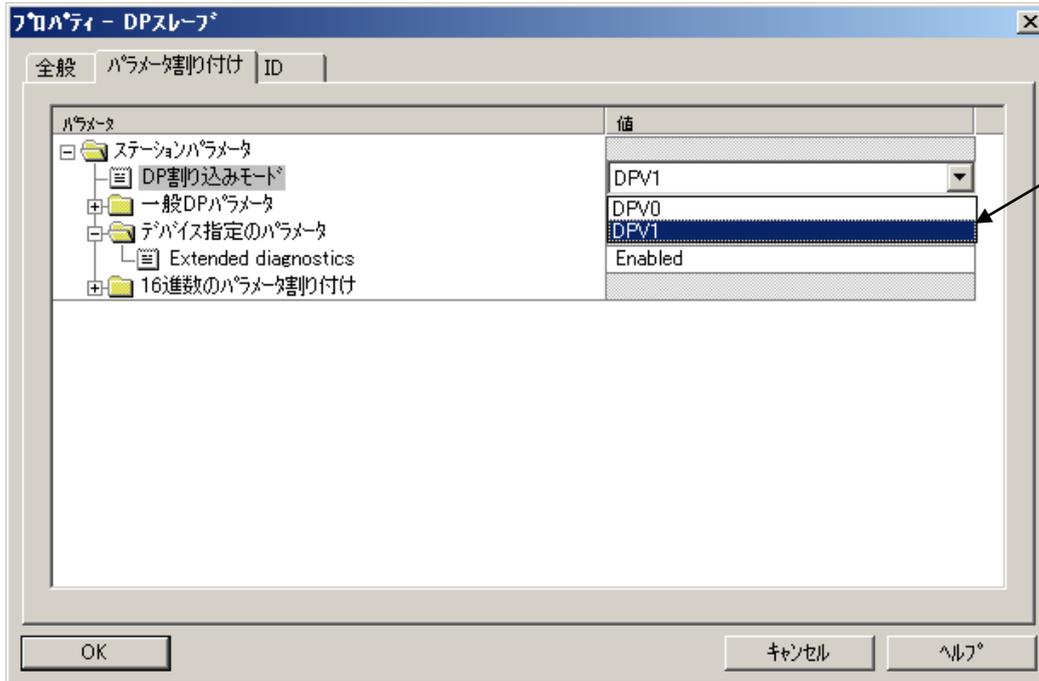
Parameter access sequence to VF-MB1/S15/AS3 takes place as described in the following figure.
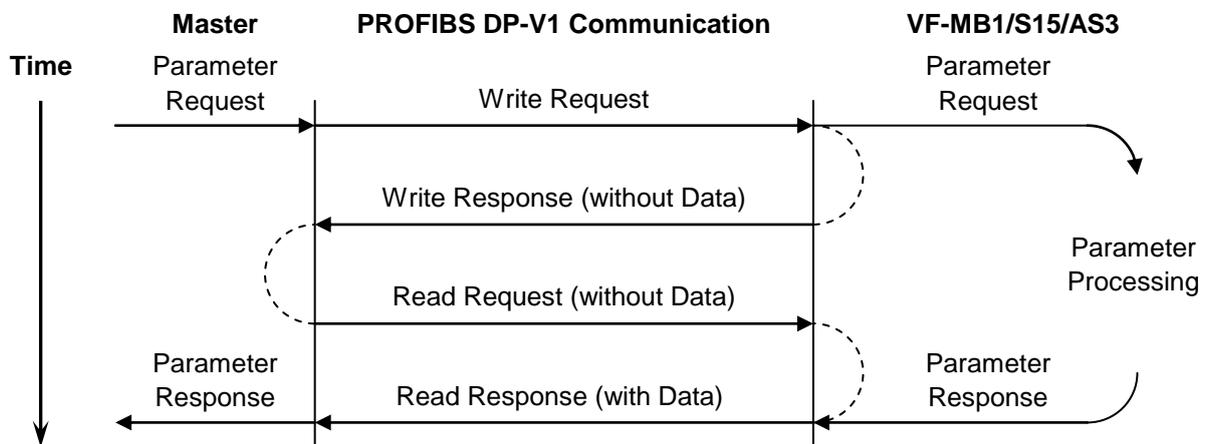
Notes
▼ When you use acyclic parameter access, the value is written to the EEPROM.

9.1. Example1. Read the PROFIdrive parameter

9.1.1.   Write Request data table (Read PNU 964 (0x03C4) IND 4)

Field	Description	Value
Header DU0	Function number	0x5F
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x0E
Request Header (Byte 1)	Request Reference	0x01
Request Header (Byte 2)	Request ID (0x01: Request)	**0x01**
Request Header (Byte 3)	Axis	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Address (Byte 1)	Attribute (0x10: Value)	0x10
Parameter Address (Byte 2)	Number of Elements	0x01
Parameter Address (Byte 3)	Parameter number (PNU), High byte	**0x03**
Parameter Address (Byte 4)	Parameter number (PNU), Low byte	**0xC4**
Parameter Address (Byte 5)	Sub-index (IND), High byte	**0x00**
Parameter Address (Byte 6)	Sub-index (IND), Low byte	**0x04**

9.1.2.   Read Response data table (positive)

Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x08
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID *	**0x01**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Value (Byte 1)	Format *	0x06
Parameter Value (Byte 2)	Number of Values	0x01
Parameter Value (Byte 3)	Values, High byte	**0x0A** **
Parameter Value (Byte 4)	Values, Low byte	**0x90** **

* Refer to Appendix.
** Value 0x0A90 is "2704" in decimal. This means "April 27".

9.2. **Example 2. Change the PROFIdrive parameter**

9.2.1.   Write Request data table (Change, set 0 to PNU 927 (0x039F))

Field	Description	Value
Header (DU0)	Function number	0x5F
Header (DU1)	Slot number (0)	0x00
Header (DU2)	Index (47)	0x2F
Header (DU3)	Length	0x0E
Request Header (Byte 1)	Request Reference	0x01
Request Header (Byte 2)	Request ID (0x02: Change) *	**0x02**
Request Header (Byte 3)	Axis	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Address (Byte 1)	Attribute	0x10
Parameter Address (Byte 2)	Number of Elements	0x01
Parameter Address (Byte 3)	Parameter number (PNU), High byte	**0x03**
Parameter Address (Byte 4)	Parameter number (PNU), Low byte	**0x9F**
Parameter Address (Byte 5)	Sub-index (IND), High byte	0x00
Parameter Address (Byte 6)	Sub-index (IND), Low byte	0x00
Parameter Value (Byte 1)	Format *	0x06
Parameter Value (Byte 2)	Number of Value	0x01
Parameter Value (Byte 3)	Values, High byte	**0x00**
Parameter Value (Byte 4)	Values, Low byte	**0x00**

* Refer to Appendix.

Read Response data table (positive)

Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x04
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID (0x02: Positive)	**0x02**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01

9.2.2.   Read Response data table (negative, set 2 to PNU 927)

Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x08
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID (0x82: Negative) *	**0x82**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Value (Byte 1)	Format (0x44: Error) *	**0x44**
Parameter Value (Byte 2)	Number of Values	0x01
Parameter Value (Byte 3)	Error number, High byte	**0x00**
Parameter Value (Byte 4)	Error number, Low byte	**0x01**

* Refer to Appendix.

9.3. Example 3. Read the VF-MB1/S15/AS3 parameter

When access to VF-MB1/S15/AS3 parameter, set "1000" to the PNU.

9.3.1. Write Request data table (Read 𝐹𝑑𝟶𝟺 (Input voltage))

Field	Description	Value
Header DU0	Function number	0x5F
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x0A
Request Header (Byte 1)	Request Reference	0x01
Request Header (Byte 2)	Request ID (0x01: Request) *	**0x01**
Request Header (Byte 3)	Axis	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Address (Byte 1)	Attribute	0x10
Parameter Address (Byte 2)	Number of Elements	0x01
Parameter Address (Byte 3)	Parameter number, High byte **	**0x03**
Parameter Address (Byte 4)	Parameter number, Low byte **	**0xE8**
Parameter Address (Byte 5)	VF-MB1/S15/AS3 Parameter number, High byte	**0xFD**
Parameter Address (Byte 6)	VF-MB1/S15/AS3 Parameter number, Low byte	**0x04**

* Refer to Appendix.

** Parameter number is fixed to 0x03E8 (1000) for accessing to VF-MB1/S15/AS3 parameter.

9.3.2. Read Response data table (positive)

Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x08
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID *	**0x01**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Value (Byte 1)	Format *	0x42
Parameter Value (Byte 2)	Number of Values	0x01
Parameter Value (Byte 3)	Values, High byte	**0x31** **
Parameter Value (Byte 4)	Values, High byte	**0xEC** **

* Refer to Appendix.

** Value 0x31EC is "12780" in decimal. This means "127.80 (%)".

9.4. Example 4. Change the VF-MB1/S15/AS3 parameter

When access to VF-MB1/S15/AS3 parameter, set "1000" to the PNU.
* This procedure changes the value of VF-MB1/S15/AS3 EEPROM.

9.4.1. Write Request data table (Change, set 7 to VF-MB1/S15/AS3 parameter F I30)

Field	Description	Value
Header DU0	Function number	0x5F
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x0E
Request Header (Byte 1)	Request Reference	0x01
Request Header (Byte 2)	Request ID (0x02: Change) *	**0x02**
Request Header (Byte 3)	Axis	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Address (Byte 1)	Attribute	0x10
Parameter Address (Byte 2)	Number of Elements	0x01
Parameter Address (Byte 3)	Parameter number, High byte **	**0x03**
Parameter Address (Byte 4)	Parameter number, Low byte **	**0xE8**
Parameter Address (Byte 5)	VF-MB1/S15/AS3 Parameter number, High byte	**0x01**
Parameter Address (Byte 6)	VF-MB1/S15/AS3 Parameter number, Low byte	**0x30**
Parameter Value (Byte 1)	Format *	0x42
Parameter Value (Byte 2)	Number of Value	0x01
Parameter Value (Byte 3)	Value, High byte	**0x00**
Parameter Value (Byte 4)	Value, Low byte	**0x07**

* Refer to Appendix.

** Parameter number is fixed to 0x03E8 (1000) for accessing to VF-MB1/S15/AS3 parameter.

9.4.2. Read Response data table (positive)

Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x04
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID *	**0x02**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01

* Refer to Appendix.

9.4.3. Read Response data table (negative, at set 256 to F I30)

| Field	Description	Value
Header DU0	Function number	0x5E
Header DU1	Slot number (0)	0x00
Header DU2	Index (47)	0x2F
Header DU3	Length	0x08
Request Header (Byte 1)	Request Reference (mirrored)	0x01
Request Header (Byte 2)	Response ID *	**0x82**
Request Header (Byte 3)	Axis (mirrored)	0x01
Request Header (Byte 4)	Number of Parameters	0x01
Parameter Value (Byte 1)	Format * (= Error)	**0x44**
Parameter Value (Byte 2)	Number of Values	0x01
Parameter Value (Byte 3)	Error number, High byte *	**0x00**
Parameter Value (Byte 4)	Error number, Low byte *	**0x02**

* Refer to Appendix.

10. PROFIBUS Local/Remote Operation

The example below shows how to configure the VF-MB1/S15/AS3 for local/remote operation.

<Terminal function>

F terminal .... RUN command

R terminal............ Local (Terminal in this example) / PROFIBUS switching

VIA(VF-MB1/S15) / RR(VF-AS3) terminal .... Operation frequency command

<Wiring>

<Parameter setting>
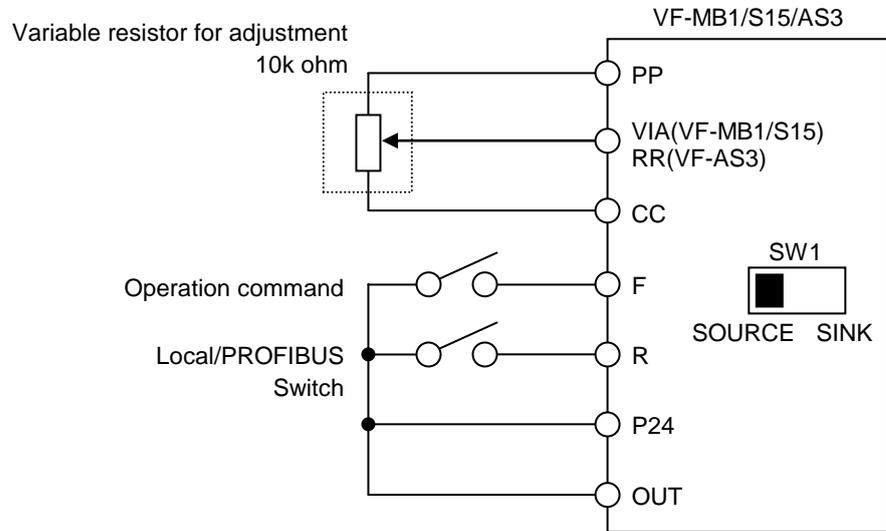
$\mathcal{L} \mathcal{\Pi} \mathcal{O} d$ (command mode selection) = 0 (terminal board)

$F \mathcal{\Pi} \mathcal{O} d$ (frequency setting mode selection 1) = 1 (VIA(VF-MB1/S15) / RR(VF-AS3))

$F \mathcal{I} \mathcal{I} \mathcal{Z}$ (input terminal selection 2 (R)) = 48 (Local/PROFIBUS control)

<Operation>

R-CC terminal open:

VF-MB1/S15/AS3 is controlled as slave device of PROFIBUS.

R-CC terminal closed:

F-CC terminal short to RUN

F-CC terminal open to STOP

Output frequency is set up by the VIA(VF-MB1/S15) / RR(VF-AS3)) signal input.

11. GSD file

As for acquisition of a GSD file for VF-MB1, VF-S15 and VF-AS3, please contact your Toshiba distributor.

12. Appendix

Function number
0x5E: Read Request
0x5F: Write Request
0x5E: Positive response for Read request
0x5F: Positive response for Write request
0xDE: Negative response for Read request
0xDF: Negative response for Write request

Request ID
0x01: Request the value
0x02: Change the value

Response ID
0x01: Positive response for Request the value
0x02: Positive response for Change the value
0x81: Negative response for Request the value
0x82: Negative response for Change the value

Axis
0x00: (Fixed for PDP003Z)

Error number
0x00: Impermissible parameter number
0x01: Impermissible parameter number
0x02: Low or High limit exceeded
0x03: Faulty subindex
0x04: No array
0x05: Incorrect data type
0x06: Setting not permitted (may only be reset)
0x07: Description element cannot be changed
0x09: No description data available
0x0B: No operation priority
0x0F: No text array available
0x11: Request cannot be executed because of operating state
0x14: Value impermissible
0x15: Response too long
0x17: Write Req., Illegal format/format of the parameter data is not supported
0x18: Number of values are not consistent
0x19: Axis/DO non existent
0x20: Parameter text element cannot be changed

Format
01: Boolean
02: Integer 8
03: Integer 16
04: Integer 32
05: Unsigned 8
06: Unsigned 16
07: Unsigned 32
08: FloatingPoint
09: VisibleString
10: OctetString
12 TimeOfDay (with date indication)
13: TimeDifference
40: Zero
41: Byte
42: Word
43: Double word
44: Error