TOSVERT VF-AS1/PS1

PROFIBUS-DP Option Function Manual

PDP002Z

* The data given in this manual are subject to change without notice.

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1. Introduction

Thank you for purchasing the PROFIBUS-DP option “PDP002Z” for the VF-AS1/PS1. 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.
In addition, please make sure that this manual and “Instruction Manual” is delivered to the end user, and keep this function manual in a safe place for future reference or drive/interface inspection.

This manual describes the supported functions for the “PDP002Z”.

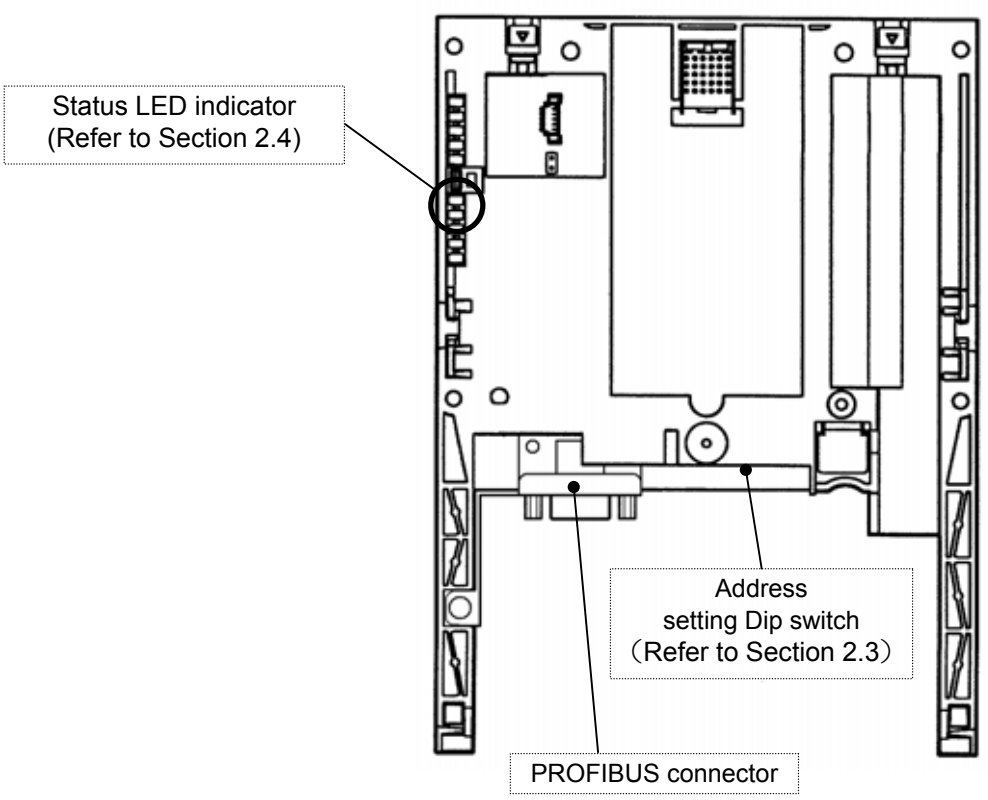
In conjunction with this manual, the following manuals are supplied by Toshiba, and they are essential both for ensuring a safe, reliable system installation as well as for realizing the full potential of the “PDP002Z”:

- TOSVERT VF-AS1 Instruction Manual E6581301
  E6581442(for WN1/WP1)
- TOSVERT VF-PS1 Instruction Manual E6581386
- PDP002Z Instruction Manual (Installation, Wiring, etc.)..... E6581279

2. Connection Information

This option allows the VF-AS1/PS1 inverter to be communicated with the cyclic command transmission and monitoring of the original profile ("USER DEFIND", refer to page 19) of our company other than application profile "Profile for Variable Speed Drives PROFIdrive (3.072), refer to page 8" which PROFIBUS defines.

2.1. **Exterior features**

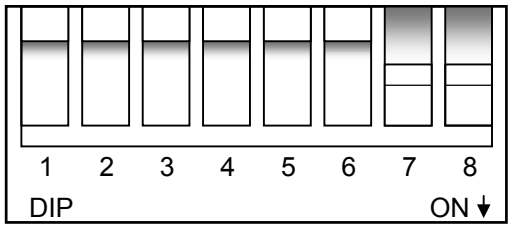


2.2. **PDP002Z Device Data**

Parameter	Value	Note
Vendor_Name	"TSIJ"	-
Model_Name	"PDP002Z"	-
Revision	"V1.1"	-
Ident_Number	0x093C	ID number
Protocol_Ident	0	PROFIBUS-DP
Station_Type	0	DP slave
FMS_supp	0	PROFIBUS-FMS: not supported
Hardware_Release	"V1.0"	-
Software_Release	"V1.0"	-
9.6_supp	1	9.6kbps: supported
19.2_supp	1	19.2kbps: supported
45.45_supp	1	45.45kbps: supported
93.75_supp	1	93.75kbps: supported
187.5_supp	1	187.5kbps: supported
500_supp	1	500kbps: supported
1.5M_supp	1	1.5Mbps: supported
3M_supp	1	3Mbps: supported
6M_supp	1	6Mbps: supported
12M_supp	1	12Mbps: supported
MaxTsdr_9.6	60	60 bit tiime
MaxTsdr_19.2	60	60 bit tiime
MaxTsdr_45.45	250	250 bit tiime
MaxTsdr_93.75	60	60 bit tiime
MaxTsdr_187.5	60	60 bit tiime
MaxTsdr_500	100	100 bit tiime
MaxTsdr_1.5M	150	150 bit tiime
MaxTsdr_3M	250	250 bit tiime
MaxTsdr_6M	450	450 bit tiime
MaxTsdr_12M	800	800 bit tiime
Redundancy	0	not supported
Repeater_Ctrl_Sig	2	TTL level
24V_Pins	0	not used
Freeze_Mode_supp	1	supported
Sync_Mode_supp	1	supported
Set_Slave_Add_Supp	0	not supported
Auto_Baud_supp	1	supported
Min_Slave_Intervall	1	0.1ms
Fail_Safe	0	mode: not supported
Modular_Station	1	-
Max_Module	1	ID: 1 byte
Max_Input_len	20	Input: 20 bytes
Max_Output_len	20	Output: 20 butes
Max_Data_len	40	Data length: 40 bytes
User_Prm_Data_Len	2	-
Max_User_Prm_Data_Len	2	-

2.3. **Setting a station address**

The DIP switch on the circuit board of the option is used to set a station address. Each DIP switch is ON when it is flipped to the lower position. By default, it is factory-configured to 2.
The station address must be unique and not match any other device on the network.



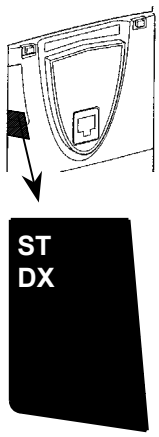
SW / ID	1	2	3	4	5	6	7	8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	**ON**
2	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	OFF
3	OFF	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**
4	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	OFF
5	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	**ON**
6	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**	OFF
7	OFF	OFF	OFF	OFF	OFF	**ON**	**ON**	**ON**
8	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	OFF
9	OFF	OFF	OFF	OFF	**ON**	OFF	OFF	**ON**
10	OFF	OFF	OFF	OFF	**ON**	OFF	**ON**	OFF
11	OFF	OFF	OFF	OFF	**ON**	OFF	**ON**	**ON**
12	OFF	OFF	OFF	OFF	**ON**	**ON**	OFF	OFF
13	OFF	OFF	OFF	OFF	**ON**	**ON**	OFF	**ON**
14	OFF	OFF	OFF	OFF	**ON**	**ON**	**ON**	OFF
15	OFF	OFF	OFF	OFF	**ON**	**ON**	**ON**	**ON**
16	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	OFF
17	OFF	OFF	OFF	**ON**	OFF	OFF	OFF	**ON**
18	OFF	OFF	OFF	**ON**	OFF	OFF	**ON**	OFF
19	OFF	OFF	OFF	**ON**	OFF	OFF	**ON**	**ON**
20	OFF	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF
21	OFF	OFF	OFF	**ON**	OFF	**ON**	OFF	**ON**
22	OFF	OFF	OFF	**ON**	OFF	**ON**	**ON**	OFF
23	OFF	OFF	OFF	**ON**	OFF	**ON**	**ON**	**ON**
24	OFF	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF
25	OFF	OFF	OFF	**ON**	**ON**	OFF	OFF	**ON**
26	OFF	OFF	OFF	**ON**	**ON**	OFF	**ON**	OFF
27	OFF	OFF	OFF	**ON**	**ON**	OFF	**ON**	**ON**
28	OFF	OFF	OFF	**ON**	**ON**	**ON**	OFF	OFF
29	OFF	OFF	OFF	**ON**	**ON**	**ON**	OFF	**ON**
30	OFF	OFF	OFF	**ON**	**ON**	**ON**	**ON**	OFF
31	OFF	OFF	OFF	**ON**	**ON**	**ON**	**ON**	**ON**

SW / ID	1	2	3	4	5	6	7	8
32	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	OFF
33	OFF	OFF	**ON**	OFF	OFF	OFF	OFF	**ON**
34	OFF	OFF	**ON**	OFF	OFF	OFF	**ON**	OFF
35	OFF	OFF	**ON**	OFF	OFF	OFF	**ON**	**ON**
36	OFF	OFF	**ON**	OFF	OFF	**ON**	OFF	OFF
37	OFF	OFF	**ON**	OFF	OFF	**ON**	OFF	**ON**
38	OFF	OFF	**ON**	OFF	OFF	**ON**	**ON**	OFF
39	OFF	OFF	**ON**	OFF	OFF	**ON**	**ON**	**ON**
40	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF
41	OFF	OFF	**ON**	OFF	**ON**	OFF	OFF	**ON**
42	OFF	OFF	**ON**	OFF	**ON**	OFF	**ON**	OFF
43	OFF	OFF	**ON**	OFF	**ON**	OFF	**ON**	**ON**
44	OFF	OFF	**ON**	OFF	**ON**	**ON**	OFF	OFF
45	OFF	OFF	**ON**	OFF	**ON**	**ON**	OFF	**ON**
46	OFF	OFF	**ON**	OFF	**ON**	**ON**	**ON**	OFF
47	OFF	OFF	**ON**	OFF	**ON**	**ON**	**ON**	**ON**
48	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF
49	OFF	OFF	**ON**	**ON**	OFF	OFF	OFF	**ON**
50	OFF	OFF	**ON**	**ON**	OFF	OFF	**ON**	OFF
51	OFF	OFF	**ON**	**ON**	OFF	OFF	**ON**	**ON**
52	OFF	OFF	**ON**	**ON**	OFF	**ON**	OFF	OFF
53	OFF	OFF	**ON**	**ON**	OFF	**ON**	OFF	**ON**
54	OFF	OFF	**ON**	**ON**	OFF	**ON**	**ON**	OFF
55	OFF	OFF	**ON**	**ON**	OFF	**ON**	**ON**	**ON**
56	OFF	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF
57	OFF	OFF	**ON**	**ON**	**ON**	OFF	OFF	**ON**
58	OFF	OFF	**ON**	**ON**	**ON**	OFF	**ON**	OFF
59	OFF	OFF	**ON**	**ON**	**ON**	OFF	**ON**	**ON**
60	OFF	OFF	**ON**	**ON**	**ON**	**ON**	OFF	OFF
61	OFF	OFF	**ON**	**ON**	**ON**	**ON**	OFF	**ON**
62	OFF	OFF	**ON**	**ON**	**ON**	**ON**	**ON**	OFF
63	OFF	OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**

SW / ID	1	2	3	4	5	6	7	8
64	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	OFF
65	OFF	**ON**	OFF	OFF	OFF	OFF	OFF	**ON**
66	OFF	**ON**	OFF	OFF	OFF	OFF	**ON**	OFF
67	OFF	**ON**	OFF	OFF	OFF	OFF	**ON**	**ON**
68	OFF	**ON**	OFF	OFF	OFF	**ON**	OFF	OFF
69	OFF	**ON**	OFF	OFF	OFF	**ON**	OFF	**ON**
70	OFF	**ON**	OFF	OFF	OFF	**ON**	**ON**	OFF
71	OFF	**ON**	OFF	OFF	OFF	**ON**	**ON**	**ON**
72	OFF	**ON**	OFF	OFF	**ON**	OFF	OFF	OFF
73	OFF	**ON**	OFF	OFF	**ON**	OFF	OFF	**ON**
74	OFF	**ON**	OFF	OFF	**ON**	OFF	**ON**	OFF
75	OFF	**ON**	OFF	OFF	**ON**	OFF	**ON**	**ON**
76	OFF	**ON**	OFF	OFF	**ON**	**ON**	OFF	OFF
77	OFF	**ON**	OFF	OFF	**ON**	**ON**	OFF	**ON**
78	OFF	**ON**	OFF	OFF	**ON**	**ON**	**ON**	OFF
79	OFF	**ON**	OFF	OFF	**ON**	**ON**	**ON**	**ON**
80	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF
81	OFF	**ON**	OFF	**ON**	OFF	OFF	OFF	**ON**
82	OFF	**ON**	OFF	**ON**	OFF	OFF	**ON**	OFF
83	OFF	**ON**	OFF	**ON**	OFF	OFF	**ON**	**ON**
84	OFF	**ON**	OFF	**ON**	OFF	**ON**	OFF	OFF
85	OFF	**ON**	OFF	**ON**	OFF	**ON**	OFF	**ON**
86	OFF	**ON**	OFF	**ON**	OFF	**ON**	**ON**	OFF
87	OFF	**ON**	OFF	**ON**	OFF	**ON**	**ON**	**ON**
88	OFF	**ON**	OFF	**ON**	**ON**	OFF	OFF	OFF
89	OFF	**ON**	OFF	**ON**	**ON**	OFF	OFF	**ON**
90	OFF	**ON**	OFF	**ON**	**ON**	OFF	**ON**	OFF
91	OFF	**ON**	OFF	**ON**	**ON**	OFF	**ON**	**ON**
92	OFF	**ON**	OFF	**ON**	**ON**	**ON**	OFF	OFF
93	OFF	**ON**	OFF	**ON**	**ON**	**ON**	OFF	**ON**
94	OFF	**ON**	OFF	**ON**	**ON**	**ON**	**ON**	OFF
95	OFF	**ON**	OFF	**ON**	**ON**	**ON**	**ON**	**ON**

SW / ID	1	2	3	4	5	6	7	8
96	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF
97	OFF	**ON**	**ON**	OFF	OFF	OFF	OFF	**ON**
98	OFF	**ON**	**ON**	OFF	OFF	OFF	**ON**	OFF
99	OFF	**ON**	**ON**	OFF	OFF	OFF	**ON**	**ON**
100	OFF	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF
101	OFF	**ON**	**ON**	OFF	OFF	**ON**	OFF	**ON**
102	OFF	**ON**	**ON**	OFF	OFF	**ON**	**ON**	OFF
103	OFF	**ON**	**ON**	OFF	OFF	**ON**	**ON**	**ON**
104	OFF	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF
105	OFF	**ON**	**ON**	OFF	**ON**	OFF	OFF	**ON**
106	OFF	**ON**	**ON**	OFF	**ON**	OFF	**ON**	OFF
107	OFF	**ON**	**ON**	OFF	**ON**	OFF	**ON**	**ON**
108	OFF	**ON**	**ON**	OFF	**ON**	**ON**	OFF	OFF
109	OFF	**ON**	**ON**	OFF	**ON**	**ON**	OFF	**ON**
110	OFF	**ON**	**ON**	OFF	**ON**	**ON**	**ON**	OFF
111	OFF	**ON**	**ON**	OFF	**ON**	**ON**	**ON**	**ON**
112	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF
113	OFF	**ON**	**ON**	**ON**	OFF	OFF	OFF	**ON**
114	OFF	**ON**	**ON**	**ON**	OFF	OFF	**ON**	OFF
115	OFF	**ON**	**ON**	**ON**	OFF	OFF	**ON**	**ON**
116	OFF	**ON**	**ON**	**ON**	OFF	**ON**	OFF	OFF
117	OFF	**ON**	**ON**	**ON**	OFF	**ON**	OFF	**ON**
118	OFF	**ON**	**ON**	**ON**	OFF	**ON**	**ON**	OFF
119	OFF	**ON**	**ON**	**ON**	OFF	**ON**	**ON**	**ON**
120	OFF	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF
121	OFF	**ON**	**ON**	**ON**	**ON**	OFF	OFF	**ON**
122	OFF	**ON**	**ON**	**ON**	**ON**	OFF	**ON**	OFF
123	OFF	**ON**	**ON**	**ON**	**ON**	OFF	**ON**	**ON**
124	OFF	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	OFF
125	OFF	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	**ON**
126	OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	OFF

2.4. **Status indicator**



The PDP002Z has two LEDs, ST (status) and DX (data exchange) to indicate the statuses of PROFIBUS-DP and the PDP002Z itself.

ST (Status): Red LED

LED	Meanings
Off	No diagnostics present
Flashes	Waiting for parameterisation or configuration
Lights	DP status error * For example, a station address is not setcorrectly.

DX (Data exchange): Green LED.
Indicates the status of the PROFIBUS network.
It lights when the PDP002Z is on-line and data exchange is possible.

2.5. **Communications-related parameters**

Parameter	Function	Adjustment range	Default setting
F830*	Communication option setting 1 (PPO TYPE)	0: None 1: PPO TYPE 1 2: PPO TYPE 2 3: PPO TYPE 3 4: PPO TYPE 4	0
F831 - F846	Communication option setting 2 - 13	Refer to section 4.	0
F851	Inverter operation at the communications loss action (Network wire breaks)	0: Stop and break of connection 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 F852)	0
F852	Preset speed operation selection	0: None 1 to 15: Preset speed	0
F853	Monitoring of communication device station address	Displays the station address assigned with the DIP switch. 0 to 125	2
F854**	Monitoring of communications device's baud rate	Displays the network communication speed set with the DIP switch. 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: 45.45 kbit/s 8: 19.2 kbit/s 9: 9.6 kbit/s 255: Disabled	0

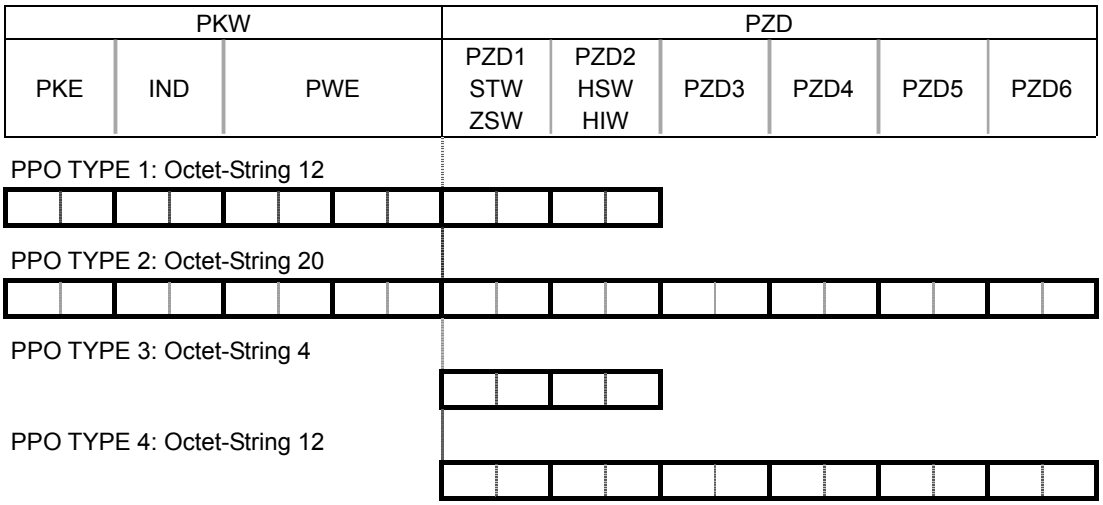
* When the parameters are changed, the power must be cycled to the VF-AS1/PS1 for the changes to take effect.

** The baud rate of the PDP002Z is automatically set by configuration a baud rate for the master.

3.“PROFIdrive” Profile

3.1. **PPO TYPE**

The PPO type of PDP002Z is set up by this parameter.
The PROFIBUS-DP protocol uses so-called PPOs *(Parameter/Process Data Objects)* in cyclic communication. The figures below show the PPO types and configurations that the PDP002Z supports.



PKW: Parameter ID/value
PZD: Process Data, cyclically transferred

PKE: Parameter ID (1st and 2nd octet)
IND: Sub-index (3rd octet), 4th octet is reserved
PWE: Parameter value (5th until 8th octet)

STW: Control word
HSW: Main setpoint

ZSW: Status word
HIW: Main actual value

∗ There are some by which a high byte / low byte is conversely treated depending on a master.

3.2. **STW Control Word Data**

PDP002Z supports only speed control mode.

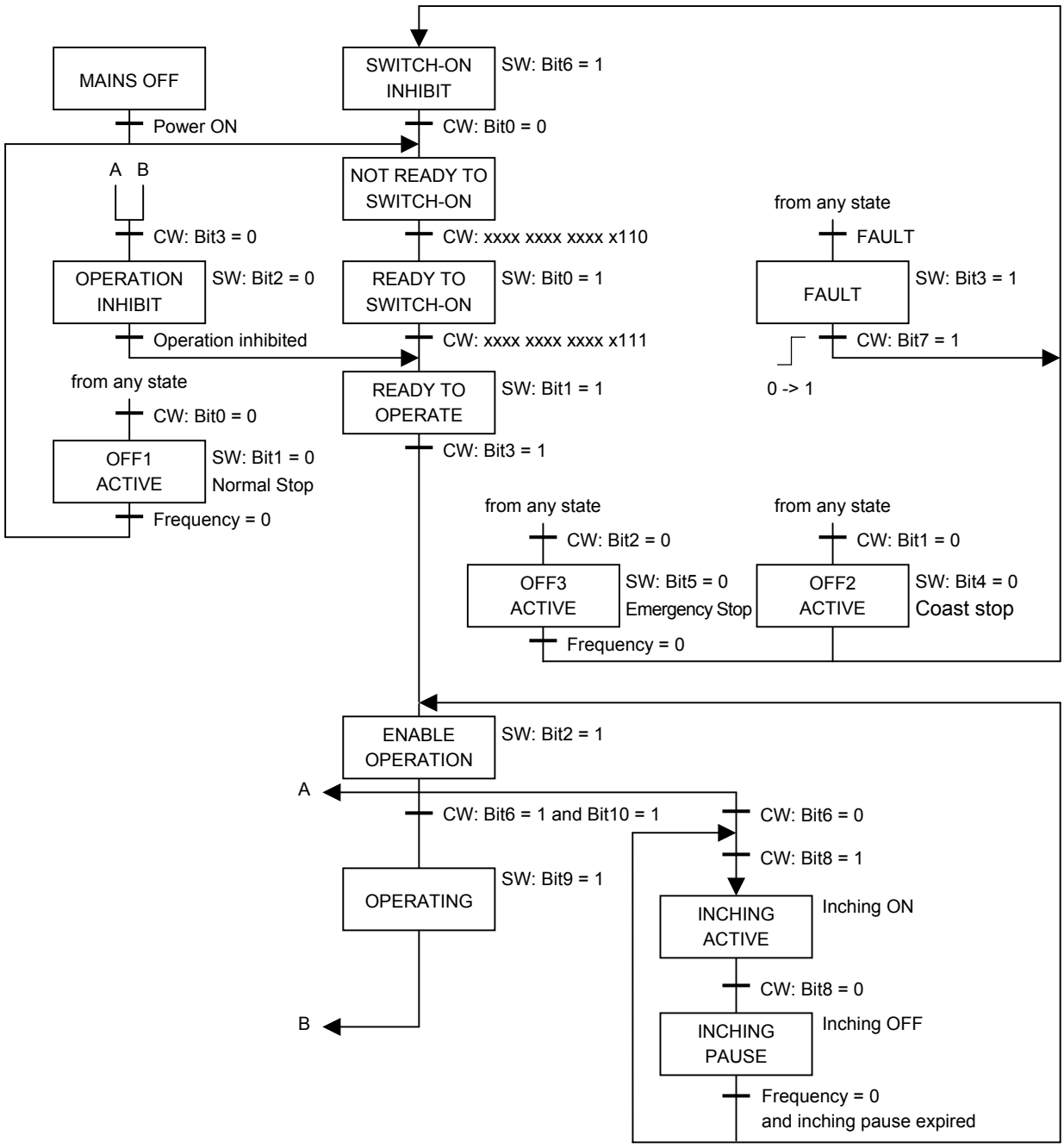
Bit	Value	Name	Note
0	1	ON	Drive can be started if all other start conditions are fulfilled.
	0	OFF 1	Normal stop.
1	1	Operating condition	Drive can be started if all other start conditions are fulfilled.
	0	OFF 2	Coast stop.
2	1	Operating condition	Drive can be started if all other start conditions are fulfilled.
	0	OFF 3	Emergency Stop.
3	1	Operation	Drive can be started if all other start conditions are fulfilled.
	0	Inhibit operation	Normal stop.
4	1	Operation condition	No function.
	0	Inhibit ramp-function	No function.
5	1	Enable ramp-function	No function.
	0	Stop ramp-function	No function.
6	1	Enable setpoint	Drive can be started if all other start conditions are fulfilled.
	0	inhibit setpoint	Reference frequency is set to zero.
7	1	Acknowledge	Fault reset (0 -> 1)
	0	No meaning	No function.
8	1	Inching 1 ON	Inverter drives with jogging speed.
	0	Inching 1 OFF	Jogging stop, if "inching 1" was previously ON. Stop drive according to inverter setting parameter.
9	1	Inching 2 ON	No function.
	0	Inching 2 OFF	No function.
10	1	Control from the automation unit	The control word and frequency setpoint (from Profibus) are activated.
	0	No control	The control word and frequency setpoint (from Profibus) are not valid.
11 - 15	----	Device-specification	(Reserved.)

3.3. **ZSW Status Word Data**

Bit	Valur	Name	Note
0	1	Ready to switch-on	Control word bit 0 = 0 and bit1, 2, 10 are set to 1.
	0	Not ready switch-on	Control word bit 0 = 0, 1, 2 or 10 are set to 0, or the inverter is tripped.
1	1	Ready	Refer to control word, bit 0.
	0	Not ready	-
2	1	Operating enabled	Refer to control word, bit 3.
	0	Operation inhibited	-
3	1	Fault	Inverter is faulted.
	0	Fault-free	Inverter is not tripped.
4	1	No OFF 2	-
	0	OFF 2	"OFF 2" command present
5	1	No OFF 3	-
	0	OFF 3	"OFF 3" command present
6	1	Switch-on inhibit	Control word bit1 or 2 is set to 0 or fault trip has been acknowledged.
	0	No switch-on inhibit	-
7	1	Alarm	Drive still operational: Alarm in service parameter: No acknowledgement.
	0	No alarm	Alarm not present or alarm has disappeared again
8	1	Setpoint / actual value monitoring in the tolerance	-
	0	As above, but not in the tolerance range	-
9	1	Control request	Run command or frequency setting is valid via Profibus.
	0	Local operation	Control only possible on the VF-AS1/PS1.
10	1	f or n reached	Actual value = comparison value (at reference), set via the parameter number
	0	f or n fallen below	-
11	----	Device-specification OUT1 terminal monitor	OUT1 output terminal monitor (bit 0 of fd07. Function selection: F130)
12	----	Device-specification OUT2 terminal monitor	OUT2 output terminal monitor (bit 1 of fd07. Function selection: F131)
13	----	Device-specification FL terminal monitor	FL output terminal monitor (bit 2 of fd07. Function selection: F132)
14	----	Device-specification OUT3 terminal monitor	OUT3 output terminal monitor (bit 3 of fd07. Function selection: F133)
15	----	Device-specification OUT4 terminal monitor	OUT4 output terminal monitor (bit 3 of fd07. Function selection: F134)

*Bit 11 - 15 are the ON/OFF status monitor of each terminals.

3.4. **State Macine**



CW: Control Word
ST: Status Word
—: Status

3.4.1. 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 uL)”.
When the reverse operation, the frequency reference is set with two's complement of the forward frequency reference.
During running, HIW shows a output frequency.

3.4.1.1. 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 0100 1111 (= 0x044F)
↓
“OPERATION”
↓
④ 0000 0100 0100 1110 (= 0x044E)
↓
“OFF1 ACTIVE (Normal Stop)”

3.4.1.2. Example 2. 30Hz Reverse running

When 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.

3.4.1.3. Example 3. Inching and pause

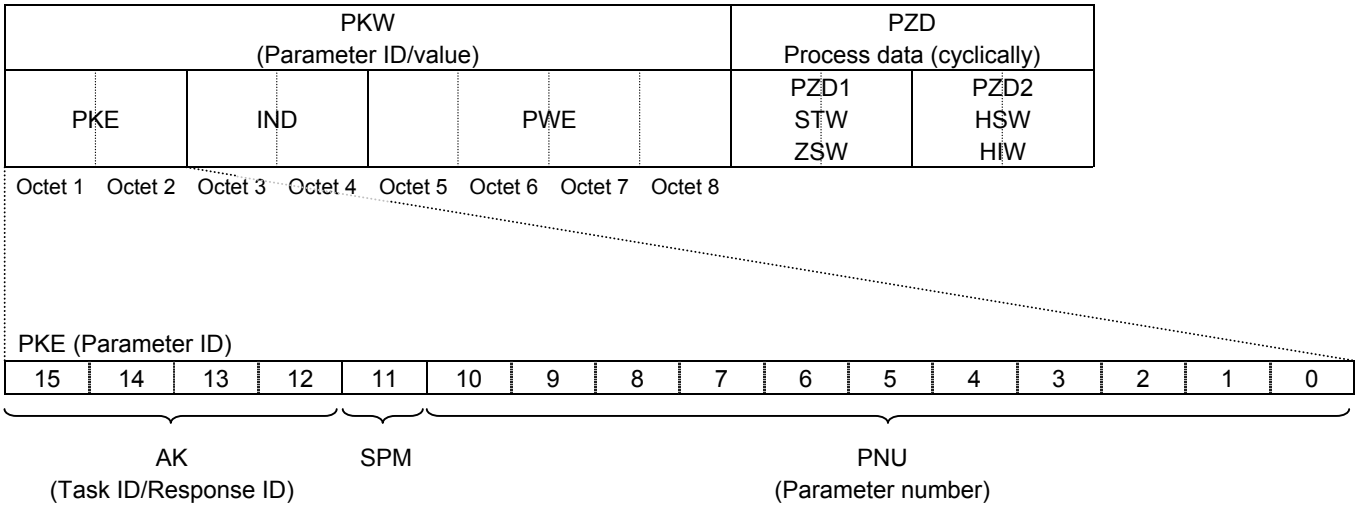
the following is set to STW in order.

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)
↓
“INCHING ACTIVE”
↓
④ 0000 0100 0100 1111 (= 0x040F)
↓
“INCHING PAUSE”

* The inching frequency is according to the parameter F260 on VF-AS1/PS1.

3.5. The Access to the PROFIBUS parameter

In the cyclic PROFIBUS-DP communication, the parameter data is transferred via PPO TYPE1 and 2. If the requirement is not executed, the cause is distinguished by octet 7 and 8.



AK (Request from Master to PDP002Z）

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-AS1/PS1 parameter access
7	Change parameter value (array)	for PNU access, VF-AS1/PS1 parameter access

AK (Response from PDP002Z to Master)

Response ID	Function
0	No response
1	Transfer parameter value (word)
4	Transfer parameter value (array)
7	Task can not 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.

PNU (the parameter number)

PNU	R/W	data type	Note
915	R/W	Array [10] Unsigned16	PNU 915, IND 1 = the inverter parameter F831 PNU 915, IND 2 = the inverter parameter F832 PNU 915, IND 3 = the inverter parameter F833 PNU 915, IND 4 = the inverter parameter F834 PNU 915, IND 5 = the inverter parameter F835 PNU 915, IND 6 = the inverter parameter F836
916	R/W	Array [10] Unsigned16	PNU 916, IND 1 = the inverter parameter F841 PNU 916, IND 2 = the inverter parameter F842 PNU 916, IND 3 = the inverter parameter F843 PNU 916, IND 4 = the inverter parameter F844 PNU 916, IND 5 = the inverter parameter F845 PNU 916, IND 6 = the inverter parameter F846
918	R	Unsigned16	Station address monitor (same as the inverter parameter F853).
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/W	Unsigned16	Control rights (process data, PZD). Value: Mode 0: PZD part is disabled. i.e. Receipt of new PZD data is ignored. 1: PZD part is enabled (default).
929	R	Unsigned16	Selected PPO-type (same as the inverter parameter F830) Value: PPO TYPE 1: PPO TYPE 1 2: PPO TYPE 2 3: PPO TYPE 3 4: PPO TYPE 4
939	R/W	Unsigned16	OUT1 output terminal selection (same as F130). Monitor is enabled using Status word bit 11.
940	R/W	Unsigned16	OUT2 output terminal selection（same as F131). Monitor is enabled using Status word bit 12.
941	R/W	Unsigned16	FL output terminal selection (same as F132). Monitor is enabled using Status word bit 13.
942	R/W	Unsigned16	OUT3 output terminal selection (same as F133). Monitor is enabled using Status word bit 14.
943	R/W	Unsigned16	OUT4 output terminal selection (same as F134). Monitor is enabled using Status word bit 15.
947	R	Array [64] Unsigned16	Fault number PNU 947, IND 1 = FC90 (Active fault) PNU 947, IND 9 = FE10 (Last ackn. fault) PNU 947, IND 17 = FE11 (Second last ackn. fault) PNU 947, IND 25 = FE12 (Third last ackn. fault) PNU 947, IND 33 = FE13 (Fourth last ackn. fault)
963	R	Unsigned16	Detected baud rate (same as F854): 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 = 45.45 kbit/s 8 = 19.2 kbit/s 9 = 9.6 kbit/s 255 = Invalid baud rate
964	R	Unsigned16	Identification number of the PDP002Z (0x093C)
965	R	Octet String2	Profile number of the PDP002Z (0x0302)
967	R	Unsigned16	Control word
968	R	Unsigned16	Status word

3.5.1. Examples of reading or changing the PROFIdrive parameter

3.5.1.1. Example 1. Reading the PNU 964 (ID number)

AK = 1 (Request parameter value)
SPM = 0
PNU = 964 (0x03C4)

PKE

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

Requirement

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

Response (Value: 0x093C)

13	**C4**	00	00	00	00	**09**	**3C**	···	···

3.5.1.2. Example 2. Reading the PNU 947, IND (Fault history)

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 947 (0x03B3)
IND = 0x0001 (Active fault)

PKE

0	1	1	0	0	0	1	1	1	0	1	1	0	0	1	1
6				3				B				3			

Requirement

PKW								PZD	
PKE		IND		PWE					
63	**B3**	**00**	**01**	00	00	00	00	···	···

Response (Value: 0x000D = Inverter over load*)

43	**B3**	**00**	**01**	00	00	**00**	**0D**	···	···

* Refer to page 26 about the fault code.

3.5.1.3. Example 2. Changing the PNU 933 (Control word, bit 11)

AK = 2 (Change parameter value (word))
SPM = 0
PNU = 933 (0x03A5)
PWE = 10 (0x000A)

PKE

0	0	1	0	0	0	1	1	1	0	1	0	0	1	0	1
2				3				A				5			

Requirement (PNU 933 = 10 (F 1 1 1 = 10))

PKW								PZD	
PKE		IND		PWE					
23	**A5**	00	00	00	00	**00**	**0A**	···	···

Response (Value: 0x000D = Inverter over load)

13	**A5**	00	00	00	00	**00**	**0A**	···	···

Example of the error occurrence

Requirement (PNU 933 = 136 (out of the value range))

PKW								PZD	
PKE		IND		PWE					
23	**A5**	00	00	00	00	**00**	**88**	···	···

Response (Value: 0x0002 = Lower or upper limit violated)

73	**A5**	00	00	00	00	**00**	**02**	···	···

3.6. **Access to the VF-AS1/PS1 parameter**

When access to the VF-AS1/PS1 parameter, set “1” to the PNU. The communication number of the inverter parameter is set to the subindex IND.
Refer to the inverter instruction manual about the communication number and unit.

3.6.1. Examples of reading or changing the VF-AS1/PS1 parameter

3.6.1.1. Example 1. Reading the basic parameter (C n0d (command mode selection))

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 1
IND = 0x0003 (C n0d 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**	···	···

3.6.1.2. Example 2. Reading the extended parameter (F2 19 (RX input point 2 frequency))

AK = 6 (Request parameter value (array))
SPM = 0
PNU = 1
IND = 0x0219 (F2 19 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 “RX input point 2 frequency” is
0x1770 = 6000 (decimal number)
Since the unit of “RX input point 2 frequency” is 0.01Hz, set the following value.
6000×0.01 = 60.00Hz

3.6.1.3. 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 can not be changed.

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

AK = 7 (Change parameter value (array word))
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 0.1s.)
7.0/0.1 = 70 = 0x0046 (hexadecimal number)

4.”USER DEFIND” Profile

Cyclic command transmission (the value of the parameter F831 - F836) and monitoring (the value of the parameter F841 - F846) are possible for PDP002Z by the original profile

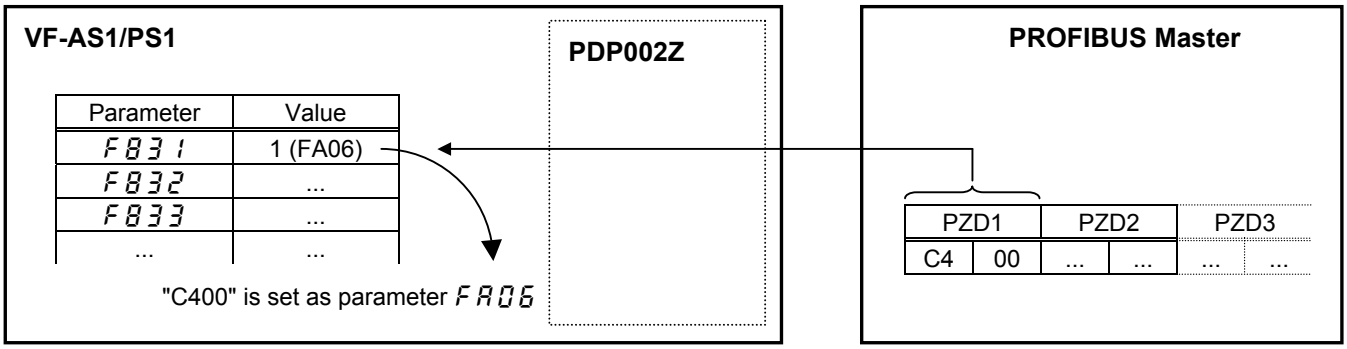
Select the ”USER DEFIND” as the profile on the configuration.
Refer to the PLC configurator documents.

F831 - F836 setup value	F841 - F846 setup value
0: No action	0: No action
1: FA06 (ALCAN2 command 1)	1: FD01 (Inverter status 1)
2: FA23 (ALCAN2 command 2)	2: FD00 (Output frequency, 0.01Hz)
3: FA07 (ALCAN2 frequency command, 0.01Hz)	3: FD03 (Output current, 0.01%)
4: FA33 (Torque command, 0.01%)	4: FD05 (Output voltage, 0.01%)
5: FA50 (Terminal output)	5: FC91 (Inverter alarm)
6: FA51 (Analog output (FM) data from comm.)	6: FD22 (PID feedback value, 0.01Hz)
7: FA52 (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: FE36 (VI/II input)
10: F443 (Regenerative braking torque limit 1 level, 0.01%)	10: FE35 (RR/S4 input)
11: F460 (Speed loop proportional gain)	11: FE37 (RX input)
12: F461 (Speed loop stabilization coefficient)	12: FD04 (Input voltage (DC detection), 0.01%)
	13: FD16 (Speed feedback (real-time value)
	14: FD18 (Torque, 0.01%)
	15: FE60 (My monitor)
	16: FE61 (My monitor)
	17: FE62 (My monitor)
	18: FE63 (My monitor)
	19: F880 (Free notes)
	20: FD29 (Input power, 0.01kW)
	21: FD30 (Output power, 0.01kW)
	22: FE14 (Cumulative operation time, 1 hour)
	23: FE40 (FM terminal output monitor)
	24: FE41 (AM terminal output monitor)

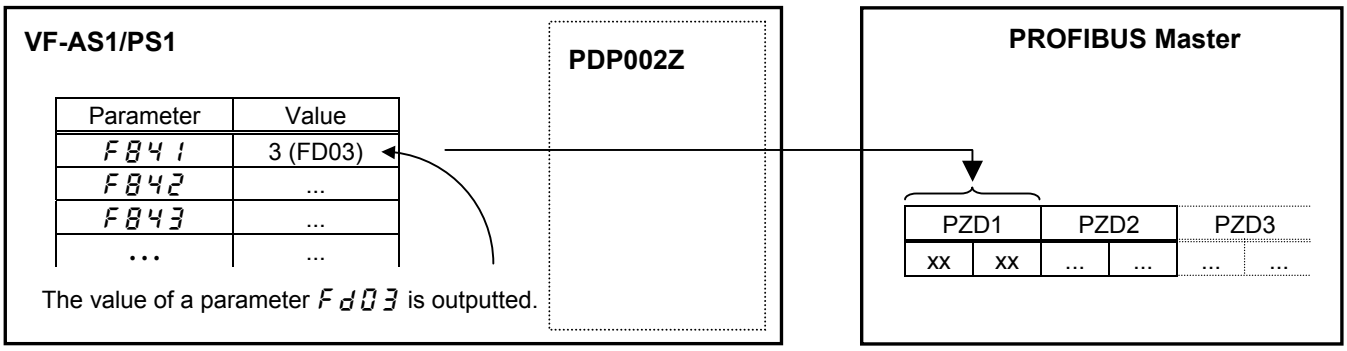
4.1. How to use

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 FA06, set “1 (FA06)” to parameter F831.
And Since 0 and 1 byte of the PZD1 supports the parameter F831, if "0xC400" is set up here, "0xC400" will be set as FA06.



Example 2: State monitoring
When you want to monitor the output current, set “3 (FD03)” to parameter F841.
The value of the parameter Fd03 specified as 0 and1 byte of the PZD1 with the parameter F841 is inputted.



4.2. The overview of the VF-AS1/PS1 parameter

Refer to a communication functional description (VF-AS1: E6581315/VF-PS1: E6581413) for details.

4.2.1. FA06 (Command word 1 from internal option PCB)

bit	Function	0	1	Note
0	Preset Speed1	OFF .....0000, 1 - 15 .....0001 - 1111		Combination of 4 bits.
1	Preset Speed2			
2	Preset Speed3			
3	Preset Speed4			
4	THR1/2	Motor 1 (THR1)	Motor 2 (THR2)	THR1: tHr THR2: F173
5	PI off	Normal	PI off	-
6	ACC1/ACC2	ACC 1 (AD1)	ACC 2 (AD2)	AD1: ACC, dEC AD2: F500, F501
7	DC braking	OFF	DC braking	-
8	Jog	OFF	JOG RUN	-
9	Forward/Reverse	Fw.	Rev.	-
10	Run/stop	STOP	RUN	-
11	Free run (ST)		Free run	-
12	Emergency stop	OFF	EMG./ Stop	Always enable
13	Reset trip	OFF	Reset	-
14	Frequency link	OFF	Priority	Enable in spite of the parameter FMOd
15	Command link	OFF	Priority	Enable in spite of the parameter CMOd

4.2.2. FA23 (Command word 2 from internal option PCB)

bit	Function	0	1	Note
0	Speed/Torque	Speed Ctrl.	Torque Ctrl.	-
1	Clear kwh	OFF	Clear	Clear the value of FE76, FE77
2	(Reserved)	-	-	-
3*	Brake Close (BC)	Normal	Forced Close	-
4*	Pre magnetic	Normal	ON	-
5*	Brake Open (B)	Brake Close	Brake Open	-
6*	Brake Answer (BA)	Brake Close	Brake Open	-
7	Fast Stop	Normal	ON	-
8	ACC1/ACC2	00: Acc. / Dec. 1 01: Acc. / Dec. 2 10: Acc. / Dec. 3* 11: Acc. / Dec. 4*		Combination of 2 bits. AD1: ACC, dEC AD2: F500, F501 AD3: F510, F511* AD4: F514, F515*
9	ACC3/ACC4*			
10	THR 1/2	00: V/f 1 01: V/f 2 10: V/f 3* 11: V/f 4*		Combination of 2 bits.
11	THR 3/4*			
12*	Torque Limit 1/2	00: Torque limit 1 01: Torque limit 2 10: Torque limit 3 11: Torque limit 4		Combination of 2 bits.
13*	Torque Limit 3/4			
14*	Speed Gain 1/2	Gain 1	Gain 2	Gain 1: F460, F461 Gain 2: F462, F463
15	(Reserved)	-	-	-

* These functions are reserved in VF-PS1.

4.2.3. FA07 (Frequency reference from internal option PCB)

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,
80 / 0.01 = 8000 = 0x1F40 (Hex.)

4.2.4. FA33 (Torque reference from internal option PCB)

Torque reference is set up by 0.01% unit and the hexadecimal number.
For example, when "torque reference" is set up to 50%, since the minimum unit is 0.01%,
50 / 0.01 = 5000 = 0x1388 (Hex.)

4.2.5. FA50 (Terminal output data from comm.)

By setting up the data of the bit 0 - 6 of terminal output data (FA50) from communication, setting data (0 or 1) can be outputted to the output terminal.
Please select the functional number 92 - 105 as the selection (F130 - F138, F168, F169) of the output terminal function before using it.

bit	Output TB function name	0	1
0	Communication data 1 (Output TB select No.: 92, 93)	OFF	ON
1	Communication data 2 (Output TB select No.: 94, 95)		
2	Communication data 3 (Output TB select No.: 96, 97)		
3	Communication data 4 (Output TB select No.: 98, 99)		
4	Communication data 5 (Output TB select No.: 100, 101)		
5	Communication data 6 (Output TB select No.: 102, 103)		
6	Communication data 7 (Output TB select No.: 104, 105)		
7	-	-	-

4.2.6. FA51 (Analog output (FM) data from comm.)

The data set as the parameter FA51 can output to FM terminal.
The data adjustment range is 0 - 1023 (resolution: 10 bits).
Please select 31 (analog output for communication) as FM terminal meter selection parameter (FM5L) before using it.
Please refer to "Meter setting and adjustment" Section of the VF-AS1/PS1 instructions manual for details.

4.2.7. FA52 (Analog output (AM) data from comm.)

The data set as the parameter FA52 can output to AM terminal.
The data adjustment range is 0 - 1023 (resolution: 10 bits).
Please choose 31 (analog output for communication) as AM terminal meter selection parameter (AM5L) before using it.
Please refer to "Meter setting and adjustment" Section of the VF-AS1/PS1 instructions manual for details.

4.2.8. FD01 (Inverter status (real time))

bit	Function	0	1	Note
0	FL	No output	Under output	-
1	EMG	No fault	Under fault	The rtry status and the trip retention status are also regarded as tripped statuses.
2	ALARM	No alarm	Under alarm	-
3	(Reserved)	-	-	-
4	tHr2(VF2+tH2)	Motor 1 (THR1)	Motor 2 (THR2)	THR1: tHr THR2: F173
5	PI	PI enable	PI off	-
6	ACC1/ACC2	Acc./Dec. 1 (AD1)	Acc./Dec. 2 (AD2)	AD1: ACC, dEC AD2: F500, F501
7	DC braking	OFF	DC braking	-
8	Jog	OFF	JOG RUN	-
9	Forward /Reverse	Fwd. RUN	Rev. RUN	-
10	Run/stop	STOP	RUN	-
11	Free run (ST)	ST=ON	ST=OFF	-
12	Emergency stop	No EMG. Stop	Under EMG. Stop	-
13	READY with ST/ RUN	-	-	ST = ON and RUN = ON in addition to “ready for operation”*
14	READY without ST/RUN	-	-	-
15**	Local/Remote	Remote	Local	-

* Ready for operation: Initialization completed, not a stop due to a failure, no alarm issued, not nOFF, not a forced stop due to LL, not a forced stop due to a momentary power failure.

** This function is reserved in VF-AS1.

4.2.9. FD00 (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.

- FD22 (Feedback value of PID (real time))....Unit: 0.01Hz
- FD16 (PG feedback or Estimated speed (real time))....Unit: 0.01Hz
- FD29 (Input power (real time))....Unit: 0.01kW
- FD30 (Output power (real time))....Unit: 0.01kW

4.2.10. FD03 (Output current (real time))

The current 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 inverter is 50% (2.4A), 0x1388 (hexadecimal number) is read.
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.

- FD05 (Output voltage(real time)....Unit: 0.01% (V)
- FD04 (Voltage at DC bus (real time)....Unit: 0.01%(V)
- FD18 (Torque....Unit: 0.01% (Nm)*

* When the motor information connected to the inverter set to the parameter (F405 - F415), torque monitor value "100%" is same as the rated torque of a motor in general.

4.2.11. FE36 (Analog input value VI/II)

The value inputted into the VI/II terminal is read.
The value range is 0 - 10000 (0 - 100.00 %).

Also the same as the parameter FE35 (RR Input).

4.2.12. FE37 (RX Input)

The value inputted into the RX terminal is read.
The value range is -10000 - 10000 (-100.00 - +100.00 %).

4.2.13. FE60 - FE63 (My Monitor)

Refer to the function Manual (E6581335).

4.2.14. FE14 (Cumulative run time)

The operated cumulative time is read by the hexadecimal number.
For example, when cumulative operation time is 18 hours, 0x12 (16 hours) is read.
0x12 (Hex.) = 18 (Dec., hour)

4.2.15. FE40 (Analog output (FM))

The output value of FM terminal is read.
The value range is set to 0 - 65535 (0xFFFF).

- Also about FE41 (AM terminal output monitor), it is the same as this parameter.

4.2.16. FC91 (Alarm code)

bit	Function	0	1	Note
0	Over current alarm	Normal	Under alarm	"E" blinking
1	Inverter over load alarm	Normal	Under alarm	"L" blinking
2	Motor over load alarm	Normal	Under alarm	"L" blinking
3	Over heat alarm	Normal	Under alarm	"H" blinking
4	Over voltage alarm	Normal	Under alarm	"P" blinking
5	Under voltage of main power	Normal	Under alarm	-
6	(Reserved)	-	-	-
7	Under current alarm	Normal	Under alarm	-
8	Over torque alarm	Normal	Under alarm	-
9	OLr alarm	Normal	Under alarm	-
10	Cumulative run-time alarm	Normal	Under alarm	-
11	(Reserved)	-	-	-
12	(Reserved)	-	-	-
13	(Reserved)	-	-	-
14	Stop after instantaneous power off	-	Dec., Under stop	Refer to F256 value
15	Stop after LL continuance time	-	Dec., Under stop	Refer to UuC value

4.2.17. FD06 (Input TB Status)

bit	TB Name	Function (Parameter)	0	1
0	F	Input TB Function select 1 (F111)	OFF	ON
1	R	Input TB Function select 2 (F112)		
2*	ST	Input TB Function select 3 (F113)		
3	RES	Input TB Function select 4 (F114)		
4	S1	Input TB Function select 5 (F115)		
5	S2	Input TB Function select 6 (F116)		
6	S3	Input TB Function select 7 (F117)		
7	S4	Input TB Function select 8 (F118)		
8	L1	Input TB Function select 9 (F119)		
9	L2	Input TB Function select 10 (F120)		
10	L3	Input TB Function select 11 (F121)		
11	L4	Input TB Function select 12 (F122)		
12	L5	Input TB Function select 13 (F123)		
13	L6	Input TB Function select 14 (F124)		
14	L7	Input TB Function select 15 (F125)		
15	L8	Input TB Function select 16 (F126)		

＊This function is reserved in VF-PS1 and VF-AS1(WN1/WP1).

4.2.18. FD07 (Output TB Status)

bit	TB Name	Function (Parameter)	0	1
0	OUT1	Output TB Function select 1 (F130)	OFF	ON
1	OUT2	Output TB Function select 2 (F131)		
2	FL	Output TB Function select 3 (F132)		
3	OUT3	Output TB Function select 4 (F133)		
4	OUT4	Output TB Function select 5 (F134)		
5	R1	Output TB Function select 6 (F135)		
6	OUT5	Output TB Function select 7 (F136)		
7	OUT6	Output TB Function select 8 (F137)		
8	R2	Output TB Function select 9 (F138)		
9	R3	Output TB Function select 10 (F168)		
10	R4	Output TB Function select 11 (F169)		
11 - 15	-	-	-	-

4.2.19. FC90, FE10 - FE13 (Inverter fault)

Data (hexa-decimal)	Data (decimal)	Code	Description
0	0	nErr	No error
1	1	OC 1	Over-current during acceleration
2	2	OC2	Over-current during deceleration
3	3	OC3	Over-current during constant speed operation
4	4	OCL	Over-current in load at startup
5	5	OCA1	U-phase arm over-current
6	6	OCA2	V-phase arm over-current
7	7	OCA3	W-phase arm over-current
8	8	EPH1	Input phase failure
9	9	EPHO	Output phase failure
A	10	OP 1	Over-voltage during acceleration
B	11	OP2	Over-voltage during deceleration
C	12	OP3	Over-voltage during constant speed operation
D	13	OL 1	Over-LOAD in inverter
E	14	OL2	Over-LOAD in motor
F	15	OLr	Dynamic braking resistor overload
10	16	OH	Overheat
11	17	E	Emergency stop
12	18	EEP1	EEPROM fault
13	19	EEP2	Initial read error
14	20	EEP3	Initial read error
15	21	Err2	Inverter RAM fault
16	22	Err3	Inverter ROM fault
17	23	Err4	CPU fault
18	24	Err5	Communication time-out error
19	25	Err6	Gate array fault
1A	26	Err7	Output current detector error
1B	27	Err8	Option error
1D	29	UC	Low current operation status
1E	30	UP 1	Under-voltage (main circuit)
20	32	Ot	Over-torque trip
21	33	EF 1	Ground fault trip
22	34	EF2	Ground fault trip
24	36	OCr	Dynamic braking abnormal element
25	37	OC 1P	Over-current during acceleration (element overheat)
26	38	OC2P	Over-current during deceleration (element overheat)
27	39	OC3P	Over-current during fixed speed operation (element overheat)
28	40	Etn	Tuning error
29	41	EtYP	Inverter type error
2A	42	E - 10	Analog input terminal over-voltage
2B	43	E - 11	Abnormal brake sequence
2C	44	E - 12	Disconnection of encoder
2D	45	E - 13	Speed error
2E	46	OH2	External thermal
2F	47	SOUt	Step-out (for PM motors only)
32	50	E - 18	Terminal input error
33	51	E - 19	Abnormal CPU2 communication
34	52	E - 20	V/f control error
35	53	E - 21	CPU1 fault
36	54	E - 22	Abnormal logic input voltage
37	55	E - 23	Option 1 error
38	56	E - 24	Option 2 error
39	57	E - 25	Stop position retaining error
3A	58	E - 26	CPU2 fault
54	84	Etn1	F410 tuning error
55	85	Etn2	F412 tuning error
56	86	Etn3	Motor constant setting error

4.3. About GSD file

As for acquisition of an GSD file, it is possible to download from homepage of our company.
Please use what was in agreement with the software version of usage's VF-AS1/PS1.

VF-AS1: http://www.inverter.co.jp/product/inv/vfas1/pdp/
VF-PS1: http://www.inverter.co.jp/product/inv/vfps1/pdp/