

TOSVERT VF-FS1 series

BACnet® option unit

Communication Function Manual

NOTICE

1. Make sure that this function manual is delivered to the end user of BACnet® option unit.
2. Read this manual before installing or operating the BACnet® option unit. Keep it in a safe place for reference.
3. All information contained in this manual are subject to change without notice. Please confirm the latest information on our web site "www.inverter.co.jp".

Introduction

Thank you for purchasing the “BACnet® option unit” for TOSVERT VF-FS1 series Inverter.
 Before using BACnet® option unit, carefully read this function manual in order to completely and correctly utilize its excellent performance.
 After reading this function manual, please keep it handy for future reference.
 For details of its general handling, see an instruction manual attached with the option unit.

- TOSVERT VF-FS1 Instruction Manual E6581381
- TOSVERT VF-FS1 Communications Function Instruction Manual E6581393
- BCN002Z Instruction Manual E6581402

* BACnet is a registered trademark of ASHRAE.

■ Handling in general

 Danger	
 Prohibited	▼ Do not connect or disconnect a network cable while the Inverter power is on. It may lead to electric shocks or fire.
 Mandatory	▼ See the instruction manual attached with the option unit for cautions the handling. Otherwise, it may lead to electric shocks, fire, injuries or damage to product.

■ Network control

 Danger	
 Prohibited	▼ Do not send the value out of the valid range to network variables. Otherwise, the motor may suddenly start/stop and that may result in injuries.
 Mandatory	▼ Use an additional safety device with your system to prevent a serious accident due to the network malfunctions. Usage without an additional safety device may cause an accident.
 Warning	
 Mandatory	▼ Set up “Communication error trip function (see below)” to stop the Inverter when the option unit is deactivated by an unusual event such as tripping, an operating error, power outage, failure, etc. - Communication error trip time, Operation at communication error (F803, F892 and F851, see the Inverter instruction manual for details) Deactivated option unit may cause an accident, if the “Communication error trip function” is not properly set up. ▼ Make sure that the operation signals are STOP before resetting Inverter’s fault. The motor may suddenly start and that may result in injuries.

■ Notes on operation

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 10000 times. Avoid writing a command more than 10000 times to the same parameter of the Inverter and the communication board.

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1. Scope

1.1. Overview

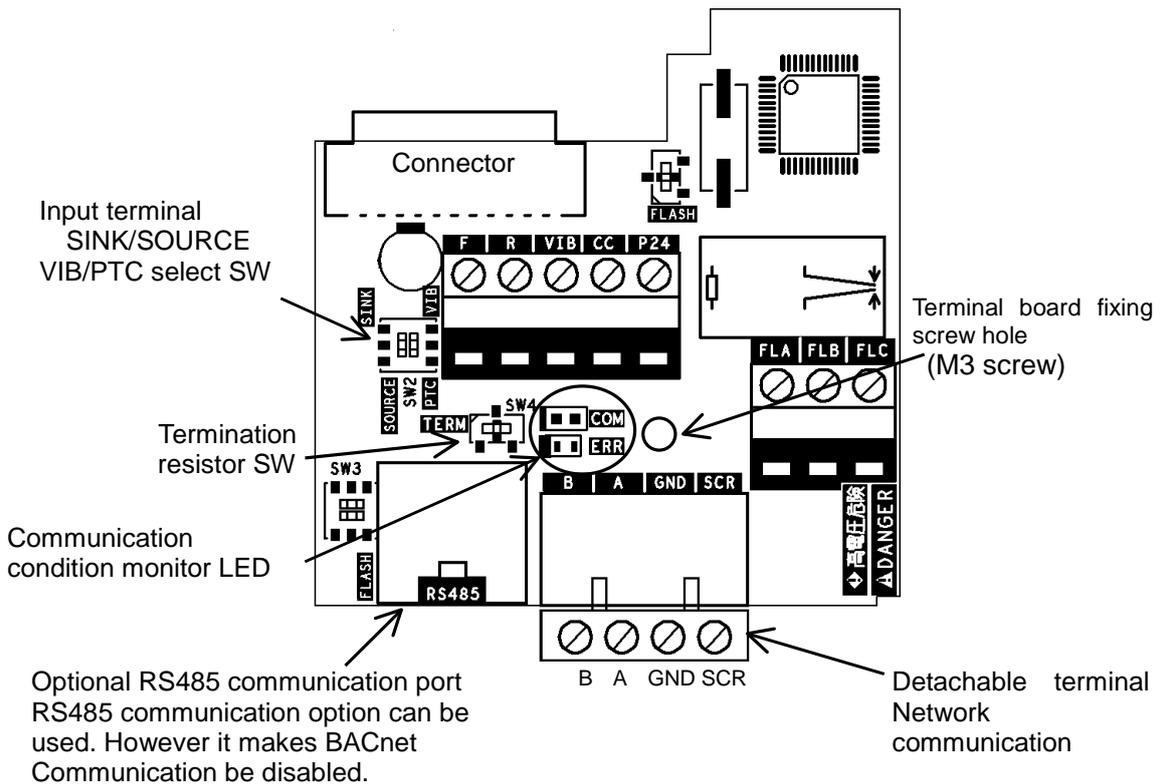
Thank you for purchasing a "BACnet communication Option (BCN002Z)" for TOSVERT VF-FS1 inverter. This option can connect with open field network BACnet MS/TP network and data communications with the network through installing this option in the VF-FS1 and using it. BACnet MS/TP supports a maximum of 32 nodes for one segment.

By attaching BCN002Z to VF-FS1, the monitor of run/stop and the setting change of the parameter become possible from the network, and it can cope with various application.

This manual is also aimed at the operator using "VF-FS1 BACnet option", so please use it for future maintenance and inspection.

2. Names and functions of main parts

2.1. Name of main parts

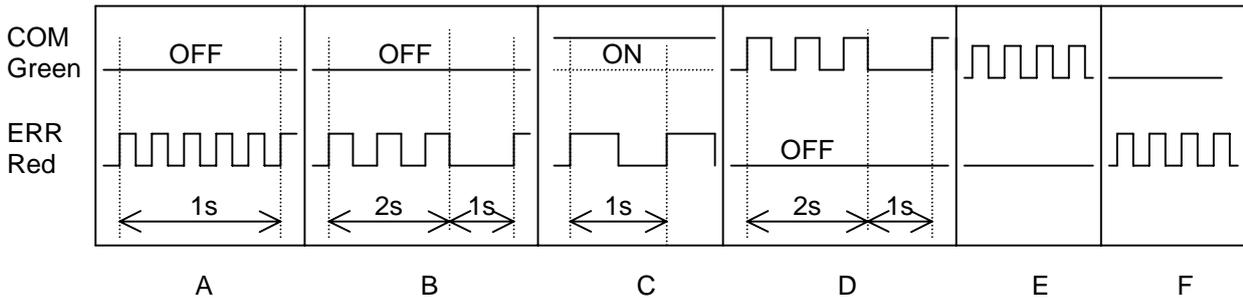


2.2. Use of RS485 communication port

Serial communication (2-wire RS485) option can be used. However, while it is connected, the internal communication line is switched to RS485 then the communication via BACnet network is disabled and the data can not be refreshed. In this case, communication error trip time (*F803*) is also active. Use RS485 serial communication option specified by Toshiba.

2.3. LED indicator

The option has two LEDs. Those functions are below table.



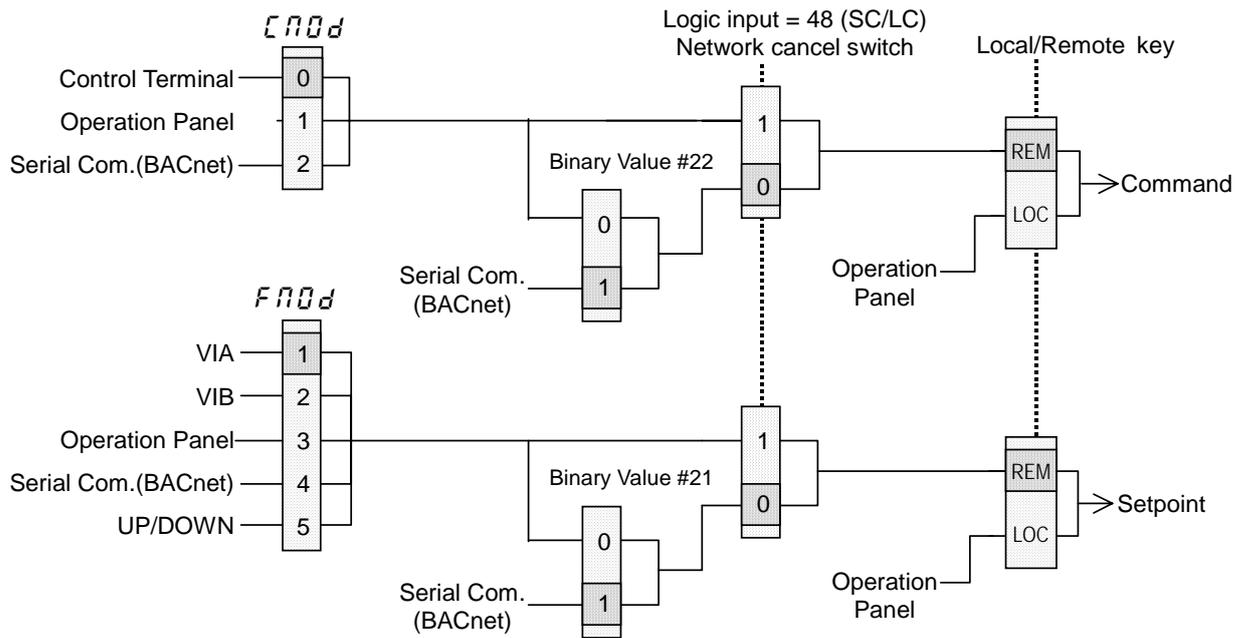
State	LEDs	Comment
A	Green LED : OFF Red LED : Flashing 5 times in 1 second	BACnet board failure
B	Green LED : OFF Red LED : Flashing 3 times in 2 seconds, Off for 1 second	Communication loss detected. Confirm the network condition and connection of the cable.
C	Green LED : ON Red LED : OFF 0.5s, ON 0.5s	Invalid configuration detected (ADR > max master), or an option is connected to RJ45.
D	Green LED : Flashing 3 times in 2 seconds, Off for 1 second Red LED : OFF	Waiting for Auto baudrate detection
E	Green LED : Flashing Intermittent Green Red LED : ---	Valid message received for this node
F	Green LED : --- Red LED : Flashing Intermittent Red	Invalid message received (any node)

2.4. Command & Setpoint selection (Local/Remote)

Indication to display Local/Remote mode is on the inverter unit (Refer to the inverter instruction manual for details). BACnet option command and setpoint are activated on Remote mode^{*1}.

Inverters have some switches to select the command and setpoint location. Following figure shows the diagram. Refer to the inverter instruction manual for the parameter in detail.

*1 Be careful that *CNOd* command and *FNOd* setpoint are activated for a short time just after the inverter power turned on. Set *CNOd* and *FNOd* to “network” to prevent this problem.



2.5. Description of terminals

<Control terminals specification>

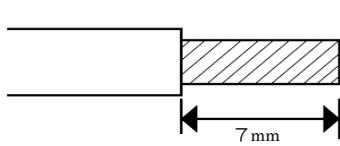
Terminal symbol	Function	Electrical specifications	Internal circuits
B	BACnet communication signal EIA-485	Communication signal (+)	
A		Communication signal (-)	
GND		Signal common	
SCR		Shield terminal. Connect to network ground	
F	Multifunctional programmable contact input.	No voltage contact input 24V _{DC} , 5mA or less	
R	SINK/SOURCE can be selected with SW.	N.B. Use contact parts for low current.	
VIB	Multifunction programmable analog input. with internal pull-up resistor for PTC	0 to 10V _{DC} input Using this terminal as PTC input, set SW2 to PTC side and set the parameters (F 5 4 5 and F 5 4 6) to proper value.	
CC	Control circuit's equipotential terminal		
P24	24 V _{DC} power supply output	24V _{DC} -50mA	
FLA FLB FLC	Multifunctional programmable relay contact outputs	1c contact 30V _{DC} -0.5A 250V _{AC} -1A (cosφ =1) 250V _{AC} -0.5A (cosφ =0.4)	

Danger	
 Prohibited	▼ Do not change switches settings while the power is on. It may lead to electric shocks or damage.
 Mandatory	▼ Turn off the motor operation signals before setting the parameter and the switch (SW), when changing the VIB function. Otherwise, the motor may suddenly start and that may result in injuries.

2.6. Network cable connection

Connect the BACnet network cable to communication option as follows.

Title	Description
Wire type	Shielded twisted cable
Characteristic impedance	Between 100 and 130 ohm
Distributed impedance between conductors	Less than 100pF per meter
Distributed impedance between conductors and shield	Less than 200pF per meter Foil or braided shields are acceptable.
Length of an MSTP segment	1200 meters with AWG18 (0.8mm ²)



Cable sheath should be peeled off by about 7mm.

For wiring work, use a flat blade screwdriver with a 0.6mm thick and 3.5mm width blade.

Tightening torque for the terminal block is 0.5Nm.

* Fix a cable so that a communication connector may be not taken the weight of wire.

2.7. Network configuration

Make up the network as follows.

- Transmission/reception signals (A, B)

Make up the communication path by connecting all transmission/reception data cables.

- Signal common (GND)

GND is the signal common.

- Grounding the shield of cable (SCR)

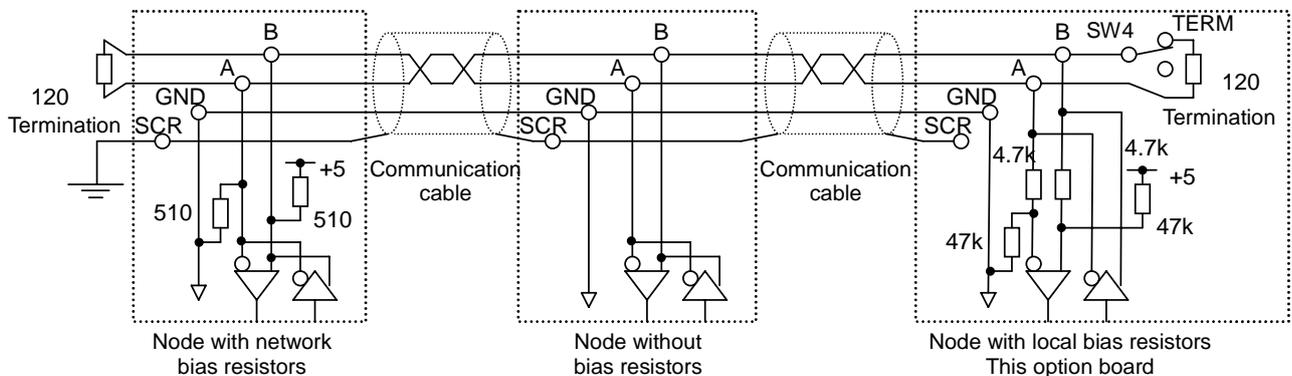
Connect the all shield lines of network cable. The shield shall be grounded at one end only prevent currents from being created.

- Termination resistor

A termination resistance of 120 ohms plus or minus 5% shall be connected at each of the two ends of the segment medium. This option has a termination resistor, so if use, set up the termination resistor SW. (Refer to 2.1Name of main parts)

At least one set, and no more than two sets, of network bias resistors shall exist for each segment.

This option has local bias resistors.



N.B.:Do not connect the SCR terminal to the power ground of inverters or other units.

Keep the network cables 20cm or more separate from the power cables to prevent from malfunctioning due to electromagnetic noise.

2.8. Wiring of a control terminal

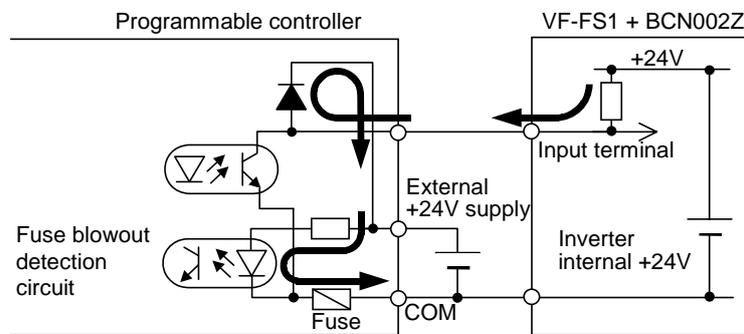
Observe the following when wiring.

- Use 0.3 to 1.5mm² solid/stranded wire (AWG 22 to 16) for control cables.
- Remove the sheath of a cable about 7mm (6mm for FLA, FLB, FLC and G/E) from the end of cable.
- Use a flat-headed screwdriver with its blade 0.6mm in thickness and 3.5mm in width.
- Screw tightening torque for the terminal block screws should be 0.5 to 0.6Nm.

N.B.: Keep the control signal cables 20cm or more separate from the power cables to prevent from malfunctioning due to electromagnetic noise.

N.B.: Provide an inter-lock system stated in below, when using a programmable controller that has the open collector output.

When the programmable controller is turned off with the inverter is on, the difference between each control power potential will cause wrong signals to the inverter as shown in below figure. Provide an inter-lock so that the programmable controller cannot be turned off when the inverter power is alive.



3. Parameters

3.1. Communication parameters

Set up the inverter parameters as follows. To update, reset the power of inverter. If these parameters are set to correct value, this unit can not work normally.

Title	Function	Description	Shipment setting	BACnet
<i>CNDd</i>	Command mode selection	0: Terminal board 1: Operation panel 2: Serial communication	0	2
<i>FNDd</i>	Frequency setting mode selection 1	1: VIA 2: VIB 3: Operation panel 4: Serial communication 5: UP/DOWN from external contact	1	4
<i>F800</i>	Communication rate	Set "1: 19200bps" (default).	1	1
<i>F801</i>	Parity	Set "1: Even" (default).	1	1
<i>F803</i>	Communication error trip time	Set communication time out period. The way of stop is selected by <i>F603</i> .	0	---
<i>F829</i>	Communication protocol	Set "4: BACnet protocol"	0	4
<i>F851</i>	Operation at communication error by disconnection	0: Inverter stop, communication command, frequency mode open (by <i>CNDd</i> , <i>FNDd</i>) 1: None (continued operation) 2: Deceleration stop 3: Coast stop 4: Communication error (<i>Err5</i> trip) or Network error (<i>ErrB</i> trip)	4	---
<i>F856</i>	Number of motor poles for communication	1: 2 poles 5: 10 poles 2: 4 poles 6: 12 poles 3: 6 poles 7: 14 poles 4: 8 poles 8: 16 poles	2	---
<i>F890</i>	Address	Set node address	0	---
<i>F891</i>	Network baud rate	0: AUTO adaptive 1: 9600 2: 19.2kbps 3: 38.4kbps 4: 76.8kbps Over 5 is AUTO adaptive.	0	---
<i>F892</i>	Network Time-Out	0: No action Unit 0.1sec, Setting range : 1 to 65535	0	---
<i>F893</i>	Instance number	Instance No.= <i>F893</i> x 1000 + <i>F894</i>	0	---
<i>F894</i>			0	---
<i>F895</i>	MaxMaster	Setting range : 0 to 127 Over 127 is limited 127.	0	---
<i>F896</i>	MaxInfoFrame	Setting range : 0 to 100 Over 100 is limited 100.	0	---

Warning



▼ Set up "Communication error trip function (*F803*, see the inverter instruction manual for details)" to stop the inverter when this option unit is deactivated by an unusual event such as tripping, an operating error, power outage, failure, etc. Deactivated option unit may cause an accident, if the "Communication error trip function" is not properly set up.

3.2. Communication setting between option board

Do not change communication rate (*F800*), parity (*F801*) and communication waiting time (*F805*) from shipment setting. If change the setting, the option board does not work properly.

3.3. Communication error detection between inverter and option board

Set the communication loss action time to *F803* between the inverter and the option board. And the network communication loss action time to *F892*. The network loss action function starts from receiving the properly frame message. The action of the network communication loss is set by *F851*. When set the communication loss action time *F803* and connect the option to the RJ45 connector, the communication between the inverter and the option is disabled, so the communication loss may be detected.

3.4. Selection of the communication protocol (*F829*)

Set the communication protocol *F829* to "4:BACnet protocol". The communication protocol of RJ45 is set to MODBUS, so when communicate with PC, use MODBUS protocol.

3.5. Number of motor poles for communication (*F856*)

Set the motor pole number of using. This parameter is for the calculation of min-1 unit motor speed of BACnet data.

3.6. Network address (*F890*)

Set the network address of this node. Do not set same address number in the segment, and not set over MaxMaster (*F895*). If set wrong number, the option board does not work properly.

3.7. Network baud rate (*F891*)

Set the network baud rate to *F891*. Set the same baud rate data in the network. If set AUTO baud rate, when the option detect network baud rate, the option sets the baud rate data to *F891* automatically.

3.8. Instance Number (*F893, F894*)

Set BACnet Object Instance number. The instance number should not be duplicate in the network. The instance number is 22bit data length, and set the number of this option board as below.

$$\text{Instance number} = F893 \times 1000 + F894$$

3.9. MaxMaster (*F895*)

Set the max master number of this segment. The network poles to MaxMaster address to find master node, so set MaxMaster to be small number to be a small response time.

3.10. MaxInfoFrames (*F896*)

Set the max information frame number to send from this node. Not need to change.

3.11. Use the communication option

Serial communication (2-wire RS485) option can be used. However, while it is connected, the internal communication line is switched to RS485 then the communication via BACnet network is disabled. In this case, communication error trip time (*F B 3*) is also active.

Use RS485 serial communication option specified by Toshiba

4. Functions

This option board is based on BACnet “Application Specific Controller” (B-ASC).

4.1. Object / Property support Matrix

This option board supports below table objects and properties.

Property	Object Type						
	Device	Binary Input	Binary Output	Binary Value	Analog Input	Analog Output	Analog Value
Object Identifier	✓	✓	✓	✓	✓	✓	✓
Object Name	✓	✓	✓	✓	✓	✓	✓
Object Type	✓	✓	✓	✓	✓	✓	✓
System Status	✓						
Vendor Name	✓						
Vendor Identifier	✓						
Model Name	✓						
Firmware Revision	✓						
Appl Software Revision	✓						
Protocol Version	✓						
Protocol Revision	✓						
Services Supported	✓						
Object Types Supported	✓						
Object List	✓						
Max APDU Length	✓						
Segmentation Support	✓						
APDU Timeout	✓						
Number APDU Retries	✓						
Max Master	✓						
Max Info Frames	✓						
Device Address Binding	✓						
Database Revision	✓						
Present Value		✓	✓	✓	✓	✓	✓
Status Flags		✓	✓	✓	✓	✓	✓
Event State		✓	✓	✓	✓	✓	✓
Out-of-Service		✓	✓	✓	✓	✓	✓
Units					✓	✓	✓
Priority Array			✓	✓*1		✓	✓*1
Relinquish Default			✓	✓*1		✓	✓*1
Polarity		✓	✓				
Active Text		✓	✓	✓			
Inactive Text		✓	✓	✓			

*1: For commandable values only.

4.2. Drive I/O Objects

4.2.1. Binary Input Object Instance

The output terminals and the input terminals can be monitored.

Binary Input

Instance ID	Object Name	VFFS1	Description	Active / Inactive	Access
Binary input #0	RO 1 ACT	FL	Output terminal monitor	ON / OFF	R
Binary input #1	RO 2 ACT	RY	Output terminal monitor	ON / OFF	R
Binary input #2	---	---	Reserve	---	---
Binary input #3	---	---	Reserve	---	---
Binary input #4	---	---	Reserve	---	---
Binary input #5	---	---	Reserve	---	---
Binary input #6	DI 1 ACT	F	Input terminal monitor	ON / OFF	R
Binary input #7	DI 2 ACT	R	Input terminal monitor	ON / OFF	R

4.2.2. Binary Output Object Instance

The output terminals can be controlled via network. Set the terminal function parameter before control via network.

Binary Output

Instance ID	Object Name	VFFS1	Description	Active / Inactive	Access
Binary Output #0	RO 1 CMD	FL	Output terminal function Set <i>F 132</i> to 38.	ON / OFF	C

4.2.3. Analog Output Object Instance

The analog input value can be monitored.

Analog Input

Instance ID	Object Name	VFFS1	Description	Units	Access
Analog Input #1	ANALOG INPUT 2	VIB	Analog input monitor	%	R

4.3. Control objects

4.3.1. Binary Value Objects Instance

Binary Value Object Instance

Binary Value ID	Object Name	Description	Active/ Inactive Text	Access
#0	RUN/STOP ACT	Indicates the drive status	RUNS/ READY	R
#1	FWD/REV ACT	Indicates the motor rotation's direction	REV/ FWD	R
#2	FAULT ACT	Indicates the drive's fault status	FAULTED/NONE	R
#3	---	---	- / -	---
#4	HAND/AUTO ACT	Indicates if the drive is locally controlled or not	HAND/ AUTO	R
#5	---	---	- / -	---
#6	MAINT REQ	Commutative operation time alarm status	YES / NO	R
#7	DRIVE READY	The VSD is ready and waits a start command	READY/ NOT READY	R
#8	AT SETPOINT	The VSD has reached the target speed	REACHED/ NO	R
#9	---	---	- / -	---
#10	RUN/STOP CMD	Commands a drive start	START/ STOP	C
#11	FWD/REV CMD	Commands a monitor direction's change	REV/ FWD	C
#12	---	---	- / -	---
#13	---	---	- / -	---
#14	FAULT REST	Resets faults	RESET/ NO	C
#15	MBOX READ	Command to read parameter	WRITE/ RESET	W
#16	MBOX WRITE	Command to write parameter	WRITE/ RESET	W
#17	---	---	- / -	---
#18	SP1PRESET	Preset speed operation frequency 1	SP1/ NONE	C
#19	SP2PRESET	Preset speed operation frequency 2	SP2/ NONE	C
#20	SP3PRESET	Preset speed operation frequency 3	SP3/ NONE	C
#21	STPSEL	Frequency priority selection	ENABLED/OFF	C
#22	CMDSEL	Command priority selection	ENABLED/OFF	C

R = Read-only, W=Writable, C=Commandable. Commandable values support the priority arrays and relinquish defaults.

4.3.2. Analog Value Objects Instance

Analog Value Object Instance

Analog Value ID	Object Name	Description	Units	Access
#0	OUTPUT SPEED	Output speed	min-1	R
#1	OUTPUT FREQ	Output frequency	Hz	R
#2	DC BUS VOLT	DC bus voltage *1	V	R
#3	OUTPUT VOLT	Motor voltage	V	R
#4	CURRENT	Motor current	A	R
#5	TORQUE	Motor Torque	%	R
#6	POWER	Motor Power 100%= $\sqrt{3} \times$ VSD rate voltage \times Motor rate current	%	R
#7	DRIVE TEMP	Drive Thermal State	%	R
#8	KWH (R)	Energy counter	KWh	R
#9	---	---	---	---
#10	PRC PID FBCK	PID regulator feedback *1	%	R
#11	---	---	---	---
#12	---	---	---	---
#13	---	---	---	---
#14	RUN TIME	Operating time	H	R
#15	---	---	---	---
#16	INPUT REF 1	Speed reference from Bus 100%= ω_L (Base frequency), Setting range= $\pm F_H / \omega_L \times 100$	%	C
#17	---	---	---	---
#18	LAST FLT	Error code	---	---
#19	PREV FLT 1	Previous fault (occurred before LASTFLT)	---	---
#20	PREV FLT 2	Previous fault (occurred before FLT1)	---	---
#21	---	---	---	---
#22	---	---	---	---
#23	ACCEL1 TIME	Acceleration time	s	W
#24	DECEL1 TIME	Deceleration time	s	W
#25	MBOX PARAM	Parameter number	---	W
#26	MBOX DATA	Parameter value	---	W

R = Read-only, W=Writable, C=Commandable. Commandable values support the priority arrays and relinquish defaults.

*1: The value are hold when the inverter trip.

4.4. Device Objects

Object Name	"VF-FS1"
Object Type	"8" (device)
Vendor Name	"TOSHIBA"
Model Name	"VFFS1-2007PM"
Firmware Revision	"V1.02"
Application Software Version	"V1.08" (VSD software version)
Protocol Version	"1"
Protocol Revision	"2"

4.5. Parameter access

Using below objects, inverter parameters can be read and written.

Object ID		Object Name	Description
Analog value	#25	MBOX PARAM	Parameter No. Set the parameter number (hexadecimal) to decimal value number.
Analog value	#26	MBOX DATA	Parameter value. The data unit is depend on the parameter specification. Refer to the inverter instruction manual and the communication function manual (E6581393).
Binary value	#15	MBOX READ	Command to read parameter
Binary value	#16	MBOX WRITE	Command to write parameter

- 1) Read Acc. time (Communication number of ACC1 is 0010)
 - a) Set "16 (16 dec=0010 hex)" to Analog value #25.
 - b) Set "1" to Binary vale #15.
 - c) Read the data (ACC1) from Analog value #26. The unit is 0.1s.

- 2) Write Dec. time (Communication number of DEC1 is 0011)
 - a) Set "17 (17 dec=0011 hex)" to Analog value #25.
 - b) Set "110 (110=11.0 sec" to Analog value #26.
 - c) Set "1" to Binary value #16.

4.6. Option Error

If the option detects the hardware or software error, the error status is indicated as LEDs on the board. Refer to 2.3 LED indicator.

5. Specifications

< Environmental specification >

Item	Specification
Service environment	Conforms to VF-FS1
Operation temperature	Conforms to VF-FS1
Storage temperature	-25 to +65°C
Relative humidity	20 to 93% (free from condensation and vapor)
Vibration	5.9m/s ² (0.6G) or less (10 to 55 Hz) (To be complied with JIS C0040.)

< BACnet option terminal specification >

Item	Specification	Note
Communication between inverter	VF-FS1	Only one board connection is available.
Applicable model		
Communication method	MODBUS-RTU	Set the inverter parameter (refer to section 3.1)
Baud rate	19200bps	
Parity	Even number	
Control power supply	5 V _{DC}	Supplied from inverter
Logic input terminal	2 circuits (F,R) Slide switch (SW) enable to select logical configurations (Source/Sink).	Not isolated
Logic output terminal	Nothing	
Relay contact output terminal	1 circuit (FL): 30V _{DC} -0.5A 250V _{AC} -1A (cosφ =1) 250V _{AC} -0.5A (cosφ =0.4)	Isolated
Analog input terminals	1 circuit (VIB): 10V _{DC} (R _{IN} = 30kohm)	Not isolated
Analog output terminals	Nothing	
Power supply output	24V _{DC} -50mA	Current limit function

< BACnet option network specification >

Item	Specification
Data link / Physical layers	Master-Slave / Token Passing (MS/TP)
Node type	Master node
Maximum node	32 nodes per segment
Communication baud rate	9600bps, 19.2kbps, 38.4kbps, 76.8kbps supports auto-baud detection
Bias resistor and termination	Local bias resistors are mounted. Termination resistor (120 ohm) can be select by SW.
Terminal block	Detachable terminal block 4-pole (5.08mm pitch) Manufacturer: PHOENIX CONTACT Type-Form : MSTB 2,5/4-ST-5.08

5.1. BACnet Protocol Implementation Conformance Statement

Date	Oct. 2006
Vendor Name	Toshiba Schneider Inverter Corporation
Product Name	Low Voltage AC Motor Drive
Product Model Number	VF-FS1
Applications Software Version	V1.08 (VSD software version)
Firmware Revision	V1.02
BACnet Protocol Revision	2
Product Description	BACnet Option board is designed for VF-FS1 series. All standard MS/TP baud rates are supported, as well as master mode functionality. Over BACnet, the drive can be fully controlled as a standard adjustable frequency drive.
BACnet Standardized Device Profile (Annex L)	<ul style="list-style-type: none"> <input type="checkbox"/> BACnet Operator Workstation (B-OWS) <input type="checkbox"/> BACnet Building Controller (B-BC) <input type="checkbox"/> BACnet Advanced Application Controller (B-AAC) <input checked="" type="checkbox"/> BACnet Application Specific Controller (B-ASC) <input type="checkbox"/> BACnet Smart Sensor (B-SS) <input type="checkbox"/> BACnet Smart Actuator (B-SA)
List all BACnet Interoperability Building Blocks Supported (Annex K)	DS-RP-B, DS-WP-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B
Segmentation Capability	<ul style="list-style-type: none"> <input type="checkbox"/> Segmented requests supported. Window Size ____ <input type="checkbox"/> Segmented responses supported. Window Size ____
<p>Standard Object Types Supported: An object type is supported if it may be present in the device. For each standard Object Type supported provide the following</p> <ol style="list-style-type: none"> 1) Whether objects of this type are dynamically creatable using the CreateObject service 2) Whether objects of this type are dynamically detectable using the DeleteObject service 3) List of the optional properties supported 4) List of all properties that are writable where not otherwise required by this standard 5) List of proprietary properties and for each its property identifier, datatype, and meaning 6) List of any property range restrictions 	
Data Link Layer Options:	<ul style="list-style-type: none"> <input type="checkbox"/> BACnet IP, (Annex J) <input type="checkbox"/> BACnet IP, (Annex J), Foreign Device <input type="checkbox"/> ISO 8802-3, Ethernet (Clause 7) <input type="checkbox"/> ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8) <input type="checkbox"/> ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) ____ <input checked="" type="checkbox"/> MS/TP master (Clause 9), baud rate(s): 9600, 19200, 38400, 76800 <input type="checkbox"/> MS/TP slave (Clause 9), baud rate(s): ____ <input type="checkbox"/> Point-To-Point, EIA 232 (Clause 10), baud rate(s): ____ <input type="checkbox"/> Point-To-Point, modem, (Clause 10), baud rate(s): ____ <input type="checkbox"/> LonTalk, (Clause 11), medium: _____ <input type="checkbox"/> Other: _____
Device Address Binding: Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.)	<ul style="list-style-type: none"> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Networking Options:	<ul style="list-style-type: none"> <input type="checkbox"/> Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc. <input type="checkbox"/> Annex H, BACnet Tunneling Router over IP <input type="checkbox"/> BACnet/IP Broadcast Management Device (BBMD)
Does the BBMD support registrations by Foreign Devices?	<ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No

Character Sets Supported: Indicating support for multiple character sets does not imply that they can all be supported simultaneously.	<ul style="list-style-type: none">■ ANSI X3.4□ ISO 8859-1□ ISO 10646 (UCS-4)□ IBM™/Microsoft™ DBCS□ ISO 10646 (UCS-2)□ JIS C 6226
If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:	