



OCS Training Workshop LAB11

Working with downloadable protocols
(Toshiba Tosvert example)

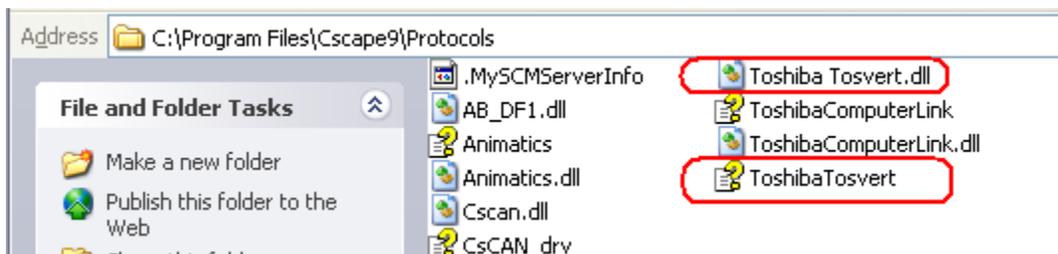
Introduction

The objective of this lab is to provide the skills to develop and trouble shoot communication with Toshiba Tosvert drives.

Overview

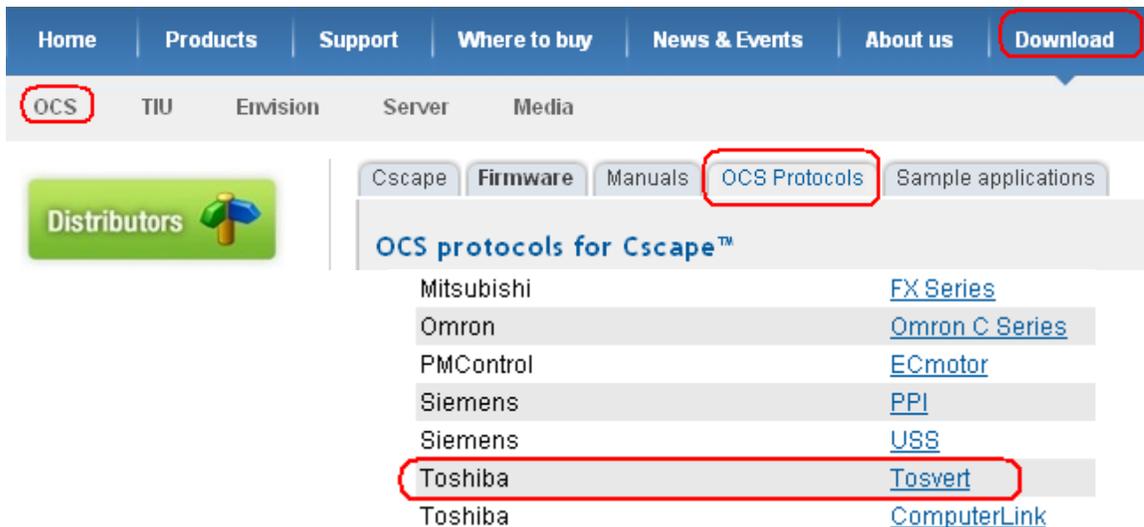
Toshiba Tosvert protocol is one of our serial protocols supported by any X-series OCS.

DLL file and it's respective help file should be installed (by default) within your Cscape directory:



The newest version is also available on our website:

www.horner-apg.com -> Download -> OCS -> OCS Protocols

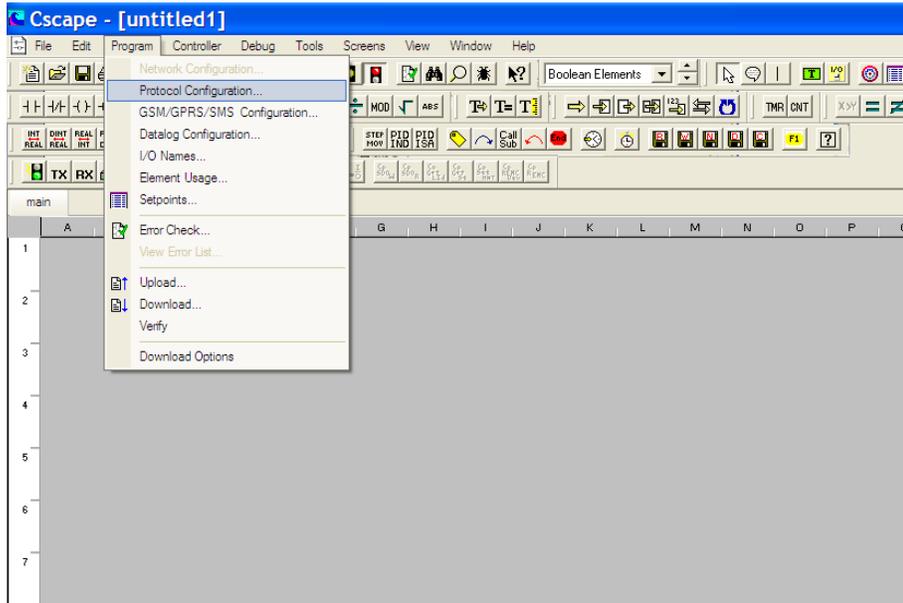


The Toshiba TOSVERT serial protocol is for communication between the Toshiba drives and an OCS. This is a Master/Slave protocol.

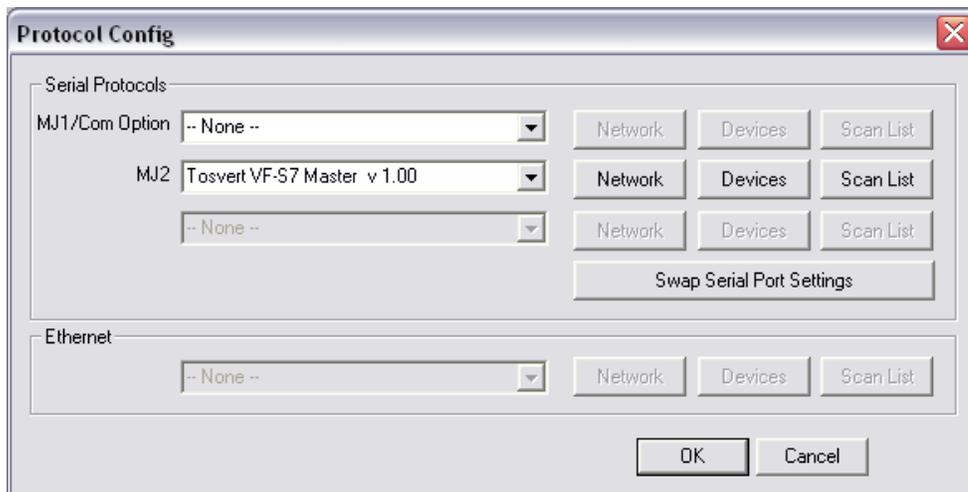
Cscape Configuration

PART 1 – Protocol configuration

1. Click Program -> Protocol Configuration



2. Select Tosvert protocol from one of the Serial Protocols Pull Downs



3. Click on the Network button and

- Select the proper Baud Rate, Parity etc.
- Select the proper Handshake and Mode
- Configure the Status to some unique Register

Network Config (Tosvert VF-S7 Master)

Port Configuration

Baud Rate: 9600
Parity: Even
Data Bits: 8
Stop Bits: 1
Handshake: Multidrop Half
Protocol: Tosvert Protocol
Mode: RS-232
Retries: 2 (0-255)
Timeout: 10000 mSec

Update Scan

Automatic
Update Interval: 0 mSec
ReacquireTime: 100000 mSec

Manual
Trigger: 1-BIT
ID Select: 16-BIT

Status

Register: %R0051 4 x 32-BIT
Name: [Dropdown]

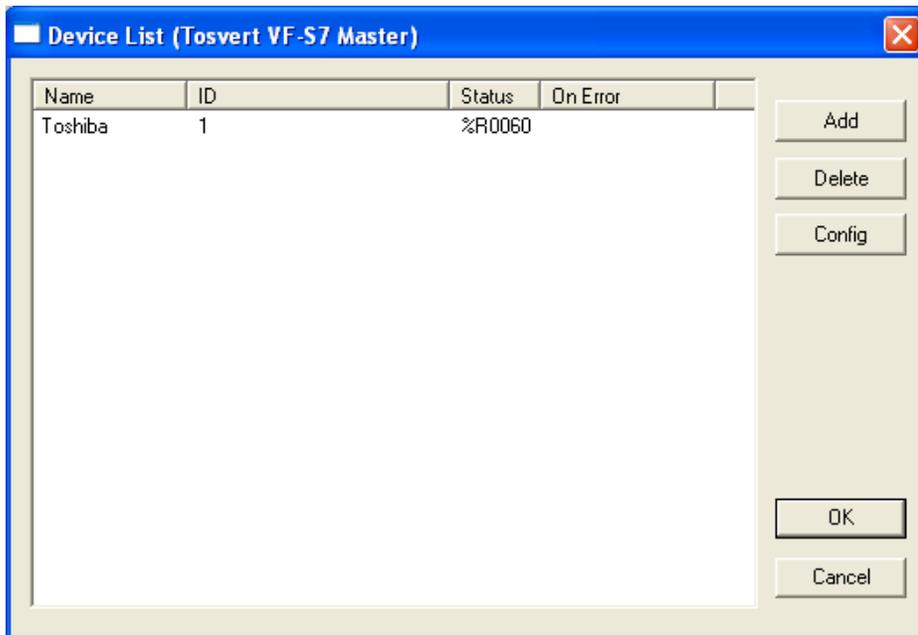
Master ID / Address

Address: 0

Protocol Help OK Cancel

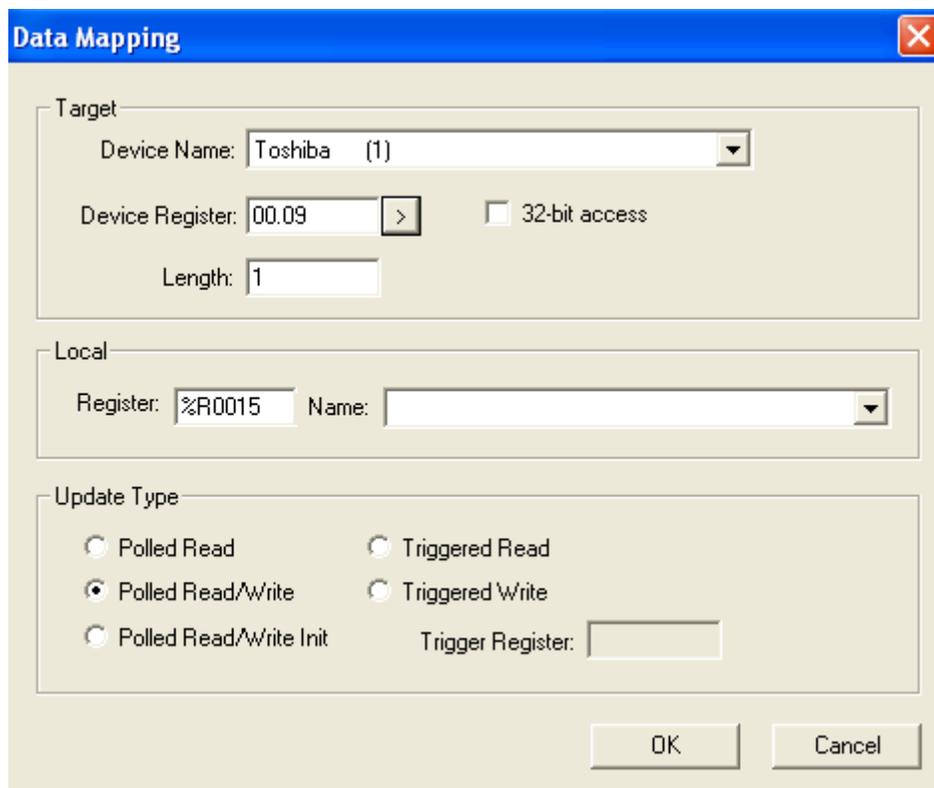
Click OK

4. Click On Devices



- Enter a Device Name and the ID (Slave Address)
- Enable Status Box and enter an available memory location (if needed)
- Click OK

5. Click On Scan List and click Add



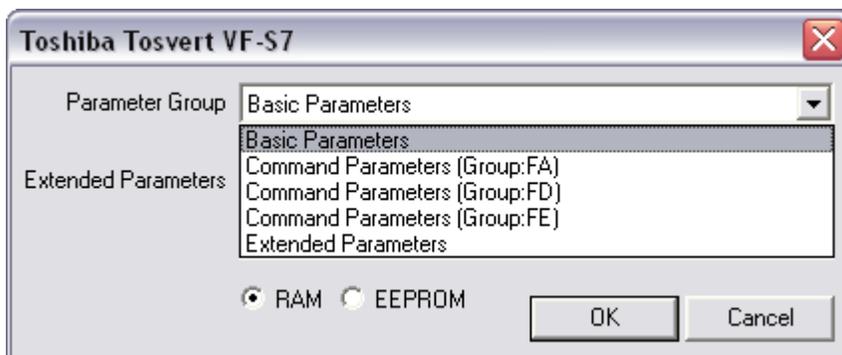
- Select the Correct Device. For our lab, only 1 device has been configured
- Enter the Device Register of the remote slave. In this lab we are going to read and write to *ACCELERATION* parameter 00.09 and listed as 'ACC' on the drive interface.
- Configure the length
- Configure the local address. This will be where the data is read from and/or written to
- Configure the Update Type
- Click OK until the Main Cscape Screen is reached

PART 2 - Creating the Screen

1. Configure a Data Point on the screen to Read/Write %R15. The ACCELERATION setting of the drive corresponding to parameter 00.09
2. Configure several Data Points to display all Status Registers in case of communication difficulties

Supported Parameters

ToshibaTosvert.dll supports the following addressing modes:



Parameter Specification

Parameters are grouped into several blocks of Basic, Extended, Command, Frequency Monitoring and State Monitoring Parameters.

Basic Parameters (Group No. 00)

Four navigation functions

| Communication No. | Function |
|-------------------|--------------------------------------|
| - | History function |
| 0000 | Automatic acceleration/ deceleration |
| 0001 | Torque boost setting macro function |

Basic parameters

| Communication No. | Function |
|-------------------|---|
| 0003 | Command mode selection |
| 0004 | Frequency setting mode selection 1 |
| 0005 | Meter selection |
| 0006 | Meter adjustment |
| 0007 | Default setting |
| 0008 | Forward/reverse run selection (Operation panel) |
| 0009 | Acceleration time 1 |
| 0010 | Deceleration time 1 |
| 0011 | Maximum frequency |
| 0012 | Upper limit frequency |
| 0013 | Lower limit frequency |
| 0014 | Base frequency 1 |
| 0015 | V/F control mode selection |
| 0016 | Torque boost value 1 |
| 0017 | Electronic-thermal protection characteristic selection *2 |
| 0018 | Preset-speed operation frequency 1 |
| 0019 | Preset-speed operation frequency 2 |
| 0020 | Preset-speed operation frequency 3 |
| 0021 | Preset-speed operation frequency 4 |
| 0022 | Preset-speed operation frequency 5 |
| 0023 | Preset-speed operation frequency 6 |
| 0024 | Preset-speed operation frequency 7 |

Sub-group of Extended parameters

Input/output parameters 1

| Communication No. | Function |
|-------------------|--|
| 0100 | Low-speed signal output frequency |
| 0101 | Speed reach setting frequency |
| 0102 | Speed reach detection band |
| 0105 | Priority selection (Both F-CC and R-CC are ON) |
| 0108 | Always active function selection 1 |
| 0109 | Analog/contact input function selection (VIA/VIB terminal) |
| 0110 | Always-active function selection 2 |
| 0111 | Input terminal selection 1 (F) |
| 0112 | Input terminal selection 2 (R) |
| 0113 | Input terminal selection 3 (RES) |
| 0114 | Input terminal selection 4 (S1) |
| 0115 | Input terminal selection 5 (S2) |
| 0116 | Input terminal selection 6 (S3) |
| 0117 | Input terminal selection 7 (VIB) |
| 0118 | Input terminal selection 8 (VIA) |
| 0130 | Output terminal selection 1A (RY-RC) |
| 0131 | Output terminal selection 2A (OUT-NO) |
| 0132 | Output terminal selection 3 (FL) |
| 0137 | Output terminal selection 1B (RY-RC) |
| 0138 | Output terminal selection 2B (OUT-NO) |
| 0139 | Output terminal logic selection (RY-RC, OUT-NO) |
| 0167 | Frequency command agreement detection range |
| 0170 | Base frequency 2 |
| 0171 | Base frequency voltage 2 |
| 0172 | Torque boost value 2 |
| 0173 | Motor electronic-thermal protection level 2 |
| 0185 | Stall prevention level 2 |

Frequency parameters

| Communication No. | Function |
|-------------------|--|
| 0200 | Frequency priority selection |
| 0201 | VIA input point 1 setting |
| 0202 | VIA input point 1 frequency |
| 0203 | VIA input point 2 setting |
| 0204 | VIA input point 2 frequency |
| 0207 | Frequency setting mode selection 2 |
| 0210 | VIB input point 1 setting |
| 0211 | VIB input point 1 frequency |
| 0212 | VIB input point 2 setting |
| 0213 | VIB input point 2 frequency |
| 0240 | Starting frequency setting |
| 0241 | Operation starting frequency |
| 0242 | Operation starting frequency hysteresis |
| 0250 | DC braking starting frequency |
| 0251 | DC braking current |
| 0252 | DC braking time |
| 0254 | Motor shaft fixing control |
| 0256 | Time limit for lower-limit frequency operation |
| 0260 | Jog run frequency |
| 0261 | Jog run stopping pattern |
| 0262 | Panel jog run operation mode |
| 0264 | Input from external contacts -UP response time |
| 0265 | Input from external contacts -UP frequency step width |
| 0266 | Input from external contacts -DOWN response time |
| 0267 | Input from external contacts - DOWN frequency step width |
| 0268 | Initial value of UP/DOWN frequency |
| 0269 | Saving of changed value of UP/DOWN frequency |
| 0270 | Jump frequency 1 |
| 0271 | Jumping width 1 |
| 0272 | Jump frequency 2 |
| 0273 | Jumping width 2 |
| 0274 | Jump frequency 3 |
| 0275 | Jumping width 3 |
| 0287 | Preset-speed operation frequency 8 |

| | |
|------|--|
| 0288 | Preset-speed operation frequency 9 |
| 0289 | Preset-speed operation frequency 10 |
| 0290 | Preset-speed operation frequency 11 |
| 0291 | Preset-speed operation frequency 12 |
| 0292 | Preset-speed operation frequency 13 |
| 0293 | Preset-speed operation frequency 14 |
| 0294 | Preset-speed operation frequency 15 (Fire-speed) |

Operation mode parameters

| Communication No. | Function |
|-------------------|---|
| 0300 | PWM carrier frequency |
| 0301 | Auto-restart control selection |
| 0302 | Regenerative power ride-through control (Deceleration stop) |
| 0303 | Retry selection (number of times) |
| 0304 | Dynamic braking selection |
| 0305 | Overvoltage limit operation (Slowdown stop mode selection) |
| 0307 | Supply voltage correction (limitation of output voltage) |
| 0308 | Dynamic braking resistance |
| 0309 | Dynamic braking resistor capacity |
| 0311 | Reverse-run prohibition |
| 0312 | Random mode |
| 0316 | Carrier frequency control mode selection |
| 0320 | Droop gain |
| 0323 | Droop insensitive torque band |
| 0342 | Braking mode selection |
| 0343 | Release frequency |
| 0344 | Release time |
| 0345 | Creeping frequency |
| 0346 | Creeping time |
| 0359 | PID control waiting time |
| 0360 | PID control |
| 0362 | Proportional gain |
| 0363 | Integral gain |
| 0366 | Differential gain |

Torque boost parameters 1

| Communication No. | Function |
|-------------------|-------------------------------------|
| 0400 | Auto-tuning |
| 0401 | Slip frequency gain |
| 0402 | Automatic torque boost value |
| 0415 | Motor rated current |
| 0416 | Motor no-load current |
| 0417 | Motor rated speed |
| 0418 | Speed control response coefficient |
| 0419 | Speed control stability coefficient |

Input/output parameters 2

| Communication No. | Function |
|-------------------|----------------|
| 0470 | VIA input bias |
| 0471 | VIA input gain |
| 0472 | VIB input bias |
| 0473 | VIB input gain |

Torque boost parameters 2

| Communication No. | Function |
|-------------------|---|
| 0480 | Exciting current coefficient |
| 0485 | Stall prevention control coefficient 1 |
| 0492 | Stall prevention control coefficient 2 |
| 0494 | Motor adjustment coefficient |
| 0495 | Maximum voltage adjustment coefficient |
| 0496 | Waveform switching adjustment coefficient |

Acceleration/deceleration time parameters

| Communication No. | Function |
|-------------------|-------------------------------------|
| 0500 | Acceleration time 2 |
| 0501 | Deceleration time 2 |
| 0502 | Acceleration/deceleration 1 pattern |
| 0503 | Acceleration/deceleration 2 pattern |

| | |
|------|---|
| 0504 | Acceleration/deceleration selection (1, 2 , 3) |
| 0505 | Acceleration/deceleration 1 and 2 |
| 0506 | S-pattern lower-limit adjustment amount |
| 0507 | S-pattern upper-limit adjustment amount |
| 0510 | Acceleration time 3 |
| 0511 | Deceleration time 3 |
| 0512 | Acceleration/deceleration 3 pattern |
| 0513 | Acceleration/deceleration 2 and 3 switching frequency |

Protection parameters

| Communication No. | Function |
|-------------------|---|
| 0601 | Stall prevention level 1 |
| 0602 | Inverter trip retention selection |
| 0603 | Emergency stop selection |
| 0604 | Emergency DC braking time |
| 0605 | Output phase failure detection mode selection |
| 0607 | Motor 150%-overload time limit |
| 0608 | Input phase failure detection mode selection |
| 0609 | Small current detection current hysteresis |
| 0610 | Small current trip/alarm selection |
| 0611 | Small current detection current |
| 0612 | Small current detection time |
| 0613 | Detection of output short-circuit during start-up |
| 0615 | Over-torque trip/alarm selection |
| 0616 | Over-torque detection level |
| 0618 | Over-torque detection time |
| 0619 | Over-torque detection level hysteresis |
| 0621 | Cumulative operation time alarm setting |
| 0626 | Over-voltage stall protection level |
| 0627 | Under voltage trip/alarm selection |
| 0633 | Trip at VIA lowlevel input mode |
| 0634 | Annual average ambient temperature (parts replacement alarms) |

Output parameters

| Communication No. | Function |
|-------------------|--|
| 0669 | Logic output/pulse train output selection (OUT-NO) |
| 0676 | Pulse train output function selection (OUT-NO) |
| 0677 | Maximum numbers of pulse train |
| 0691 | Inclination characteristic of analog output |
| 0692 | Meter bias |

Operation panel parameters

| Communication No. | Function |
|-------------------|---|
| 0700 | Prohibition of change of parameter settings |
| 0701 | Unit selection |
| 0702 | Free unit selection |
| 0705 | Inclination characteristic of free unit display |
| 0706 | Free unit display bias |
| 0707 | Free step 1 (pressing a panel key once) |
| 0708 | Free step 2 (panel display) |
| 0710 | Standard monitor display selection |
| 0719 | Canceling of operation command when standby terminal (ST) is turned off |
| 0721 | Panel stop pattern |
| 0730 | Prohibition of frequency setting on the operation panel |
| 0733 | Panel operation prohibition (RUN/STOP keys) |
| 0734 | Prohibition of panel emergency stop operation |
| 0735 | Prohibition of panel reset operation |
| 0736 | Prohibition of change of CNOD/FNOD during operation |

Communication parameters

| Communication No. | Function |
|-------------------|---|
| 0800 | Communication rate |
| 0801 | Parity |
| 0802 | Inverter number |
| 0803 | Communication error trip time |
| 0805 | Communication waiting time |
| 0806 | Setting of master and slave for communication between inverters |
| 0811 | Communication command point 1 setting |

| | |
|------|---|
| 0812 | Communication command point 1 frequency |
| 0813 | Communication command point 2 setting |
| 0814 | Communication command point 2 frequency |
| 0829 | Selection of communication protocol |
| 0870 | Block write data 1 |
| 0871 | Block write data 2 |
| 0875 | Block read data 1 |
| 0876 | Block read data 2 |
| 0877 | Block read data 3 |
| 0878 | Block read data 4 |
| 0879 | Block read data 5 |
| 0880 | Free notes |
| 0890 | Parameter for option 1 |
| 0891 | Parameter for option 2 |
| 0892 | Parameter for option 3 |
| 0893 | Parameter for option 4 |
| 0894 | Parameter for option 5 |

PM motor parameters

| Communication No. | Function |
|-------------------|--|
| 0910 | Step-out detection current level |
| 0911 | Step-out detection time |
| 0912 | High-speed torque adjustment coefficient |

Command Parameters (Group No. FA)

Group is RAM only do not use EEPROM Parameters

| Title | Function | VF-S7 | VF-S7e |
|-------|---------------------------------|-------|--------|
| FA00 | Communication command | * | * |
| FA01 | Communication Frequency Command | * | * |
| FA02 | Panel Frequency Command | * | * |

FA00 Communication Command Bit Structure

| Bit | Operation | 0 | 1 |
|-----|---|-----------|------------|
| 15 | Communication Command valid (FA00) | Invalid | Valid |
| 14 | Frequency Command valid (FA01) | Invalid | Valid |
| 13 | Reset Trip | OFF | Reset |
| 12 | Emergency Stop | OFF | E-Stop |
| 11 | Free Run Command | OFF | Free Run |
| 10 | Run / Stop | Stop | Run |
| 9 | Forward / Reverse | Forward | Reverse |
| 8 | Jog Operation | OFF | Jog |
| 7 | DC Braking | OFF | DC Braking |
| 6 | Acceleration / Deceleration 1 / 2 Selection | Acc/Dec 1 | Acc/ Dec 2 |
| 5 | Reserved | - | - |
| 4 | Reserved | - | - |
| 3 | Preset Speed 4 (VF-S7 only) | OFF | ON |
| 2 | Preset Speed 3 | OFF | ON |
| 1 | Preset Speed 2 | OFF | ON |
| 0 | Preset Speed 1 | OFF | ON |

Command Parameters (Group No. FD)

Group is READ only.

| Title | Function | VF-S7 | VF-S7e |
|-------|--------------------------|-------|--------|
| FD00 | Current Output Frequency | * | * |

Command Parameters (Group No. FE)

Group is READ only.

| Title | Function | VF-S7 | VF-S7e |
|-------|---|-------|--------|
| FE00 | Output Frequency (saves Trip Frequency) | * | * |
| FE01 | Status (saves trip status) | * | * |

| | | | |
|------|---------------------------|---|---|
| FE02 | Current Frequency Command | * | * |
| FE03 | Output current Display | * | * |
| FE04 | Bus Voltage | * | * |
| FE05 | Output Voltage | * | * |
| FE06 | Input Terminal Data | * | * |
| FE07 | Output Terminal Data | * | * |
| FE08 | CPU Version | * | * |
| FE09 | EEPROM Version | * | * |
| FE10 | Past Trip 1 | * | * |
| FE11 | Past Trip 2 | * | * |
| FE12 | Past Trip 3 | * | * |
| FE13 | Past Trip 4 | * | * |
| FE10 | Cumulative Run time | * | * |

FE01 Inverter Status Bit Structure

| Bit | Operation | 0 | 1 |
|-----|--|-----------|------------|
| 15 | Reserved | Invalid | Valid |
| 14 | Reserved | Invalid | Valid |
| 13 | Reserved | OFF | Reset |
| 12 | Reserved | OFF | E-Stop |
| 11 | Reserved | OFF | Free Run |
| 10 | Run / Stop status | Stop | Run |
| 9 | Forward / Reverse status | Forward | Reverse |
| 8 | Jog Operation status | - | Jogging |
| 7 | DC Braking status | - | DC Braking |
| 6 | Acceleration / Deceleration 1 / 2 Status | Acc/Dec 1 | Acc/ Dec 2 |
| 5 | Reserved | - | - |
| 4 | Reserved | - | - |
| 3 | Reserved | OFF | ON |
| 2 | Reserved | OFF | ON |
| 1 | Reserved | OFF | ON |
| 0 | Reserved | OFF | ON |

End of LAB11