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 Produced by : - CTC  
 Travellers Lane, Hatfield, Herts, AL10 8XB, UK  
 Author: Matt Wills

## Databank - Technical Bulletin

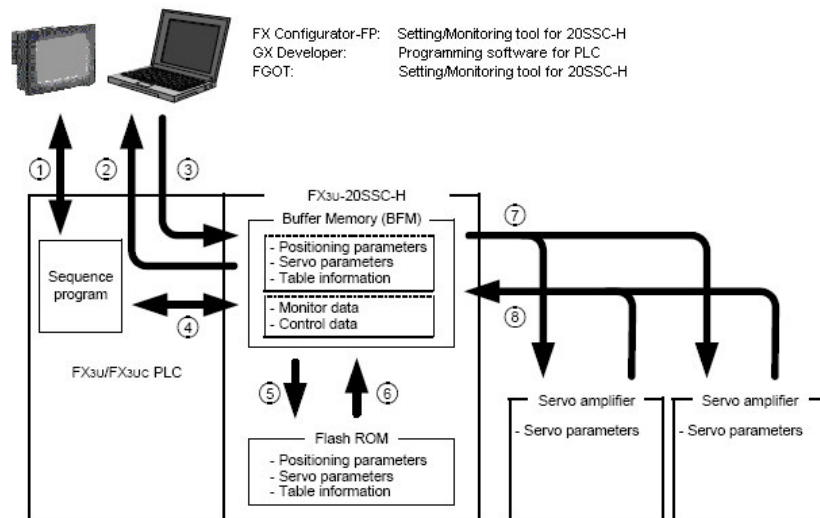
**This Data Sheet covers the configuration of the FX3U-20SSC-H (Hereinafter referred to as 20SSC-H) parameters and MR-J3 Servo Amplifier parameters using the FX-Configurator FP Software.**

### 20SSC-H Memory Configuration and Role

The 20SSC-H has two types of memory for initial data transfer processes and continuous communication with servo equipment and programming devices. The module's flash memory retains parameter information and table data for initialising servo equipment at power-ON while the buffer memory (BFM) constantly communicates with servo equipment and PLC sequence programs. To set up positioning parameters, servo parameters and table information for the 20SSC-H, it is necessary to send data to the module from a PLC sequence program or FX Configurator-FP. Due to the convenience and reduced complexity of program coding, FX Configurator-FP should be used whenever possible.

Below is a diagram of how the 20SSC-H memory communicates with servo amplifiers, PLC's and other equipment.

### 20SSC-H System Components and their Communication



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No.	Description
①	Read/Write/Monitor/Test the sequence programs with GX Developer.
②	Read out the following data from the 20SSC-H BFM to Configurator-FP <ul style="list-style-type: none"> <li>· Positioning parameters</li> <li>· Servo parameters</li> <li>· Table information</li> <li>· Monitor data (Operation status, motion status, input signal status, etc.)</li> </ul>
③	Write the following data from Configurator-FP to the 20SSC-H BFM. <ul style="list-style-type: none"> <li>· Positioning parameters</li> <li>· Servo parameters</li> <li>· Table information</li> <li>· Control data (The present value change, speed change and operation test command, etc.)</li> </ul>
④	Read/Write the following data in BFM with sequence program. <ul style="list-style-type: none"> <li>· Positioning parameters</li> <li>· Servo parameters</li> <li>· Table information</li> <li>· Monitor data (Operation status, motion status, input signal status, etc.)</li> <li>· Control data (The present value change, speed change and operation test command, etc.)</li> </ul>
⑤	Store the following BFM data to the Flash ROM by the store command from a sequence program, Configurator-FP . <ul style="list-style-type: none"> <li>· Positioning parameters</li> <li>· Servo parameters</li> <li>· Table information</li> </ul>
⑥	Positioning/servo parameters and table information transfer from the Flash ROM to the BFM at power ON. Simultaneously, servo parameters transfer to the servo amplifiers.
⑦	Servo parameters in the BFM transfer to the servo amplifiers at power ON.
⑧	20SSC-H retrieves the servo parameters changed by the servo amplifiers and updates the servo parameters in its BFM.

In this document, and in most manuals the sections of the 20SSC-H BFM are divided and referred to as:

Position Parameters  
Monitor Data

Servo Parameters  
Control Data

Table Information

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### Read/Write Properties for the 20SSC-H Buffer Memory

BFM #	Content	R/W
0 – 99	X-axis Monitor Data	R <sup>*1</sup>
100 – 199	Y-axis Monitor Data	R <sup>*1</sup>
200 – 499	Undefined	R
500 – 599	X-axis Control Data	R/W
600 – 699	Y-axis Control Data	R/W
700 – 999	Undefined	R
1000 – 3999	X-axis Table Information	R/W
4000 – 6999	Y-axis Table Information	R/W
7000 – 12999	XY-axis Table Information	R/W
13000 – 13999	Undefined	R
14000 – 14199	X-axis Positioning Parameters	R/W
14200 – 14399	Y-axis Positioning Parameters	R/W
14400 – 14999	Undefined	R
15000 – 15199	X-axis Servo Parameters	R/W
15200 – 15399	Y-axis Servo Parameters	R/W
15400 – 15999	Undefined	R
16000 – 16255	System Use Only	R

\*1: R/W is possible for the Current address (user) in BFM #1,#0 and BFM #101,#100

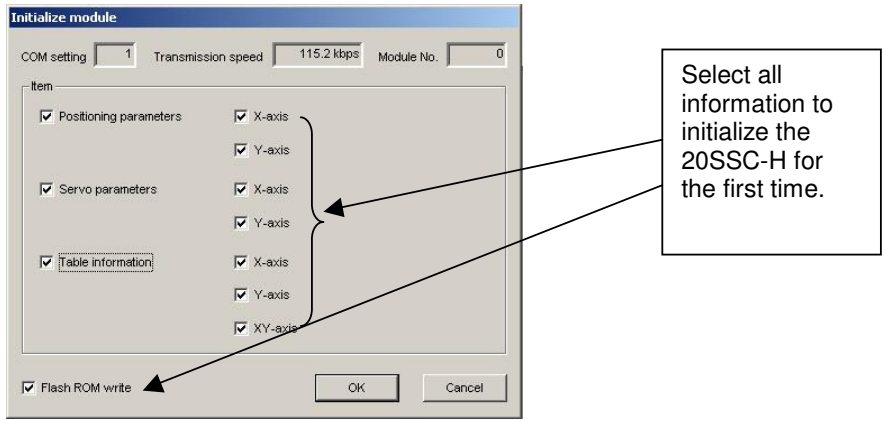
### 20SSC-H FX Configurator FP Software – Initialisation & Set-up

When setting up the 20SSC-H for the first time or when beginning a new project, it is necessary to initialise servo amplifier parameters and positioning parameters. Although these parameters can be set by several methods, the most convenient and easiest way to set them is to use FX Configurator-FP as described below.

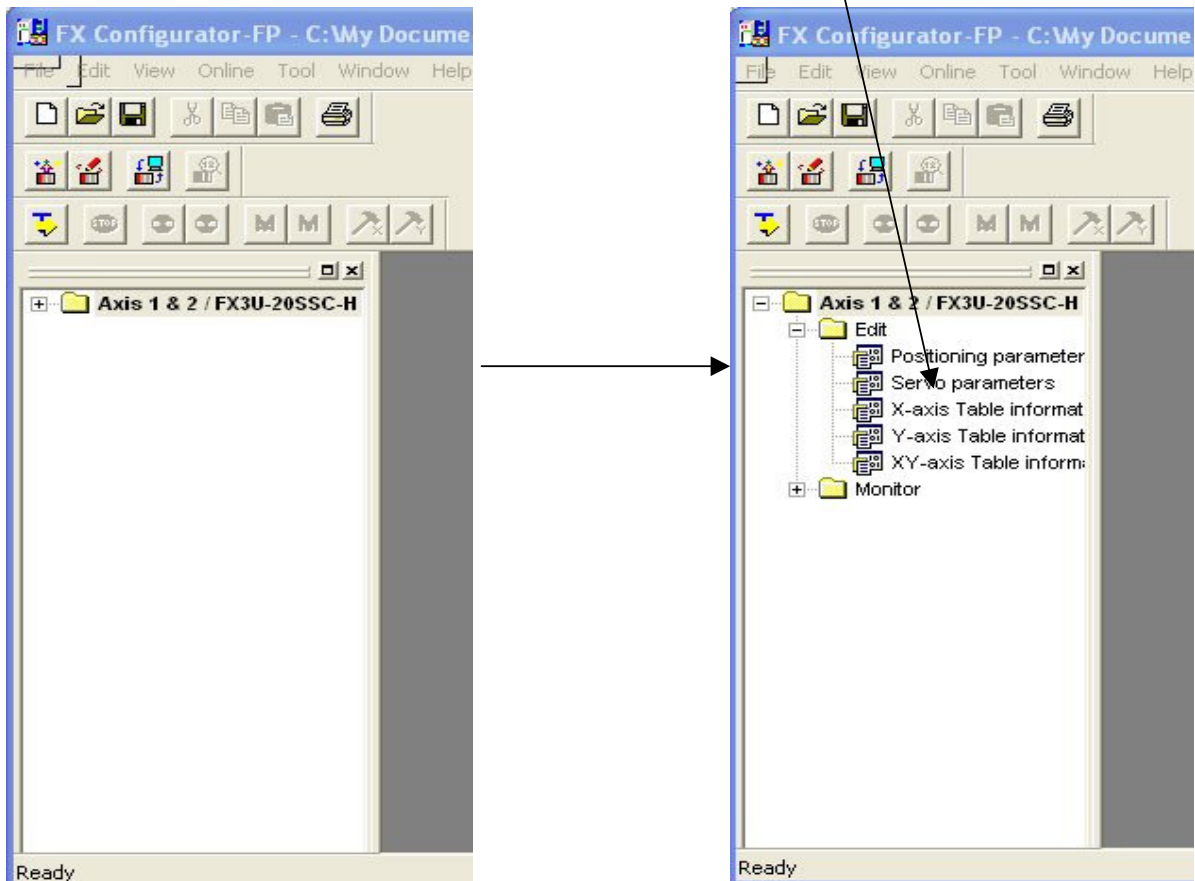
- 1) Open FX Configurator-FP and create a New file by clicking  in the Toolbar.
- 2) Expand the tree of folders in the 'File data list' panel on the left-hand side by double clicking on 'Unset file,' 'Edit' and 'Monitor.'
- 3) Go to [Online → Connection set-up → Comm. Test.]  
Verify the devices are communicating
- 4) Go to [Online → Initialise module.]  
Select all servo parameters, positioning parameters and table information and place a check mark in 'Flash ROM write.' Click the OK button and proceed with selecting 'Yes' and then 'OK'

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5) Expand the 'File Data List' in the navigator panel on the left and Double click on '**Servo Parameters**' to modify the Servo Parameters. Be Sure to make any changes to both X & Y Axis independently.



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Follows is a brief explanation of the most commonly configured Servo Parameters. For information on other parameters please refer to the MR-J3 Manual.

### Servo Amplifier Series

<b>Servo amplifier series</b>	Servo amplifier series	1:MR-J3-B	1:MR-J3-B
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Select MR-J3-B here for both Axis X & Y.

### Basic Setting Parameters

<b>Basic setting parameters</b>	Regenerative brake option	Selection of regenerative brake option	00: Regenerative brake option is not used	00: Regenerative brake option is not used
	Absolute position detection system	Selection of absolute position detection system	0:Used in incremental system	1:Used in absolute position detection system
	Function selection A-1	Servo forced stop selection	1:Invalid (Do not use the forced stop signal.)	1:Invalid (Do not use the forced stop signal.)
	Auto tuning	Gain adjustment mode setting	1:Auto tuning mode 1	1:Auto tuning mode 1
	Auto tuning response		12:37.0Hz	12:37.0Hz
	In-position range		100 pulse	100 pulse
	Rotation direction selection		0:Forward rotation (CCW) with the increase of the positioning address.	1:Reverse rotation (CW) with the increase of the positioning address.
	Encoder output pulse		4000 pulse/rev	4000 pulse/rev

#### **Absolute Position Detection System:**

Set this Parameter when using the Absolute Position Detection System in the position control mode, or leave as Incremental.

#### **Function Selection – Servo Forced Stop Selection:**

Set this parameter to 'Invalid' when a stop Signal is NOT wired into the MR-J3 Amplifier. Failure to either Wire the Stop signal or set this to Invalid will result in **Error E6** on the Amp.

#### **Auto Tuning – Gain adjustment mode setting**

Select between the modes of Tuning here. (Interpolation, Mode 1, Mode 2 and Manual)

#### **Auto Tuning Response:**

Select the level of response for the Auto Tuning Modes

#### **Rotation Direction Selection:**

Use this parameter to select direction of motor rotation with increase of position address.

#### **Encoder Output Pulses:**

This is used to define the number of output pulses per motor revolution from the Amplifier to other devices and should not be confused with the Encoder output of the Motor itself.

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### Extended Parameters

<b>Extension setting parameters</b>	Error excessive alarm level		3 rev	3 rev
	Electromagnetic brake sequence output		0 ms	0 ms
	Encoder output pulses selection	Encoder pulse output phase changing	0:CCW progress to A phases 90 degree	0:CCW progress to A phases 90 degree
		Encoder output pulse setting selection	0:Output pulse setting	0:Output pulse setting
	Function selection C-1	Encoder cable communication system selection	0:Two-wire type	0:Two-wire type
	Function selection C-2	Motor-less operation selection	0:Invalid	0:Invalid
	Zero speed		50 r/min	50 r/min
	Analog monitor output 1	Analog monitor (MO1) output selection	0:Servo motor speed(+/-8V/Max. speed)	0:Servo motor speed(+/-8V/Max. speed)
	Analog monitor output 2	Analog monitor (MO2) output selection	1:Torque(+/-8V/Max. torque)	1:Torque(+/-8V/Max. torque)
	Analog monitor 1 offset		0 mV	0 mV
	Analog monitor 2 offset		0 mV	0 mV
	Function selection C-4	OPR set condition selection	1:it is not necessary to pass through the Z phase after the power on.	1:it is not necessary to pass through the Z phase after the power on.

#### **Function Selection C-4 – OPR Set Condition Selection.**

Use this to set whether it is necessary for the motor to pass through the Z phase after the power supply is switched on or not before an OPR can be carried out.

6) Double click on ‘**Positioning parameters**’ in the ‘File data list’ panel on the left-hand side to modify the positioning parameters.

### Positioning Parameters

System of units		0:Motor(PLS,Hz)	0:Motor(PLS,Hz)
Pulse rate	Pulse per rotation	262144 PLS/REV	262144 PLS/REV
Feed rate	Travel per rotation	52428800 PLS/REV	52428800 PLS/REV
Position data magnification		0:X 1 times	0:X 1 times

#### **System of Units:**

Select here the System units that you wish to work in. Choices are:

- 0:Motor (PLS,Hz) – Distance in Pulses, Speed in Hz
- 1:Mechanical Metric (µm,cm/min) – Distance in µm, speed in cm/min

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- 2: Mechanical Imperial (0.0001 inch, inch/min) – Distance in 0.0001 of an inch, speed in inch/min
- 3: Mechanical Angular (mdeg, 10deg/min) – Distance in mdeg, speed in x10 deg/min
- 4: Combined (µm,Hz) – Distance in µm, speed in Hz
- 5: Combined (0.0001 inch, Hz) - Distance in 0.0001 of an inch, speed in Hz
- 6: Combined (mdeg, Hz) - - Distance in mdeg, speed in Hz.

**Pulse Rate:**

This parameter sets the number of pulses required to rotate the servo motor once. It is only necessary to set this parameter when 'Mechanical' or 'Combined' **System Units** are selected. 'Motor System Units' will ignore this parameter.

**Feed Rate:**

This Parameter sets the travel distance per revolution of the motor. It is only necessary to set this parameter when 'Mechanical' or 'Combined' **System Units** are selected. 'Motor System Units' will ignore this parameter.

**Position Data Magnification:**

This parameter magnifies the Target Address by the values set here. For Example:

The actual address (or travel distance) with target address 1 "123" and position data magnification "1000" are as follows:

Motor system units:  $123 \times 1000 = 123000$  (pulse)  
 Mechanical system units, combined system units:  $123 \times 1000 = 123000$  (µm,mdeg,10<sup>-4</sup>inch)  
 $= 123$ (mm, deg, 10<sup>-1</sup>inch)

Maximum speed	4000000 Hz	4000000 Hz
JOG speed	2000000 Hz	2000000 Hz
JOG instruction evaluation time	300 ms	300 ms
ACC/DEC mode	0:Trapezoid ACC/DEC	0:Trapezoid ACC/DEC
ACC time	200 ms	200 ms
DEC time	200 ms	200 ms
Interpolation time constant	100 ms	100 ms

**Maximum Speed**

This parameter sets the maximum speed for each operation. Units will depend on **System Units** setting.

**Jog Speed**

This parameter sets the speed for Forward JOG and Reverse JOG operations.

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**Jog Instruction Evaluation Time**

This parameter sets the evaluation time for the forward/reverse JOG command to determine whether the control is inching or continuous.

For forward/reverse commands that are **ON** for **longer** than the JOG evaluation time, 20SSC-H executes continuous operation. For forward/reverse commands that are **ON** for **shorter** than the JOG evaluation time, the 20SSC-H executes inching operation.

**Acc/Dec Mode**

Used to select between Standard Trapezoidal and Approximate 'S' Curve modes

**Acceleration Time**

This parameter sets a time for the operation speed to reach the maximum speed from zero.

**Deceleration Time**

This parameter sets the time for the operation speed to reach to zero from the maximum.

**Interpolation Time Constant**

This parameter sets the time for the interpolation operation speed to reach the maximum speed from zero (acceleration) or to reach zero from the maximum speed (deceleration).

Stop mode		0:Positioning end	0:Positioning end
Software limit(upper)		0 PLS	0 PLS
Software limit(lower)		0 PLS	0 PLS
FLS,RLS External input selection	Signal selection	0:Use signal via FX3U(C)	0:Use signal via FX3U(C)
	Signal logic	1:B-contact(servo amplifier)	1:B-contact(servo amplifier)
Torque limit		3000 x0.1 %	3000 x0.1 %

**Stop Mode**

**Software Limit (Upper)**

Used to set the Software limit of the system for the Increase of position direction  
 Set to 0 to disable for continuous feed applications. (Default is now 0)

**Software Limit (Lower)**

Used to set the Software limit of the system for the Decrease of position direction  
 Set to 0 to disable for continuous feed applications. (Default is now 0)

**FLS, RLS External input Selection, Signal Selection**

Used to specify where the FLS and RLS limit switches are connected.

- 0:Use signal via FX3U(c)
- 1:Use Signal via FX3U(c) & Servo Amp

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**FLS, RLS External input Selection, Signal Logic**

When the FLS and RLS limits are connected to the Servo Amplifier use this parameter to select the input logic of the switches.

**Torque Limit**

Used to set the Torque Limit in 0.1% steps. Example 3000 = 300%

Servo ready check	1:Valid	1:Valid
Servo end check	1:Valid	1:Valid
Servo end evaluation time	5000 ms	5000 ms

**Servo Ready Check**

The servomotor ready signal is checked during startup of operation or during operation. With no servo ready signal, a servo-ready error occurs, stopping the operation. For servomotors with no servo-ready signal, disable the servo-ready check function.

- 0: Invalid
- 1: Valid - Default

**Servo end Check**

Use the servo end check function to detect the positioning operation completion by the servo status in-position signal.

The servo status in-position signal turns ON after operation completion (within the range of servo end check determination time

When the in-position signal does not turn ON within the specified servo end determination time, an external error occurs, stopping the operation.

**Servo end evaluation time**

This parameter sets the evaluation time for the servo end check. Setting range is 1 to 5000ms

OPR mode	0:DOG	0:DOG
OPR direction	0:Decrease present value	0:Decrease present value
Mechine zero point address	0 PLS	0 PLS
OPR speed(High speed)	4000000 Hz	4000000 Hz
OPR speed(Creep)	100000 Hz	100000 Hz
OPR torque limit value	3000 x0.1 %	3000 x0.1 %
OPR interlock setting	1:Valid	1:Valid

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**OPR Mode (For more information on OPR methods refer to OPR DataSheet)**

This parameter selects mechanical zero return operations. There are four types of OPR operation:

- 0: DOG Search - Search for a DOG switch and stop on a Z phase after DOG OFF-ON-OFF.
- 1: Data Set type - Set Current motor position as Home/Origin
- 2: Stopper #1 – A physical Stopper is used to zero the OPR/Origin. Stopper #1 uses a DOG switch before the stopper to allow high speed travel up to the DOG.
- 3: Stopper #2 – As Stopper #1 but no DOG is used.

**OPR Direction**

Use this parameter to define the direction the machine will travel in when an OPR is requested

- 0: The current value decreasing direction
- 1: The current value increasing direction

**Machine Zero Point Address**

This parameter sets the current value address at zero return operation completion. After mechanical zero return completion, the 20SSC-H writes the current address to this parameter.

**OPR Speed (High Speed)**

This parameter sets the mechanical zero return operation speed (high speed)  
 Applies to OPR Methods: DOG, Stopper #1

**OPR Speed (Creep Speed)**

This parameter sets the mechanical zero return operation speed (Creep speed)  
 Applies to OPR Methods: DOG, Stopper #1, Stopper #2

**OPR Torque limit value**

This parameter sets the torque limit for the mechanical zero return operation (creep speed)

**OPR Interlock Setting**

Use this parameter to Enable or disable the OPR interlock function.

- 1: Enable - Disables the START command without zero return completion  
 Enables the START command with zero return completion
- 0: Disable - Allows START command without zero return completion.

Zero signal count start timing		0: Backward end of DOG	0: Backward end of DOG
Zero signal count		1 PLS	1 PLS
DOG External input selection	Signal selection	0: Use signal via 20SSC-H	0: Use signal via 20SSC-H
	Signal logic	0: A-contact(servo amplifier)	0: A-contact(servo amplifier)
DOG switch input logic		0: A-contact(20SSC-H)	0: A-contact(20SSC-H)

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### Zero signal count start timing

This parameter specifies when the **Zero Signal count** starts:

- 0: Backward end of DOG. (Counting starts when the DOG switch has gone OFF-ON-OFF)
- 1: Forward End of DOG. (Counting starts as soon as the DOG switch has gone OFF-ON)

### Zero Signal count

This parameter sets the number of zero-phase signal counts in the mechanical zero return operation. (1 x Z phase pulse per full motor shaft rotation)

The mechanical zero return ends at the specified number of zero-phase signal count.

### DOG external input selection – Signal selection

Use this parameter to specify where the DOG switch is wired to:

- 0: Use Signal via 20SSC-H unit
- 1: Use Signal via Servo Amplifier

### DOG external input selection – Signal Logic

Use this parameter when above **DOG external input selection** is set to **1: via Servo Amp** to specify the type of DOG switch input:


- 0: NO Contact (A Contact)
- 1: NC Contact (B Contact)

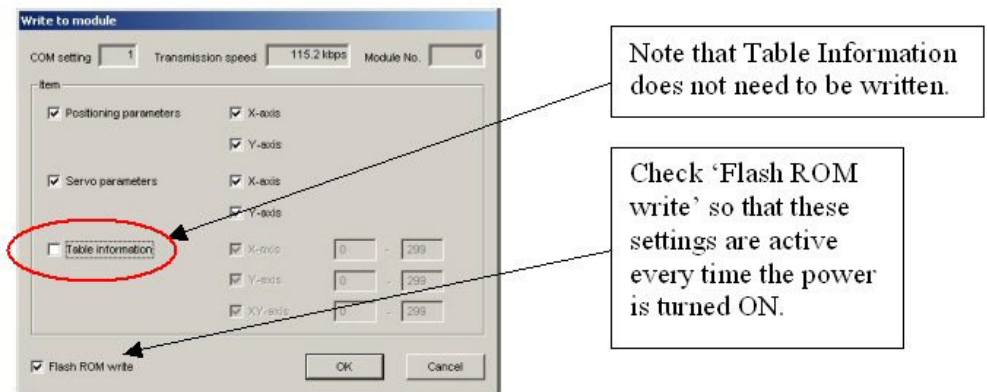
### DOG switch input logic

Use this to specify the type of DOG switch which is connected to the 20SSC-H module:

- 0: NO Contact (A contact)
- 1: NC Contact (B Contact)

7) Write the servo parameters and positioning parameters to the 20SSC-H by pressing the

'Write to module' button  or by using [Online → Write to module (Ctrl+T).] Select only the servo and positioning parameters and put a check mark in the 'Flash ROM write' box as shown below. Click the OK button and proceed with selecting 'Yes' and then 'OK.'



The screenshot shows the 'Write to module' dialog box. At the top, it displays 'COM setting' (1), 'Transmission speed' (115.2 kbps), and 'Module No.' (0). The main area contains a list of items with checkboxes: 'Positioning parameters' (checked), 'Servo parameters' (checked), and 'Table information' (unchecked). Under 'Positioning parameters', 'X-axis' and 'Y-axis' are checked. Under 'Servo parameters', 'X-axis', 'Y-axis', and 'XY-axis' are checked. To the right of these checkboxes are numerical input fields for 'X-axis', 'Y-axis', and 'XY-axis', each with a value of 0 and a range of -299. At the bottom left, the 'Flash ROM write' checkbox is checked. Two callout boxes provide instructions: one points to the 'Table information' checkbox with the text 'Note that Table Information does not need to be written.', and another points to the 'Flash ROM write' checkbox with the text 'Check 'Flash ROM write' so that these settings are active every time the power is turned ON.'