

# PISO-PS400 Function Reference

(Version 3.1)



**ICP DAS CO., LTD.**

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# Introduction

This software package is dedicated to PISO-PS400 pulse-based motion controller. It includes the WDM (Windows Driver Model) driver and ANSI-C Library for Windows 2000 and Windows XP.

The changes between the current version (Version 3.0) and the older version are:

- ✧ The function-names are changed.
- ✧ The driver is re-designed to embed all Motion-control in OS kernel.
- ✧ The routines are re-defined and the simpler programming follow-chart (refer to the figure 1).

One unique Card ID will be referred by each function in Library. This Card ID is configured with on-board Dip-Switch, and helps to identify multiple PISO-PS400 cards in your system. In other words, you no longer worry about the order that Operating System scans PISO-PS400 cards; the only thing you must take care is the correct relationship between the terminal-boards and PISO-PS400 cards.

There are samples that are provided for Microsoft® Visual Studio 6.0 (VC and VB) and Borland® BCB 6.0 samples to demonstrate the functions of PISO-PS400 Library. Some samples need the Generic-Type terminal-board (DN-8468G) to connect the external sensors, output pulse and encoder-input.

This documentation provides the detailed information of PISO-PS400 APIs, including the function-decelerations, definitions of both parameters and return codes. The APIs will be cataloged and described in the following chapters:

- CHAPTER 2 – System Initialization
- CHAPTER 3 – Automatic Home Search
- CHAPTER 4 – Independent Moving Functions
- CHAPTER 5 – Interpolation Moving Functions
- CHAPTER 6 – Other Motion Functions
- CHAPTER 7 – Advanced Motion Configurations
- CHAPTER 8 – Miscellaneous Functions

- CHAPTER 9 – Status
- CHAPTER 10 – FRnet I/O extension

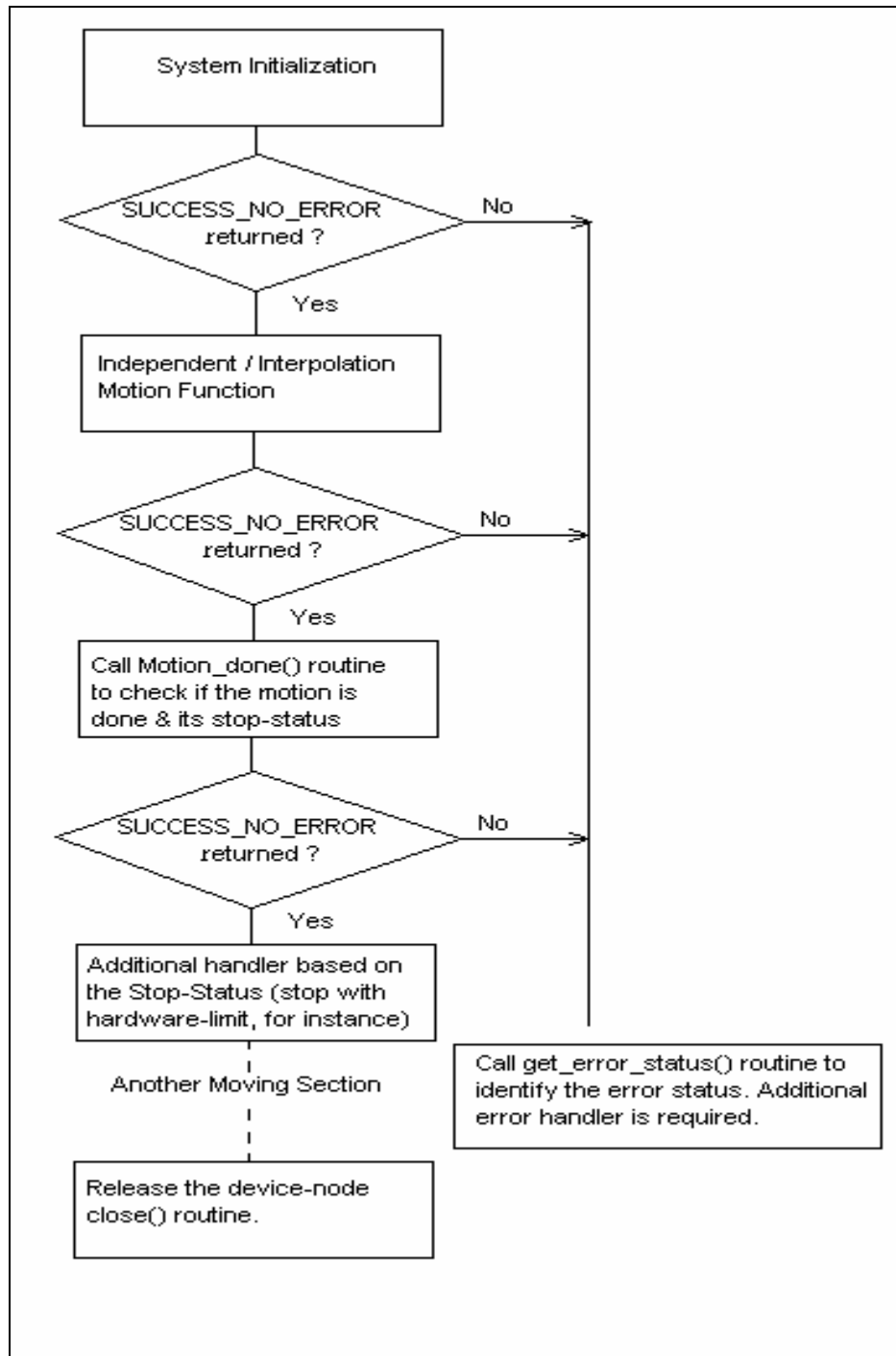


Figure 1 - typical programming following-chart

# System Initialization

## 2.1 Operating-System Configuration

The functions in this chapter provide the interface to Operating-System. By calling these functions, your applications can scan all active PISO-PS400 cards in your system, and get the specific Card-IDs configured with the on-board Dip-Switch. Open the card and access the internal Motion-Control ASIC with the other functions in PISO-PS400 Library.

### 2.1.1 ps400\_scan

#### VC6 / BCB6

short ps400\_scan(short\* pCardNum, BYTE\* pAvailCards = NULL)

#### VB6

ps400\_scan(ByRef pCardNum As Integer, Optional pAvailCards As Byte = 0) As Integer

#### Description:

This function scans all active PISO-PS400 cards in your system. The pCardNum saves the numbers of active PISO-PS400 cards. The optional user-provided Array, pAvailCards, indicates the presence of active PISO-PS400 card. (1: present, 0: absent)

#### Parameters:

pCardNum: The pointer to the memory that stores the numbers of active PISO-PS400 cards.

pAvailCard: The address of user-provided **BYTE**-Array. Based on the Card ID, each element indicates the presence of active PISO-PS400 card. The user must prepare one **BYTE**-Array with **PS400\_MaxCards** elements.

For instance, there are three active PISO-PS400 cards with Card ID 3, 5 and 7. The



content of pAvailCard Array will be  
{ 0, 0, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0 }

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_NO\_CARD\_FOUND: There is no active card available in your system.

ERROR\_CARD\_ID\_DUPLICATED: There are multiple cards are assigned the same Card ID, please check the settings of on-board Dip-Switch.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

## 2.1.2 ps400\_get\_cardinfo

### VC6 / BCB6

short ps400\_get\_cardinfo(int ScannedIndex, BYTE\* pCardID)

### VB6

ps400\_get\_cardinfo(ByVal ScannedIndex As Integer, ByVal pCardID As Byte) As Integer

### Description:

This function returns the Card ID based on the scanned-index. This routine will get the Card ID configured with on-board Dip-Switch.

### Parameters:

ScannedIndex: The index that the active PISO-PS400 card is scanned. This index begins from 0, and is less than the active PISO-PS400 cards.

pCardID: The pointer to the memory that stores the specific Card ID.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_NO\_CARD\_FOUND: There is no active card available in your system.

ERROR\_INVALID\_SCANNED\_INDEX: Indicates the ScannedIndex is not less than the numbers of active PISO-PS400 cards.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

## 2.1.3 ps400\_open

### VC6 / BCB6

short ps400\_open(BYTE bCardID)

### VB6

ps400\_open(ByVal bCardID As Byte) As Integer

### Description:

This function opens the device node of PISO-PS400 based on the specific Card ID. If this function returns successfully, the process that calls this function owns the device until ps400\_close() is called. The device node of PISO-PS400 is ought to be owned before accessing the Motion-Control ASIC with the other functions. It's recommended to call ps400\_scan() and ps400\_get\_cardinfo() to get the Card ID.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_IOCTL\_FAILED: Cannot get the settings of **Range** register, please call GetLastError() for further system information.

ERROR\_DEVICE\_OPEN: Fail to open the device-node of PISO-PS400. Please make sure no other process owns that PISO-PS400 card.

ERROR\_MEMORY\_MAP: Indicates the Memory-Mapping is failed, please check the event logs in Event Viewer.

## 2.1.4 ps400\_close

### VC6 / BCB6

short ps400\_close(BYTE bCardID)

### VB6

ps400\_close(ByVal bCardID As Byte) As Integer

### Description:

This function closes the device node of PISO-PS400 based on the specific Card ID. After calling this function, the PISO-PS400 card will be released, and other process can open it.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no opened PISO-PS400 card with assigned Card ID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_DEVICE\_CLOSE: Fail to close the device-node of PISO-PS400.

ERROR\_MEMORY\_UNMAP: Indicates the Memory-Un-mapping is failed, please check the event logs in Event Viewer.

## 2.1.5 ps400\_reset

### VC6 / BCB6

short ps400\_reset(BYTE bCardID)

### VB6

ps400\_reset(ByVal bCardID As Byte) As Integer

### Description:

This function re-sets the internal Motion-Control ASIC and re-configures the basic registers with default value. After calling this function, all configuration set before will be ignored. This function terminates the current motion, too.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no opened PISO-PS400 card with assigned Card ID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_CARD\_RESET: Cannot reset the Motion-Control ASIC, please call GetLastError() for further system information.

## 2.1.6 ps400\_open\_all

### VC6 / BCB6

short ps400\_open\_all(void)

### VB6

ps400\_open\_all() As Integer

### Description:

This function opens the all active PISO-PS400 cards. If this function returns successfully, the process that calls this function owns all devices until ps400\_close\_all() is called.

### Parameters:

None

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_IOCTL\_FAILED: Cannot get the settings of **Range** register, please call GetLastError() for further system information.

ERROR\_DEVICE\_OPEN: Fail to open the device-node of PISO-PS400. Please make sure no other process occupies that PISO-PS400 card.

ERROR\_MEMORY\_MAP: Indicates the Memory-Mapping is failed, please check the event logs in Event Viewer.

## 2.1.7 ps400\_close\_all

### VC6 / BCB6

short ps400\_close\_all(void)

### VB6

ps400\_close\_all() As Integer

### Description:

This function closes all PISO-PS400 cards that are opened by one application. After calling this function, the PISO-PS400 cards will be released, and other process can open them.

### Parameters:

None

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_DEVICE\_CLOSE: Fail to close the device-node of PISO-PS400.

ERROR\_MEMORY\_UNMAP: Indicates the Memory-Un-mapping is failed, please check the event logs in Event Viewer.

## 2.1.8 ps400\_reset\_all

### VC6 / BCB6

short ps400\_reset\_all(void)

### VB6

ps400\_reset\_all() As Integer

### Description:

This function re-sets the internal Motion-Control ASIC of all PISO-PS400 cards that are opened by one application, and re-configures the basic registers with default value. After calling this function, all configuration set before will be ignored. This function terminates the current motion of the active PISO-PS400 cards, too.

### Parameters:

None

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_CARD\_RESET: Cannot reset the Motion-Control ASIC, please call GetLastError() for further system information.



## 2.2 Hardware Configuration

After the driver is loaded, the pre-defined configurations are assigned to the relative registers of Motion-Control ASIC. The functions in this chapter configure/change the default-settings and polarities of output-pulse, input-encoder and hardware-limit sensors.

### 2.2.1 ps400\_set\_pls\_cfg

#### VC6 / BCB6

short ps400\_set\_pls\_cfg(BYTE bCardID, WORD wAxis, WORD wPulseMode, WORD wPulseLogic, WORD wDirectionLogic)

#### VB6

ps400\_set\_pls\_cfg(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wPulseMode As Integer, ByVal wPulseLogic As Integer, ByVal wDirectionLogic As Integer) As Integer

#### Description:

This function configures the output-pulse mode of PISO-PS400.

#### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wPulseMode: PULSE\_MODE\_CW\_CCW or PULSE\_MODE\_PULSE\_DIRECTION.

wPulseLogic: PULSE\_LOGIC\_ACTIVE\_HIGH or PULSE\_LOGIC\_ACTIVE\_LOW

wDirectionLogic: PULSE\_FORWARD\_ACTIVE\_HIGH or PULSE\_FORWARD\_ACTIVE\_LOW. This parameter will be ignored if the parameter **wPulseMode** is assigned to PULSE\_MODE\_CW\_CCW.

#### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_PULSE\_MODE: Neither PULSE\_MODE\_CW\_CCW nor PULSE\_MODE\_PULSE\_DIRECTION is assigned to parameter **wPulseMode**.

ERROR\_INVALID\_PULSE\_LEVEL: Neither PULSE\_LOGIC\_ACTIVE\_HIGH nor

PULSE\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wPulseLogic**.

ERROR\_INVALID\_PULSE\_DIRECTION: Neither PULSE\_FORWARD\_ACTIVE\_HIGH nor

PULSE\_FORWARD\_ACTIVE\_LOW is assigned to parameter **wDirectionLogic**.

ERROR\_PULSE\_MODE\_SET: Cannot change the output pulse mode, please call GetLastError() for further system information.

## 2.2.2 ps400\_set\_enc\_cfg

### VC6 / BCB6

short ps400\_set\_enc\_cfg(BYTE bCardID, WORD wAxis, WORD wEncoderMode, BYTE bCounterSource = 0)

### VB6

(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wEncoderMode As Integer, Optional ByVal bCounterSource As Byte = 0) As Integer

### Description:

This function configures the input-encoder mode of PISO-PS400.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wEncoderMode: ENCODER\_MODE\_AB, ENCODER\_MODE\_AB\_DIVID\_2, ENCODER\_MODE\_AB\_DIVID\_4 or ENCODER\_MODE\_CW\_CCW.

bCounterSource: The optional parameter that is reserved for future.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_ENCODER\_MODE: No valid encoder mode is assigned to parameter **wEncoderMode**.

ERROR\_ENCODER\_MODE\_SET: Cannot change the input encoder mode, please call GetLastError() for further system information.

## 2.2.3 ps400\_set\_limit

### VC6 / BCB6

short ps400\_set\_limit(BYTE bCardID, WORD wAxis, WORD wLimitLogic, WORD wStopMode = LIMIT\_STOP\_SUDDEN)

### VB6

ps400\_set\_limit(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wLimitLogic As Integer, Optional ByVal wStopMode As Integer = LIMIT\_STOP\_SUDDEN) As Integer

### Description:

This function configures the polarity and stop-mode of hardware-limit sensor.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wLimitLogic: LIMIT\_LOGIC\_ACTIVE\_HIGH or LIMIT\_LOGIC\_ACTIVE\_LOW.

wStopMode: LIMIT\_STOP\_SUDDEN or LIMIT\_STOP\_SLOWDOWN. This optional parameter is set as LIMIT\_STOP\_SUDDEN by default.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_LIMIT\_LOGIC: Neither LIMIT\_LOGIC\_ACTIVE\_HIGH nor LIMIT\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wLimitLogic**.

ERROR\_INVALID\_STOP\_MODE: Neither LIMIT\_STOP\_SUDDEN nor LIMIT\_STOP\_SLOWDOWN is assigned to parameter **wStopMode**.

ERROR\_LIMIT\_SENSOR\_SET: Cannot configure the hardware-limit sensor, please call GetLastError() for further system information.

## 2.3 Hardware Configuration (optional)

The functions in this chapter enable/disable the additional signals, including INP and ALARM. The signal-filtering feature is built in Motion-Control ASIC, and can be configured with `ps400_set_filter()`.

The **Range** register of Motion-Control ASIC can be configured with `ps400_set_range()` function.

Assigning different value to the **Range** register, the accuracy and valid-range of speed, acceleration/deceleration and jerk/deceleration-rate will be changed.

The Motion-Control ASIC also provides the software-limit feature, and is enabled/configured with `ps400_set_softlimit()`. Another helpful function, `ps400_load_config()`, configures all PISO-PS400 cards with the pre-defined configuration file, `PS400_Config.ini`.

### 2.3.1 ps400\_set\_range

#### VC6 / BCB6

```
short ps400_set_range(BYTE bCardID, WORD wAxis, DWORD dwRange)
```

#### VB6

```
ps400_set_range(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwRange As Long)
As Integer
```

#### Description:

This function changes the **Range** register to change the accuracy and valid-range of speed, acceleration/deceleration and jerk/deceleration-rate. The relationship between **Range** register and Speed/Acceleration/Jerk is illustrated in Figure 2. Another function, `ps400_get_range_settings()`, gets the current valid-range of speed, acceleration/deceleration and jerk/deceleration-rate.

$\text{Multiple} = \frac{8,000,000}{R}$	$\text{Deceleration Increasing Rate (PPS/SEC}^2) = \frac{62.5 \times 10^6}{L} \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$
$\text{Jerk (PPS/SEC}^3) = \frac{62.5 \times 10^6}{K} \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$	$\text{Deceleration (PPS/SEC)} = D \times 125 \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$
$\text{Acceleration (PPS/SEC)} = A \times 125 \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$	$\text{Initial Speed (PPS)} = SV \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$
$\text{Drive Speed (PPS)} = V \times \underbrace{\frac{8,000,000}{R}}_{\text{Multiple}}$	

Figure 2 – relationship between **Range** register and Speed/Acceleration/Jerk

**Parameters:**

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwRange: The value to be assigned to the **Range** register (16,000 ~ 8,000,000)

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_RANGE: The value to be assigned to **Range** register is invalid.

ERROR\_RANGE\_CHANGE: Cannot change the content of **Range** register, please call GetLastError() for further system information.

## 2.3.2 ps400\_get\_range\_settings

### VC6 / BCB6

```
short ps400_get_range_settings(BYTE bCardID, WORD wAxis, AXIS_RANGE_SETTINGS*  
pAxisRangeSetting)
```

### VB6

```
ps400_get_range_settings(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef  
pAxisRangeSetting As AXIS_RANGE_SETTINGS) As Integer
```

### Description:

This function gets the valid-range of Speed, Acceleration/Deceleration and Jerk/Deceleration-Increasing-Rate based on the setting of **Range** register. Please refer to the 'Set\_Range' sample.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pAxisRangeSetting: The pointer to the data structure that stores the valid-range of Speed, Acceleration/Deceleration and Jerk/Deceleration-Increasing-Rate.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

## 2.3.3 ps400\_set\_inp

### VC6 / BCB6

short ps400\_set\_inp(BYTE bCardID, WORD wAxis, WORD winPEnable, WORD winPLogic)

### VB6

ps400\_set\_inp(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal winPEnable As Integer, ByVal winPLogic As Integer) As Integer

### Description:

This function enables/disables INP feature and configures its polarity. This feature is active until calling ps400\_set\_inp() with INP\_DISABLE\_FEATURE.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

winPEnable: INP\_ENABLE\_FEATURE or INP\_DISABLE\_FEATURE.

winPLogic: INP\_LOGIC\_ACTIVE\_HIGH or INP\_LOGIC\_ACTIVE\_LOW.

### Caveat:

If the incorrect setting is assigned to parameter **winPLogic**, the ps400\_motion\_done() will report MOTION\_NOT\_DONE always.

It's recommended to run **PCEzGo.exe** to check the correct settings.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_INP\_ENABLE: Neither INP\_ENABLE\_FEATURE nor INP\_DISABLE\_FEATURE is assigned to parameter **winPEnable**.

ERROR\_INVALID\_INP\_LOGIC\_LEVEL: Neither INP\_LOGIC\_ACTIVE\_HIGH nor INP\_LOGIC\_ACTIVE\_LOW is assigned to parameter **winPLogic**.

ERROR\_INP\_SIGNAL\_SET: Cannot set the INP configuration, please call GetLastError() for further system information.

## 2.3.4 ps400\_set\_alarm

### VC6 / BCB6

short ps400\_set\_alarm(BYTE bCardID, WORD wAxis, WORD wAlarmEnable, WORD wAlarmLogic)

### VB6

ps400\_set\_alarm(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wAlarmEnable As Integer, ByVal wAlarmLogic As Integer) As Integer

### Description:

This function enables/disables ALARM feature and configures its polarity. This feature is active until calling ps400\_set\_alarm() with ALARM\_DISABLE\_FEATURE.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wAlarmEnable: ALARM\_ENABLE\_FEATURE or ALARM\_DISABLE\_FEATURE.

wAlarmLogic: ALARM\_LOGIC\_ACTIVE\_HIGH or ALARM\_LOGIC\_ACTIVE\_LOW.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_ALARM\_ENABLE: Neither ALARM\_ENABLE\_FEATURE nor ALARM\_DISABLE\_FEATURE is assigned to parameter **wAlarmEnable**.

ERROR\_INVALID\_ALARM\_LOGIC\_LEVEL: Neither ALARM\_LOGIC\_ACTIVE\_HIGH nor ALARM\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wAlarmLogic**.

ERROR\_ALARM\_SIGNAL\_SET: Cannot set the ALARM configuration, please call GetLastError() for further system information.



## 2.3.5 ps400\_set\_filter

### VC6 / BCB6

short ps400\_set\_filter(BYTE bCardID, WORD wAxis, WORD wFilterEnable, WORD wFilterCfg, WORD wDelayTime)

### VB6

ps400\_set\_filter(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wFilterEnable As Integer, ByVal wFilterCfg As Integer, ByVal wDelayTime As Integer) As Integer

### Description:

This function enables/disables the signal filter built in Motion-Control ASIC, and configures the signal-sources and delay-time. This feature is active until calling ps400\_set\_filter() with FILTER\_DISABLE\_FEATURE.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wFilterEnable: FILTER\_ENABLE\_FEATURE or FILTER\_DISABLE\_FEATURE.

wFilterCfg: The following signal-sources can be combined with OR ( | ) operator.

FILTER\_CFG\_EMG\_EL\_ORG\_NORG (for EMG, hardware-limit, Home and Near-Home),  
FILTER\_CFG\_ENCODER\_Z\_PHASE (for Z-Phase/INDEX),  
FILTER\_CFG\_INP\_ALARM (for INP and ALARM),  
FILTER\_CFG\_EXP\_EXPLSN (for manual-pulse-generator),  
FILTER\_CFG\_IN3 (for digital-input IN3)

wDelayTime: Can be one of the following delay-time settings (unit: micro-second):

FILTER\_DELAY\_2us,  
FILTER\_DELAY\_256us,  
FILTER\_DELAY\_512us,  
FILTER\_DELAY\_1024us,  
FILTER\_DELAY\_2048us,  
FILTER\_DELAY\_4096us,  
FILTER\_DELAY\_8192us,  
FILTER\_DELAY\_16384us

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_FILTER\_ENABLE: Neither FILTER\_ENABLE\_FEATURE nor FILTER\_DISABLE\_FEATURE is assigned to parameter **wFilterEnable**.

ERROR\_INVALID\_FILTER\_CONFIGURATION: Invalid Filter-Source combination is assigned to parameter **wFilterCfg**.

ERROR\_INVALID\_FILTER\_DELAY\_TIME: Invalid delay-time is assigned to parameter **wDelayTime**.

ERROR\_FILTER\_SET: Cannot set the Filter configuration, please call GetLastError() for further system information.

## 2.3.6 ps400\_set\_softlimit

### VC6 / BCB6

short ps400\_set\_softlimit(BYTE bCardID, WORD wAxis, WORD wSWLimitEnable, WORD wCmpSource, long LimitPositive, long LimitNegative)

### VB6

ps400\_set\_softlimit(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wSWLimitEnable As Integer, ByVal wCmpSource As Integer, ByVal LimitPositive As Long, ByVal LimitNegative As Long) As Integer

### Description:

The internal comparators of Motion-Control ASIC provide the software-limit feature. The Motion-Control ASIC will monitor either Logic-Command counter or Encoder-Position counter. Once the content of these counters exceeds the pre-defined value, the deceleration stop will be started. This feature is active until calling ps400\_set\_softlimit() with SW\_LIMIT\_DISABLE\_FEATURE.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSWLimitEnable: SW\_LIMIT\_ENABLE\_FEATURE or SW\_LIMIT\_DISABLE\_FEATURE.

wCmpSource: CMP\_SRC\_LOGIC\_COMMAND or CMP\_SRC\_ENCODER\_POSITION.

LimitPositive: The pre-defined value for the comparator in forward direction.

LimitNegative: The pre-defined value for the comparator in reverse direction.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_SOFTWARE\_LIMIT\_ENABLE: Neither SW\_LIMIT\_ENABLE\_FEATURE nor SW\_LIMIT\_DISABLE\_FEATURE is assigned to parameter **wSWLimitEnable**.

ERROR\_INVALID\_SOFTWARE\_LIMIT\_COMPARATOR\_SOURCE: Neither CMP\_SRC\_LOGIC\_COMMAND nor CMP\_SRC\_ENCODER\_POSITION is assigned to parameter **wCmpSource**.

ERROR\_CONFLICT\_WITH\_VRING: Indicates that the ASIC-Internal Comparators are used for Variable-Ring counter. Please disable Variable-Ring counter with ps400\_set\_vring().

ERROR\_CONFLICT\_WITH\_CMPTRIG: Indicates that the ASIC-Internal Comparators are used for Compare & Trigger feature. Please disable Compare & Trigger feature with `ps400_cmptrig_config()`.

ERROR\_CONFLICT\_WITH\_SYNCH\_ACTION: Indicates that the ASIC-Internal Comparators are used as the condition of Synchronous-Action. Please disable synchronous-condition with `ps400_set_synch()`.

ERROR\_SW\_LIMIT\_SET: Cannot configure the software-limit settings, please call `GetLastError()` for further system information.

## 2.3.7 ps400\_load\_config

### VC6 / BCB6

short ps400\_load\_config(char\* FileName = NULL)

### VB6

ps400\_load\_config(Optional ByRef FileName As Byte = &H0) As Integer

### Description:

This function loads the pre-defined configuration file and configures all active PISO-PS400 cards automatically. The ps400\_open\_all() is needed to be called before this function.

It's strongly recommended to change the settings of configuration file with the utility, PCEzGO.exe.

Please **DO NOT** modify the configuration file manually.

The involved configuration routines are:

ps400\_set\_pls\_cfg(), ps400\_set\_enc\_cfg(), ps400\_set\_limit(), ps400\_set\_home\_cfg(),  
ps400\_set\_softlimit(), ps400\_set\_alarm(), ps400\_set\_inp() and ps400\_set\_filter().

### Parameters:

FileName: The pointer to the memory that stores the pathname of configuration file. Without assigning pathname, the default configuration file, \$windir/system32/PS400\_Config.ini, will be loaded. This parameter is optional, and NULL is assigned by default.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_CONFIG\_FILE\_LOAD: Cannot locate the configuration file.

ERROR\_CONFLICT\_IN\_CONFIG\_FILE: The active PISO-PS400 cards settings is not identical to the configuration file.

ERROR\_INVALID\_FILE\_HANDLE: There is no valid file-handle is related to the PISO-PS400 card recorded in configuration. Please make sure the ps400\_open\_all() had been called and returns SUCCESS\_NO\_ERROR..

Other return codes please refer to the following functions:

ps400\_set\_pls\_cfg, ps400\_set\_enc\_cfg, ps400\_set\_limit, ps400\_set\_softlimit, ps400\_set\_inp,  
ps400\_set\_alarm and ps400\_set\_filter.

## 2.3.8 ps400\_servo\_on

### VC6 / BCB6

short ps400\_servo\_on(BYTE bCardID, WORD wAxis, BYTE bServoON, BYTE bAutoOFF)

### VB6

ps400\_servo\_on(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal bServoON As Byte, ByVal bAutoOFF As Integer) As Integer

### Description:

This function turns on/off the Servo.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

bServoON: SERVO\_ON or SERVO\_OFF.

bAutoOFF: SERVO\_MANUAL\_OFF: turn off Servo manually.

SERVO\_AUTO\_OFF: turn off Servo when the ps400\_close() or ps400\_close\_all() is called.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_SERVO\_SETTING: Neither SERVO\_ON nor SERVO\_OFF is assigned to parameter **bServoON**.

ERROR\_SERVO\_ON\_SET: Cannot set the Servo output, please call GetLastError() for further system information.

## Automatic Home Search

With the external Near-Home (NORG), Home (ORG) and Z-Phase/INDEX sensors, the auto-homing feature provided by Motion-Control ASIC will help to search the Home (ORG) automatically.

The typical Automatic Home Search is illustrated in Figure 3.

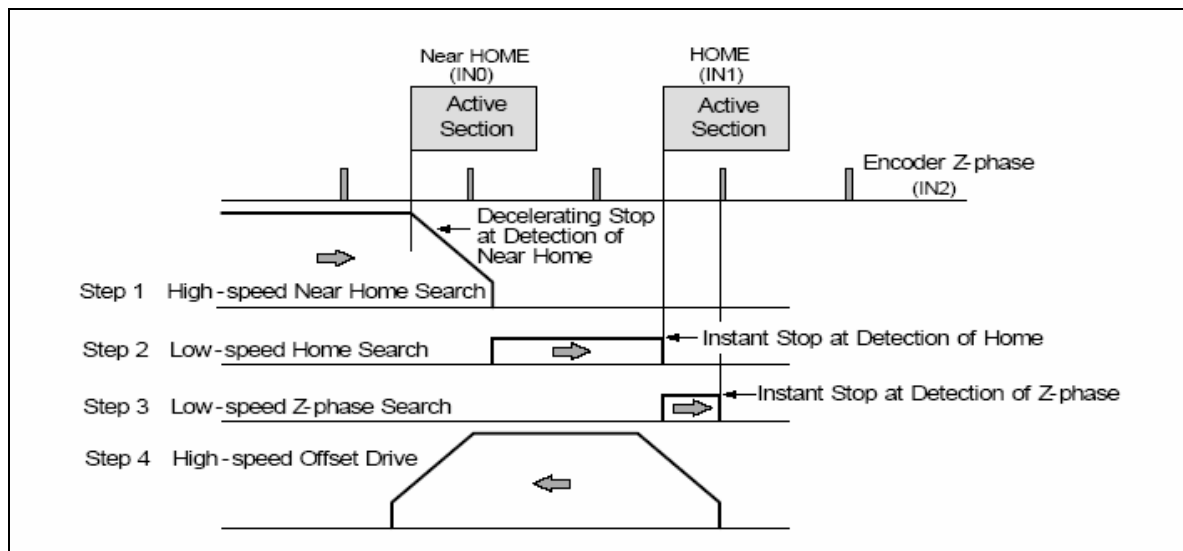


Figure 3 - typical Automatic Home Search

## 3.1 ps400\_set\_home\_cfg

### VC6 / BCB6

short ps400\_set\_home\_cfg(BYTE bCardID, WORD wAxis, WORD wHomeLogic, WORD wNHomeLogic, WORD wIndexLogic, WORD wHomeSteps, DWORD dwStep4Offset)

### VB6

ps400\_set\_home\_cfg(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wHomeLogic As Integer, ByVal wNHomeLogic As Integer, ByVal wIndexLogic As Integer, ByVal wHomeSteps As Integer, ByVal dwStep4Offset As Long) As Integer

### Description:

This function configures the polarities of Near-Home(NORG), Home(ORG) and Z-Phase/INDEX sensors. The searching-steps of Automatic-Home-Search are configured in this function, too.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wHomeLogic: HOME\_LOGIC\_ACTIVE\_HIGH or HOME\_LOGIC\_ACTIVE\_LOW.

wNHomeLogic: NHOME\_LOGIC\_ACTIVE\_HIGH or NHOME\_LOGIC\_ACTIVE\_LOW

wIndexLogic: INDEX\_LOGIC\_ACTIVE\_HIGH or INDEX\_LOGIC\_ACTIVE\_LOW

wHomeSteps: The combination of Automatic-Home-Search 4-Steps. The configurations are:

Step-1:

AUTO\_HOME\_STEP1\_FORWARD, AUTO\_HOME\_STEP1\_REVERSE and  
AUTO\_HOME\_STEP1\_DISABLE

Step-2:

AUTO\_HOME\_STEP2\_FORWARD, AUTO\_HOME\_STEP2\_REVERSE and  
AUTO\_HOME\_STEP2\_DISABLE

Step-3:

AUTO\_HOME\_STEP3\_FORWARD, AUTO\_HOME\_STEP3\_REVERSE and  
AUTO\_HOME\_STEP3\_DISABLE

Step-4:

AUTO\_HOME\_STEP4\_FORWARD, AUTO\_HOME\_STEP4\_REVERSE and  
AUTO\_HOME\_STEP4\_DISABLE

**Notice:** Based on external sensor, It's recommended to include either

AUTO\_HOME\_STEP1\_FORWARD/AUTO\_HOME\_STEP1\_REVERSE or

AUTO\_HOME\_STEP2\_FORWARD/AUTO\_HOME\_STEP2\_REVERSE in wHomeSteps.

dwStep4Offset: The offset driving in Step-4 of Automatic Home Search.



**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_HOME\_LOGIC\_LEVEL: Neither HOME\_LOGIC\_ACTIVE\_HIGH nor HOME\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wHomeLogic**.

ERROR\_INVALID\_NEAR\_HOME\_LOGIC\_LEVEL: Neither NHOME\_LOGIC\_ACTIVE\_HIGH nor NHOME\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wNHomeLogic**.

ERROR\_INVALID\_INDEX\_LOGIC\_LEVEL: Neither INDEX\_LOGIC\_ACTIVE\_HIGH nor INDEX\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wIndexLogic**.

ERROR\_INVALID\_AUTO\_HOME\_STEP: The Automatic-Home-Search Steps are out of pre-defined configurations.

ERROR\_HOME\_CFG\_SET: Cannot change the configuration of Automatic-Home-Search, please call GetLastError() for further system information.

## 3.2 ps400\_home\_start

### VC6 / BCB6

short ps400\_home\_start(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwAcceleration, DWORD dwDeceleration, DWORD dwNHomeSearchSpeed, DWORD dwHomeSearchSpeed, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

### VB6

ps400\_home\_start(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwAcceleration As Long, ByVal dwDeceleration As Long, ByVal dwNHomeSearchSpeed As Long, ByVal dwHomeSearchSpeed As Long, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

### Description:

This function starts Automatic-Home-Search with the Start-Speed, Acceleration/Deceleration, Near-Home Searching Speed and Home Searching Speed.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed: The Start Speed in Step-1 of Automatic-Home-Search.

dwAcceleration: The Acceleration in Step-1 of Automatic-Home-Search motion.

dwDeceleration: The Deceleration in Step-1 of Automatic-Home-Search motion.

dwNHomeSearchSpeed: The Near-Home Search Speed(Driving Speed) in Step-1 of Automatic-Home-Search motion.

dwHomeSearchSpeed: The Home Search Speed in Step-2 of Automatic-Home-Search motion. This speed is recommended to be lower than dwStartSpeed.

wBlockMode: The Block/Non-Block operation mode. This optional parameter is set as DISABLE\_BLOCK\_OPEARTION by default.

### Notice:

The **BLOCK-OPERATION** means that the function returns only when the related motion is completed.

For instance, if ENABLE\_BLOCK\_OPERATION is assigned to parameter **wBlockMode**, the function, ps400\_home\_start(), will return only when the Automatic-Home-Search is completed.

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE: Neither DISABLE\_BLOCK\_OPEARTION nor ENABLE\_BLOCK\_OPEARTION is assigned to parameter **wBlockMode**.

ERROR\_INVALID\_HOME\_SEARCH\_SPEED: The value assigned to parameter **dwHomeSearchSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than **dwNHomeSearchSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwNHomeSearchSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_ACCELERATION: The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION: The value assigned to parameter **dwDeceleration** is out of range of Deceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_CONFIG\_IS\_NEEDED: The Automatic-Home-Search had not been configured. Please configure the Automatic-Home-Search with ps400\_set\_home\_cfg() first.

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with ps400\_cmptrig\_config().

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed. Please wait for completion of motion, or stop motion with ps400\_stop\_move().

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call ps400\_drv\_start() to release the hold-axes first.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call GetLastError() for further system information.

ERROR\_START\_HOME: Cannot start Automatic-Home-Search, please call GetLastError() for further system information.

# Independent Moving Functions

These functions in this chapter start the independent motion, including velocity-move, constant-speed move, trapezoidal-profile and S-curve move.

## 4.1 ps400\_velocity\_move

### VC6 / BCB6

short ps400\_velocity\_move(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, BYTE bDirection)

### VB6

ps400\_velocity\_move(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal bDirection As Byte) As Integer

### Description:

This function starts velocity-move with **dwDriveSpeed** driving-speed continuously. The trapezoidal-profile moving will be applied to Acceleration. Calling ps400\_stop\_move() to terminate the velocity-move.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed: The Start-Speed in trapezoidal-profile move.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile move.

dwAcceleration: The Acceleration in trapezoidal-profile move.

bDirection: MOVE\_DIRECTION\_FORWARD or MOVE\_DIRECTION\_REVERSE.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with `bCardID`, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **`wAxis`**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **`wAxis`**.

ERROR\_INVALID\_MOVE\_DIRECTION: Neither `MOVE_DIRECTION_FORWARD` nor `MOVE_DIRECTION_REVERSE` is assigned to parameter **`bDirection`**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **`dwStartSpeed`** is larger than **`dwDriveSpeed`**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **`dwStartSpeed`** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **`dwDriveSpeed`** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_ACCELERATION: The value assigned to parameter **`dwAcceleration`** is out of range of Acceleration. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to `AXIS_X`, `AXIS_Y`, `AXIS_Z` or `AXIS_U`. Please call `ps400_get_error_status()` for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

ERROR\_CONTI\_MOVE\_START: Cannot start velocity-move, please call `GetLastError()` for further system information.

## 4.2 ps400\_const\_move

### VC6 / BCB6

short ps400\_const\_move(BYTE bCardID, WORD wAxis, DWORD dwDriveSpeed, long FixedPulse)

### VB6

ps400\_const\_move(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwDriveSpeed As Long, ByVal FixedPulse As Long) As Integer

### Description:

This function starts constant-speed, fixed-pulse motion. No acceleration/deceleration is applied in this motion.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwDriveSpeed: The Drive-Speed in constant-speed moving.

FixedPulse: The total numbers of output pulse. This parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_CONST\_MOVE\_START: Cannot start constant-speed motion, please call GetLastError() for further system information.

## 4.3 ps400\_const\_moveall

### VC6 / BCB6

short ps400\_const\_moveall(BYTE bCardID, WORD wAxis, DWORD dwDriveSpeed[], long FixedPulse[])

### VB6

ps400\_const\_moveall(ByVal bCardID As Byte, ByVal wAxes As Integer, dwDriveSpeed As Long, FixedPulse As Long) As Integer

### Description:

This function starts multiple axes the constant-speed, fixed-pulse moving simultaneously. No acceleration/deceleration is applied in this motion.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxes: Can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwDriveSpeed[]: The pointer to the **DWORD**-Array that contains Driving-Speed of multiple axes. Different speed can be assigned to each axis.

FixedPulse[]: The pointer to the **long**-Array that contains Fixed-Pulse of multiple axes. Different pulse number can be assigned to each axis. The element of this **long**-Array is a signed 32-bits variable, the negative value indicates motion in reverse-direction

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to some elements of **dwDriveSpeed[]** are out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,



ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,  
ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,  
ERROR\_OCCURS\_IN\_AXIS\_YZU, ERROR\_OCCURS\_IN\_AXIS\_XYZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call GetLastError() for further system information.

ERROR\_CONST\_MOVE\_START: Cannot start constant-speed motion, please call GetLastError() for further system information.

## 4.4 ps400\_t\_move

### VC6 / BCB6

short ps400\_t\_move(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, DWORD dwDeceleration, long FixedPulse, short wAccCntOffset = 0)

### VB6

ps400\_t\_move(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal dwDeceleration As Long, ByVal FixedPulse As Long, Optional ByVal wAccCntOffset As Integer = 0) As Integer

### Description:

This function starts trapezoidal-profile, fixed-pulse motion.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

wAxis: can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed: The Start-Speed in trapezoidal-profile moving.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile moving.

dwAcceleration: The Acceleration in trapezoidal-profile moving.

dwDeceleration: The Deceleration in trapezoidal-profile moving.

FixedPulse: The total numbers of output pulse. This parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

wAccCntOffset: This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than **dwDriveSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_ACCELERATION: The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION: The value assigned to parameter **dwDeceleration** is out of range of Deceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

**Notice:** In the case, **dwAcceleration > dwDeceleration** , the following formula should be satisfied, too.

$$\mathbf{dwDeceleration > (dwAcceleration \times dwDriveSpeed) / 4,000,000.}$$

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_T\_MOVE\_START: Cannot start trapezoidal moving, please call GetLastError() for further system information.

## 4.5 ps400\_t\_moveall

### VC6 / BCB6

```
short ps400_t_moveall(BYTE bCardID, WORD wAxes, DWORD dwStartSpeed[], DWORD  
dwDriveSpeed[], DWORD dwAcceleration[], DWORD dwDeceleration[], long FixedPulse[],  
short wAccCntOffset[] = NULL)
```

### VB6

```
ps400_t_moveall (ByVal bCardID As Byte, ByVal wAxes As Integer, ByRef dwStartSpeed As  
Long, ByRef dwDriveSpeed As Long, ByRef dwAcceleration As Long, ByRef dwDeceleration  
As Long, ByRef FixedPulse As Long, Optional ByRef wAccCntOffset As Integer = 0) As Integer
```

### Description:

This function starts multiple axes the trapezoidal-profile, fixed-pulse moving simultaneously.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

wAxes: can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed[]: The pointer to the **DWORD**-Array that contains Start-Speed of multiple axes.

Different value can be assigned to each axis.

dwDriveSpeed[]: The pointer to the **DWORD**-Array that contains Driving-Speed of multiple axes.

Different value can be assigned to each axis.

dwAcceleration[]: The pointer to the **DWORD**-Array that contains Acceleration of multiple axes.

Different value can be assigned to each axis.

dwDeceleration[]: The pointer to the **DWORD**-Array that contains Deceleration of multiple axes.

Different value can be assigned to each axis.

FixedPulse[]: The pointer to the **long**-Array that contains Fixed-Pulse of multiple axes. Different pulse

number can be assigned to each axis. The element of this parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

wAccCntOffset[]: This optional pointer to the **short**-Array that contains offset of multiple axes. The default setting of **wAccCntOffset[]** is NULL.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: Some elements in ***dwStartSpeed[]*** are larger than relative element of ***dwDriveSpeed[]***.

ERROR\_INVALID\_START\_SPEED: The value assigned to some elements of ***dwStartSpeed[]*** are out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to some elements of ***dwDriveSpeed[]*** are out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_ACCELERATION: The value assigned to some elements of ***dwAcceleration[]*** are out of range of Acceleration. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_DECELERATION: The value assigned to some elements of ***dwDeceleration[]*** are out of range of Deceleration. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**Notice:** In the case, ***dwAcceleration*** > ***dwDeceleration*** , the following formula should be satisfied, too.

$$\mathbf{dwDeceleration} > (\mathbf{dwAcceleration} \times \mathbf{dwDriveSpeed}) / 4,000,000.$$

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,  
ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,  
ERROR\_OCCURS\_IN\_AXIS\_YZU, ERROR\_OCCURS\_IN\_AXIS\_XYZU:

Indicates that some error happens to AXIS\_xxxx. Please call `ps400_get_error_status()` for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call `GetLastError()` for further system information.

ERROR\_T\_MOVE\_START: Cannot start trapezoidal moving, please call `GetLastError()` for further system information.

## 4.6 ps400\_s\_move

### VC6 / BCB6

short ps400\_t\_move(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAccelerationRate, DWORD dwDecelerationRate, long FixedPulse, short wAccCntOffset = 0)

### VB6

ps400\_t\_move(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAccelerationRate As Long, ByVal dwDecelerationRate As Long, ByVal FixedPulse As Long, Optional ByVal wAccCntOffset As Integer = 0) As Integer

### Description:

This function starts S-curve, fixed-pulse motion.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed: The Start-Speed in S-curve moving.

dwDriveSpeed: The Drive-Speed in S-curve moving.

dwAccelerationRate: The Acceleration-Increasing-Rate in S-curve moving. The Acceleration will be assigned to maximum value automatically.

dwDecelerationRate: The Deceleration-Increasing-Rate in S-curve moving. The Deceleration will be assigned to maximum value automatically.

FixedPulse: This parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

wAccCntOffset: This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than or equal to **dwDriveSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_JERK: The value assigned to parameter **dwAccelerationRate** is out of range of Acceleration-Increasing-Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION\_RATE: The value assigned to parameter **dwDecelerationRate** is out of range of Deceleration-Increasing-Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_S\_MOVE\_START: Cannot start S-curve moving, please call GetLastError() for further system information.

## 4.7 ps400\_s\_moveall

### VC6 / BCB6

short ps400\_s\_moveall(BYTE bCardID, WORD wAxes, DWORD dwStartSpeed[], DWORD dwDriveSpeed[], DWORD dwAccelerationRate[], DWORD dwDecelerationRate[], long FixedPulse[], short wAccCntOffset[] = NULL)

### VB6

ps400\_s\_moveall(ByVal bCardID As Byte, ByVal wAxes As Integer, ByRef dwStartSpeed As Long, ByRef dwDriveSpeed As Long, ByRef dwAccelerationRate As Long, ByRef dwDecelerationRate As Long, ByRef FixedPulse As Long, Optional ByRef wAccCntOffset As Integer = 0) As Integer

### Description:

This function starts multiple axes the S-curve, fixed-pulse moving simultaneously.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxes: Can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwStartSpeed[]: The pointer to the **DWORD**-Array that contains Start-Speed of multiple axes.

Different value can be assigned to each axis.

dwDriveSpeed[]: The pointer to the **DWORD**-Array that contains Driving-Speed of multiple axes.

Different value can be assigned to each axis.

dwAccelerationRate[]: The pointer to the **DWORD**-Array that contains Acceleration-Increasing-Rate of multiple axes. Different value can be assigned to each axis.

dwDecelerationRate[]: The pointer to the **DWORD**-Array that contains Deceleration-Increasing-Rate of multiple axes. Different value can be assigned to each axis.

FixedPulse[]: The pointer to the **long**-Array that contains Fixed-Pulse of multiple axes. Different pulse number can be assigned to each axis. The element of this parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

wAccCntOffset[]: This optional pointer to the **short**-Array that contains offset of multiple axes. The default setting of **wAccCntOffset[]** is NULL.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.



**ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED:** Some elements in ***dwStartSpeed[]*** are larger than relative element of ***dwDriveSpeed[]***.

**ERROR\_INVALID\_START\_SPEED:** The value assigned to some elements of ***dwStartSpeed[]*** are out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_DRIVING\_SPEED:** The value assigned to some elements of ***dwDriveSpeed[]*** are out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_JERK:** The value assigned to some elements of ***dwAccelerationRate[]*** are out of range of Acceleration-Increasing-Rate. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_DECELERATION\_RATE:** The value assigned to some elements of ***dwDecelerationRate[]*** are out of range of Deceleration-Increasing-Rate. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_ACCESS\_VIOLATION\_DATA\_COPY:** Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

**ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z, ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY, ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ, ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU, ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ, ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU, ERROR\_OCCURS\_IN\_AXIS\_YZU, ERROR\_OCCURS\_IN\_AXIS\_XYZU:**  
 Indicates that some error happens to `AXIS_xxxx`. Please call `ps400_get_error_status()` for detailed information.

**ERROR\_MOTION\_NOT\_COMPLETE:** Indicates the previous motion is not completed.

**ERROR\_CONFLICT\_WITH\_MPG:** Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

**ERROR\_AXES\_MOVE\_CHECK:** Cannot forward the Axes-checking command to system, please call `GetLastError()` for further system information.

**ERROR\_S\_MOVE\_START:** Cannot start S-curve moving, please call `GetLastError()` for further system information.

# Interpolation Moving Functions

## 5.1 Individual Interpolation Moving

The functions in this chapter provide both trapezoidal and S-curve acceleration/deceleration in 2D/3D linear interpolation moving. And only trapezoidal acceleration/deceleration can be applied to circular interpolation moving.

### 5.1.1 ps400\_t\_line2\_move

#### VC6 / BCB6

short ps400\_t\_line2\_move(BYTE bCardID, WORD wMainAxis, WORD wSlaveAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, DWORD dwDeceleration, long MainAxisFinishPoint, long SlaveAxisFinishPoint, short wAccCntOffset = 0, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

#### VB6

ps400\_t\_line2\_move(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSlaveAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal dwDeceleration As Long, ByVal MainAxisFinishPoint As Long, ByVal SlaveAxisFinishPoint As Long, Optional ByVal wAccCntOffset As Integer = 0, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

#### Description:

This function starts the trapezoidal-profile, 2-dimension linear interpolation moving.

#### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

**wSlaveAxis:** The slave-axis of Interpolation moving, can be one of `AXIS_X`, `AXIS_Y`, `AXIS_Z` or `AXIS_U` (cannot be the same as **wMainAxis**).

**dwStartSpeed:** The Start-Speed in trapezoidal-profile moving. This Start-Speed will be applied to main-axis.

**dwDriveSpeed:** The Drive-Speed in trapezoidal-profile moving. This Drive-Speed will be applied to main-axis.

**dwAcceleration:** The Acceleration in trapezoidal-profile moving. This Acceleration will be applied to main-axis.

**dwDeceleration:** The Deceleration in trapezoidal-profile moving. This Deceleration will be applied to main-axis.

**MainAxisFinishPoint:** The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**SlaveAxisFinishPoint:** The finish point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**wAccCntOffset:** This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

**wBlockMode:** The Block/Non-Block operation mode. This optional parameter is set as `DISABLE_BLOCK_OPEARTION` by default.

#### **Return Code:**

**SUCCESS\_NO\_ERROR:** The function returns successfully.

**ERROR\_INVALID\_CARD\_ID:** There is no active PISO-PS400 card configured with `bCardID`, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

**ERROR\_MULTI\_AXES\_ASSIGNED:** Multiple axes are assigned to parameter **wMainAxis** or **wSlaveAxis**.

**ERROR\_NO\_VALID\_AXIS\_ASSIGNED:** No valid axis ID is assigned to parameter **wMainAxis** or **wSlaveAxis**.

**ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES:** The parameter **wSlaveAxis** includes the axis ID assigned to **wMainAxis**.

**ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE:** Neither `DISABLE_BLOCK_OPEARTION` nor `ENABLE_BLOCK_OPEARTION` is assigned to parameter **wBlockMode**.

**ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED:** The **dwStartSpeed** is larger than **dwDriveSpeed**.

**ERROR\_INVALID\_START\_SPEED:** The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_DRIVING\_SPEED:** The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_INVALID\_ACCELERATION: The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION: The value assigned to parameter **dwDeceleration** is out of range of Deceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

**Notice:** In the case, **dwAcceleration > dwDeceleration** , the following formula should be satisfied, too.

$$\mathbf{dwDeceleration > (dwAcceleration \times dwDriveSpeed) / 4,000,000.}$$

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-Operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with ps400\_cmptrig\_config().

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The interpolation moving started before had not completed.

ERROR\_REASSIGN\_SYNCH\_MODE\_COMMAND: The previous Synchronous Operation is not returned.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call ps400\_drv\_start() to release the hold-axes first.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call GetLastError() for further system information.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call GetLastError() for further system information.

ERROR\_T\_LINE2\_START: Cannot start trapezoidal 2D interpolation moving, please call GetLastError() for further system information.

## 5.1.2 ps400\_s\_line2\_move

### VC6 / BCB6

short ps400\_s\_line2\_move(BYTE bCardID, WORD wMainAxis, WORD wSlaveAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAccelerationRate, DWORD dwDecelerationRate, long MainAxisFinishPoint, long SlaveAxisFinishPoint, short wAccCntOffset = 0, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

### VB6

ps400\_s\_line2\_move(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSlaveAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAccelerationRate As Long, ByVal dwDecelerationRate As Long, ByVal MainAxisFinishPoint As Long, ByVal SlaveAxisFinishPoint As Long, Optional ByVal wAccCntOffset As Integer = 0, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

### Description:

This function starts the S-curve, 2-dimension linear interpolation moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSlaveAxis: The slave-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (cannot be the same as **wMainAxis**).

dwStartSpeed: The Start-Speed in S-curve moving. This Start-Speed will be applied to main-axis.

dwDriveSpeed: The Drive-Speed in S-curve moving. This Drive-Speed will be applied to main-axis.

dwAccelerationRate: The Acceleration-Increasing-Rate in S-curve moving. The Acceleration will be assigned to maximum value automatically. This Acceleration-Increasing-Rate will be applied to main-axis.

dwDecelerationRate: The Deceleration-Increasing-Rate in S-curve moving. The Deceleration will be assigned to maximum value automatically. This Acceleration-Increasing-Rate will be applied to main-axis.

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

SlaveAxisFinishPoint: The finish point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction

wAccCntOffset: This optional parameter to configure the offset for Acceleration/Deceleration driving.

The default setting of **wAccCntOffset** is 0.

wBlockMode: The Block/Non-Block operation mode. This optional parameter is set as

DISABLE\_BLOCK\_OPEARTION by default.

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wMainAxis** or **wSlaveAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wMainAxis** or **wSlaveAxis**.

ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES: The parameter **wSlaveAxis** includes the axis ID assigned to **wMainAxis**.

ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE: Neither DISABLE\_BLOCK\_OPEARTION nor ENABLE\_BLOCK\_OPEARTION is assigned to parameter **wBlockMode**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than or equal to **dwDriveSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_JERK: The value assigned to parameter **dwAccelerationRate** is out of range of Acceleration Increasing Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION\_RATE: The value assigned to parameter **dwDecelerationRate** is out of range of Deceleration Increasing Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-Operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with ps400\_cmptrig\_config().

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The interpolation moving started before had not completed.

ERROR\_REASSIGN\_SYNCH\_MODE\_COMMAND: The previous Synchronous Operation is not returned.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,

ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with ps400\_set\_mpg().

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call ps400\_drv\_start() to release the hold-axes first.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call GetLastError() for further system information.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call GetLastError() for further system information.

ERROR\_S\_LINE2\_START: Cannot start S-curve 2D interpolation moving, please call GetLastError() for further system information.

## 5.1.3 ps400\_t\_line3\_move

### VC6 / BCB6

short ps400\_t\_line3\_move(BYTE bCardID, WORD wMainAxis, WORD wSecondAxis, WORD wThirdAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, DWORD dwDeceleration, long MainAxisFinishPoint, long SecondAxisFinishPoint, long ThirdAxisFinishPoint, short wAccCntOffset = 0, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

### VB6

ps400\_t\_line3\_move(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSecondAxis As Integer, ByVal wThirdAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal dwDeceleration As Long, ByVal MainAxisFinishPoint As Long, ByVal SecondAxisFinishPoint As Long, ByVal ThirdAxisFinishPoint As Long, Optional ByVal wAccCntOffset As Integer = 0, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

### Description:

This function starts the trapezoidal-profile, 3-dimension linear interpolation moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSecondAxis: The second-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (cannot be the same as **wMainAxis**).

wThirdAxis: The third-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (neither **wMainAxis** nor **wSecondAxis** can be assigned to **wThirdAxis**)

dwStartSpeed: The Start-Speed in trapezoidal-profile moving. This Start-Speed will be applied to main-axis.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile moving. This Drive-Speed will be applied to main-axis.

dwAcceleration: The Acceleration in trapezoidal-profile moving. This Acceleration will be applied to main-axis.

dwDeceleration: The Deceleration in trapezoidal-profile moving. This Deceleration will be applied to main-axis.

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.



**SecondAxisFinishPoint:** The finish point of second-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**ThirdAxisFinishPoint:** The finish point of third-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**wAccCntOffset:** This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

**wBlockMode:** The Block/Non-Block operation mode. This optional parameter is set as **DISABLE\_BLOCK\_OPEARTION** by default.

#### **Return Code:**

**SUCCESS\_NO\_ERROR:** The function returns successfully.

**ERROR\_INVALID\_CARD\_ID:** There is no active PISO-PS400 card configured with **bCardID**, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

**ERROR\_MULTI\_AXES\_ASSIGNED:** Multiple axes are assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

**ERROR\_NO\_VALID\_AXIS\_ASSIGNED:** No valid axis ID is assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

**ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES:** Either **wSecondAxis** or **wThirdAxis** includes the axis ID assigned to **wMainAxis**.

**ERROR\_INTERPOLATION\_SLAVE\_AXES\_DUPLICATED:** The axis ID assigned to **wSecondAxis** and **wThirdAxis** is the same.

**ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE:** Neither **DISABLE\_BLOCK\_OPEARTION** nor **ENABLE\_BLOCK\_OPEARTION** is assigned to parameter **wBlockMode**.

**ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED:** The **dwStartSpeed** is larger than **dwDriveSpeed**.

**ERROR\_INVALID\_START\_SPEED:** The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_DRIVING\_SPEED:** The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_ACCELERATION:** The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_DECELERATION:** The value assigned to parameter **dwDeceleration** is out of range of Deceleration. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**Notice:** In the case, *dwAcceleration* > *dwDeceleration* , the following formula should be satisfied, too.

$$dwDeceleration > (dwAcceleration \times dwDriveSpeed) / 4,000,000.$$

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-Operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with `ps400_cmptrig_config()`.

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The interpolation moving started before had not completed.

ERROR\_REASSIGN\_SYNCH\_MODE\_COMMAND: The previous Synchronous Operation is not returned.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,  
ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,  
ERROR\_OCCURS\_IN\_AXIS\_YZU,;

Indicates that some error happens to AXIS\_xxxx. Please call `ps400_get_error_status()` for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call `ps400_drv_start()` to release the hold-axes first.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call `GetLastError()` for further system information.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call `GetLastError()` for further system information.

ERROR\_T\_LINE3\_START: Cannot start trapezoidal 3D interpolation moving, please call `GetLastError()` for further system information.

## 5.1.4 ps400\_s\_line3\_move

### VC6 / BCB6

short ps400\_s\_line3\_move(BYTE bCardID, WORD wMainAxis, WORD wSecondAxis, WORD wThirdAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAccelerationRate, DWORD dwDecelerationRate, long MainAxisFinishPoint, long SecondAxisFinishPoint, long ThirdAxisFinishPoint, short wAccCntOffset = 0, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

### VB6

ps400\_s\_line3\_move(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSecondAxis As Integer, ByVal wThirdAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAccelerationRate As Long, ByVal dwDecelerationRate As Long, ByVal MainAxisFinishPoint As Long, ByVal SecondAxisFinishPoint As Long, ByVal ThirdAxisFinishPoint As Long, Optional ByVal wAccCntOffset As Integer = 0, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

### Description:

This function starts the S-curve, 3-dimension linear interpolation moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSecondAxis: Thhe second-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (cannot be the same as **wMainAxis**).

wThirdAxis: The third-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (neither **wMainAxis** nor **wSecondAxis** can be assigned to **wThirdAxis**)

dwStartSpeed: The Start-Speed in S-curve moving. This Start-Speed will be applied to main-axis.

dwDriveSpeed: The Drive-Speed in S-curve moving. This Drive-Speed will be applied to main-axis.

dwAccelerationRate: The Acceleration-Increasing-Rate in S-curve moving. The Acceleration will be assigned to maximum value automatically. This Acceleration-Increasing-Rate will be applied to main-axis.

dwDecelerationRate: The Deceleration-Increasing-Rate in S-curve moving. The Deceleration will be assigned to maximum value automatically. This Acceleration-Increasing-Rate will be applied to main-axis.

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**SecondAxisFinishPoint:** The finish point of second-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**ThirdAxisFinishPoint:** The finish point of third-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**wAccCntOffset:** This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

**wBlockMode:** The Block/Non-Block operation mode. This optional parameter is set as **DISABLE\_BLOCK\_OPEARTION** by default.

#### **Return Code:**

**SUCCESS\_NO\_ERROR:** The function returns successfully.

**ERROR\_INVALID\_CARD\_ID:** There is no active PISO-PS400 card configured with **bCardID**, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

**ERROR\_MULTI\_AXES\_ASSIGNED:** Multiple axes are assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

**ERROR\_NO\_VALID\_AXIS\_ASSIGNED:** No valid axis ID is assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

**ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES:** Either **wSecondAxis** or **wThirdAxis** includes the axis ID assigned to **wMainAxis**.

**ERROR\_INTERPOLATION\_SLAVE\_AXES\_DUPLICATED:** The axis ID assigned to **wSecondAxis** and **wThirdAxis** is the same.

**ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE:** Neither **DISABLE\_BLOCK\_OPEARTION** nor **ENABLE\_BLOCK\_OPEARTION** is assigned to parameter **wBlockMode**.

**ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED:** The **dwStartSpeed** is larger than or equal to **dwDriveSpeed**.

**ERROR\_INVALID\_START\_SPEED:** The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_DRIVING\_SPEED:** The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_JERK:** The value assigned to parameter **dwAccelerationRate** is out of range of Acceleration Increasing Rate. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

**ERROR\_INVALID\_DECELERATION\_RATE:** The value assigned to parameter **dwDecelerationRate** is out of range of Deceleration Increasing Rate. Please refer to **ps400\_set\_range()** and **ps400\_get\_range\_settings()**.

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-Operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with `ps400_cmptrig_config()`.

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The interpolation moving started before had not completed.

ERROR\_REASSIGN\_SYNCH\_MODE\_COMMAND: The previous Synchronous Operation is not returned.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,  
ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,  
ERROR\_OCCURS\_IN\_AXIS\_YZU:

Indicates that some error happens to AXIS\_xxxx. Please call `ps400_get_error_status()` for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call `ps400_drv_start()` to release the hold-axes first.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call `GetLastError()` for further system information.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call `GetLastError()` for further system information.

ERROR\_S\_LINE3\_START: Cannot start S-curve 3D linear interpolation moving, please call `GetLastError()` for further system information.

## 5.1.5 ps400\_t\_arc2\_move

### VC6 / BCB6

short ps400\_t\_arc2\_move(BYTE bCardID, WORD wMainAxis, WORD wSlaveAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, WORD wArcDirection, long MainAxisCenterPoint, long SlaveAxisCenterPoint, long MainAxisFinishPoint, long SlaveAxisFinishPoint, short wAccCntOffset = 0, WORD wBlockMode = DISABLE\_BLOCK\_OPEARTION)

### VB6

ps400\_t\_arc2\_move (ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSlaveAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal wArcDirection As Integer, ByVal MainAxisCenterPoint As Long, ByVal SlaveAxisCenterPoint As Long, ByVal MainAxisFinishPoint As Long, ByVal SlaveAxisFinishPoint As Long, Optional ByVal wAccCntOffset As Integer = 0, Optional ByVal wBlockMode As Integer = DISABLE\_BLOCK\_OPEARTION) As Integer

### Description:

This function starts the trapezoidal-profile, 2-dimension circular interpolation moving. Only symmetric trapezoidal Acceleration/Deceleration is applied to circular interpolation. The start-point will be the *Origin* of circular-interpolation motion. The **MainAxisCenterPoint** & **SlaveAxisCenterPoint** are center coordinates related to *Origin*; and **MainAxisFinishPoint** & **SlaveAxisFinishPoint** are finish coordinates related to *Origin*. The position tolerance for the specified circular curve is  $\pm 1$  within the interpolation range. When the value of finish-point reaches the coordinate of *short-axis*, the circular interpolation will be completed. Figure 4 illustrates the finish-point checking of circular interpolation.

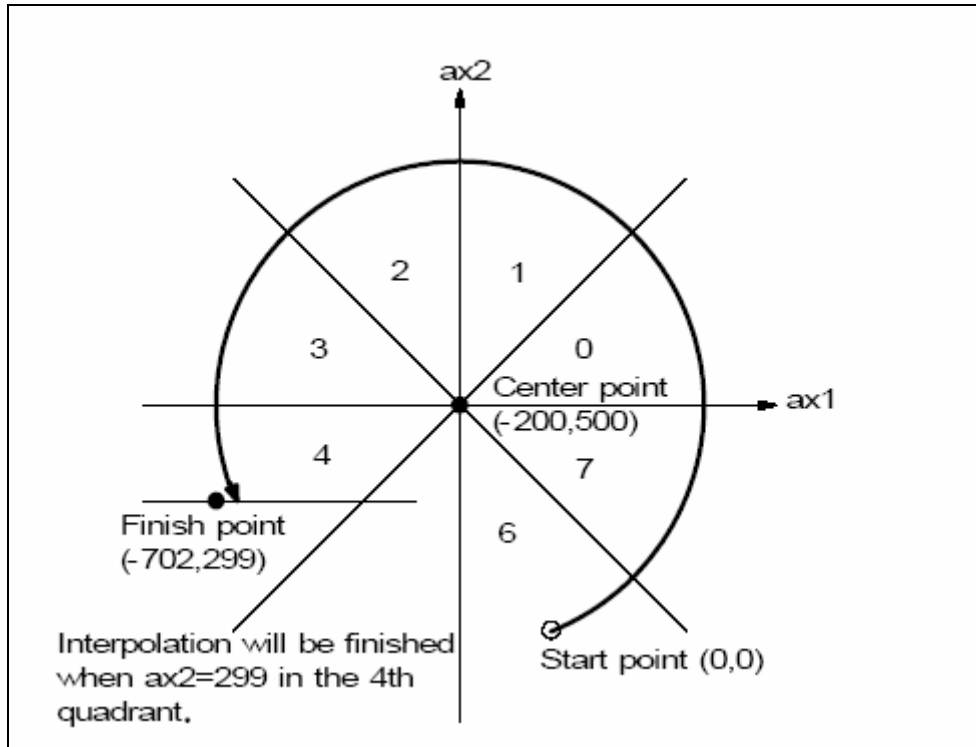


Figure 4 – finish-point checking of circular interpolation

**Parameters:**

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSlaveAxis: The slave-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (cannot be the same as **wMainAxis**).

dwStartSpeed: The Start-Speed in trapezoidal-profile moving. This Start-Speed will be applied to main-axis.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile moving. This Drive-Speed will be applied to main-axis.

dwAcceleration: The Acceleration in trapezoidal-profile moving. This Acceleration will be applied to main-axis.

wArcDirection: Clockwise (INTERP\_ARC\_DIRECTION\_CLOCKWISE) or Counter-Clockwise (INTERP\_ARC\_DIRECTION\_COUNTER\_CLOCKWISE).

MainAxisCenterPoint: The center point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

SlaveAxisCenterPoint: The center point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**MainAxisFinishPoint:** The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**SlaveAxisFinishPoint:** The finish point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-direction.

**wAccCntOffset:** This optional parameter to configure the offset for Acceleration/Deceleration driving. The default setting of **wAccCntOffset** is 0.

**wBlockMode:** The Block/Non-Block operation mode. This optional parameter is set as `DISABLE_BLOCK_OPEARTION` by default.

#### **Return Code:**

**SUCCESS\_NO\_ERROR:** The function returns successfully.

**ERROR\_INVALID\_CARD\_ID:** There is no active PISO-PS400 card configured with `bCardID`, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

**ERROR\_MULTI\_AXES\_ASSIGNED:** Multiple axes are assigned to parameter **wMainAxis** or **wSlaveAxis**.

**ERROR\_NO\_VALID\_AXIS\_ASSIGNED:** No valid axis ID is assigned to parameter **wMainAxis** or **wSlaveAxis**.

**ERROR\_INVALID\_INTERPOLATION\_ARC\_DIRECTION:** Neither `INTERP_ARC_DIRECTION_CLOCKWISE` nor `INTERP_ARC_DIRECTION_COUNTER_CLOCKWISE` is assigned to parameter **wArcDirection**.

**ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES:** The parameter **wSlaveAxis** includes the axis ID assigned to **wMainAxis**.

**ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE:** Neither `DISABLE_BLOCK_OPEARTION` nor `ENABLE_BLOCK_OPEARTION` is assigned to parameter **wBlockMode**.

**ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED:** The **dwStartSpeed** is larger than **dwDriveSpeed**.

**ERROR\_INVALID\_START\_SPEED:** The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_DRIVING\_SPEED:** The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_INVALID\_ACCELERATION:** The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

**ERROR\_ARC\_DECELERATION\_POINT\_CALCULATE:** The path of circular moving is too small. Please try to increase the circular-path.



ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_CMPTRIG: Indicates the Block-Operation cannot co-exist with Compare & Trigger feature. Please disable Compare & Trigger feature with `ps400_cmptrig_config()`.

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The interpolation moving started before had not completed.

ERROR\_REASSIGN\_SYNCH\_MODE\_COMMAND: The previous Synchronous Operation is not returned.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU:

Indicates that some error happens to AXIS\_xxxx. Please call `ps400_get_error_status()` for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active. Please disable MPG settings with `ps400_set_mpg()`.

ERROR\_BLOCK\_OP\_CONFLICT\_WITH\_DRV\_HOLD: Indicates the Block-Operation is not allowed in hold-axes. Please call `ps400_drv_start()` to release the hold-axes first.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call `GetLastError()` for further system information.

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call `GetLastError()` for further system information.

ERROR\_T\_ARC2\_START: Cannot start circular interpolation moving, please call `GetLastError()` for further system information.

## 5.2 Continuous Interpolation Moving

The continuous interpolation provides none-stop linear & circular interpolation moving. The continuous interpolation moving is combined with multiple linear & circular interpolation segments. To add arbitrary interpolation segment, only the constant Vector-Speed is applied to continuous-interpolation moving.

The continuous interpolation moving is configured with `ps400_conti_interp_begin()` and completed with `ps400_conti_interp_end()`. All settings that are configured with `ps400_conti_interp_begin()` will be kept in driver until `ps400_conti_interp_end()` being called. The interpolation segments after `ps400_conti_interp_begin()` will use these configurations, including axes involved in interpolation-moving and constant Vector-Speed.

To avoid the continuous interpolation to be interrupted, the configurations of next interpolation segment had better be set as soon as possible. The function, `ps400_conti_interp_next_ready()`, indicates the next interpolation segment is ready to be configured.

In case the continuous-interpolation moving is terminated, you could re-start the uncompleted interpolation segments with `INTERP_CONTINUE_START` setting in parameter ***wContiInterpMoveMode***. The typical programming following-chart is described in Figure 5. Please refer to the 'Conti\_Interp' sample.

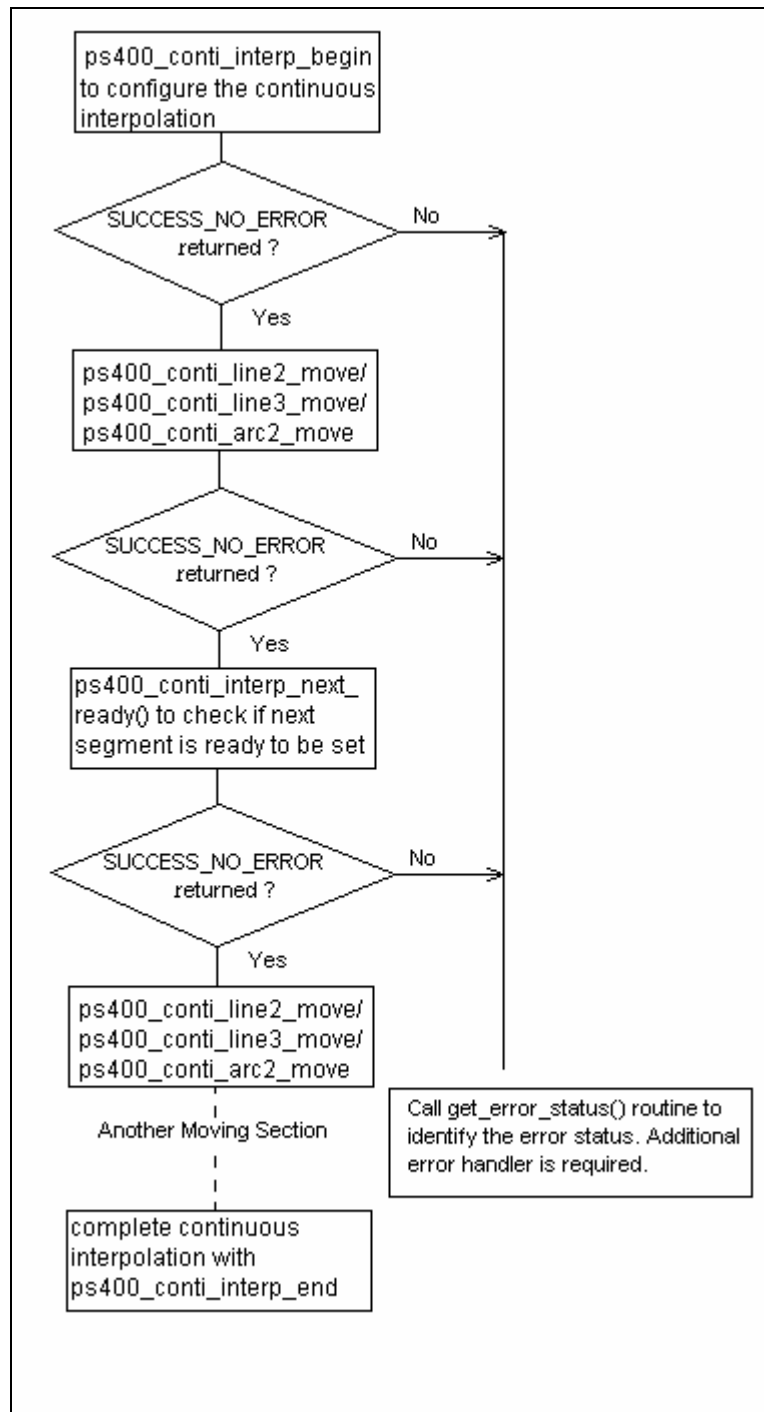


Figure 5 - typical programming following-chart of continuous-interpolation

## 5.2.1 ps400\_conti\_interp\_begin

### VC6 / BCB6

short ps400\_conti\_interp\_begin(BYTE bCardID, WORD wMainAxis, WORD wSecondAxis, WORD wThirdAxis, DWORD dwConstSpeed)

### VB6

ps400\_conti\_interp\_begin(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSecondAxis As Integer, ByVal wThirdAxis As Integer, ByVal dwConstSpeed As Long) As Integer

### Description:

This function configures the involved axes, the constant vector-speed in continuous interpolation moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wSecondAxis: The second-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U (cannot be the same as **wMainAxis**).

wThirdAxis: The third-axis of Interpolation moving, can be one of AXIS\_X, AXIS\_Y, AXIS\_Z, AXIS\_U or INVALID\_AXIS\_ASSIGNMENT. (neither **wMainAxis** nor **wSecondAxis** can be assigned to **wThirdAxis**).

dwConstSpeed: The constant Vector-Speed in continuous interpolation. This parameter should be less than 2,000,000 PPS )

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wMainAxis**, **wSecondAxis** or **wThirdAxis**.

ERROR\_INVALID\_INTERPOLATION\_SLAVE\_AXES: Either **wSecondAxis** or **wThirdAxis** includes the axis ID assigned to **wMainAxis**.

ERROR\_INTERPOLATION\_SLAVE\_AXES\_DUPLICATED: The axis ID assigned to **wSecondAxis** and **wThirdAxis** is the same.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INTERPOLATION\_NOT\_COMPLETE: The previous interpolation-moving had not been completed.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,

ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,

ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,

ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,

ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,

ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,

ERROR\_OCCURS\_IN\_AXIS\_YZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_CONFLICT\_WITH\_MPG: Indicates the previous Manual-Pulse-Generator setting is active.

Please disable MPG settings with ps400\_set\_mpg().

ERROR\_AXES\_MOVE\_CHECK: Cannot forward the Axes-checking command to system, please call GetLastError() for further system information.

ERROR\_INVALID\_RANGE: The assigned value is invalid.

ERROR\_RANGE\_CHANGE: Cannot change the settings of **Range** register, please call

GetLastError() for further system information.

ERROR\_CONTI\_INTERP\_SET: Cannot configure continuous-interpolation moving, please call

GetLastError() for further system information.

## 5.2.2 ps400\_conti\_interp\_next\_ready

### VC6 / BCB6

short ps400\_conti\_interp\_next\_ready(BYTE bCardID, BYTE \*pReady)

### VB6

ps400\_conti\_interp\_next\_ready(ByVal bCardID As Byte, ByRef pReady As Byte) As Integer

### Description:

This function checks if the next interpolation segment is ready to be set.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

pReady: The pointer to the memory that stores the ready-status of next interpolation segment.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_CONFIG\_IS\_NEEDED: The continuous interpolation had not been configured. Please call ps400\_conti\_interp\_begin() first.

ERROR\_CONTI\_INTERP\_NEXT\_READY: Cannot get the next-ready status, please call GetLastError() for further system information.

## 5.2.3 ps400\_conti\_line2\_move

### VC6 / BCB6

short ps400\_conti\_line2\_move(BYTE bCardID, long MainAxisFinishPoint, long SlaveAxisFinishPoint, WORD wContiInterpMoveMode)

### VB6

ps400\_conti\_line2\_move(ByVal bCardID As Byte, ByVal MainAxisFinishPoint As Long, ByVal SlaveAxisFinishPoint As Long, ByVal wContiInterpMoveMode As Integer) As Integer

### Description:

This function starts the constant vector-speed, 2-dimension linear interpolation moving.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way.

SlaveAxisFinishPoint: The finish point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way

wContiInterpMoveMode:

INTERP\_CONTINUE\_START: indicates the begin of continuous interpolation moving.

INTERP\_NEXT\_CONTINUOUS\_MOTION: indicates the interpolation segment is one part of continuous interpolation moving, and the interrupt of motion checking is involved implicitly.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_CONFIG\_IS\_NEEDED: The continuous interpolation had not been configured. Please call ps400\_conti\_interp\_begin() first.

ERROR\_INVALID\_CONTINUE\_INTERPOLATION\_MOTION: Neither INTERP\_CONTINUE\_START nor INTERP\_NEXT\_CONTINUOUS\_MOTION is assigned to parameter

**wContiInterpMoveMode.**

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,

ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,

ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,

ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,

ERROR\_OCCURS\_IN\_AXIS\_ZU:

Indicates that some error happens to AXIS\_XXXX. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_CONTI\_INTERP\_INTERRUPTED: Indicates the continuous interpolation moving is interrupted. This code is returned only when **wContiInterpMoveMode** is set as INTERP\_NEXT\_CONTINUOUS\_MOTION.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed. This code is returned only when **wContiInterpMoveMode** is set as INTERP\_CONTINUE\_START.

ERROR\_CONTI\_INTERP\_NEXT\_NOT\_READY: Indicates the internal Motion-Control ASIC is not ready to set the next interpolation segment. Please call ps400\_conti\_interp\_next\_ready() first.

ERROR\_CONTI\_INTERP\_LINE2\_MOVE: Cannot start ps400\_conti\_line2\_move, please call GetLastError() for further system information.



## 5.2.4 ps400\_conti\_line3\_move

### VC6 / BCB6

short ps400\_conti\_line3\_move(BYTE bCardID, long MainAxisFinishPoint, long SecondAxisFinishPoint, long ThirdAxisFinishPoint, WORD wContiInterpMoveMode)

### VB6

ps400\_conti\_line3\_move(ByVal bCardID As Byte, ByVal MainAxisFinishPoint As Long, ByVal SecondAxisFinishPoint As Long, ByVal ThirdAxisFinishPoint As Long, ByVal wContiInterpMoveMode As Integer) As Integer

### Description:

This function starts the constant vector-speed, 3-dimension linear interpolation moving.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way.

SecondAxisFinishPoint: The finish point of second-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way

ThirdAxisFinishPoint: The finish point of third-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way

wContiInterpMoveMode:

INTERP\_CONTINUE\_START: indicates the begin of continuous interpolation moving.

INTERP\_NEXT\_CONTINUOUS\_MOTION: indicates the interpolation segment is one part of continuous interpolation moving, and the interrupt of motion checking is involved implicitly.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_CONFIG\_IS\_NEEDED: The continuous interpolation had not been configured. Please call ps400\_conti\_interp\_begin() first.

ERROR\_INVALID\_CONTINUE\_INTERPOLATION\_MOTION: Neither INTERP\_CONTINUE\_START nor INTERP\_NEXT\_CONTINUOUS\_MOTION is assigned to parameter **wContiInterpMoveMode**.

ERROR\_CONTI\_INTERP\_INCORRECT\_CONFIG: Only two axes are configured with  
ps400\_conti\_interp\_begin(), and ps400\_conti\_line3\_move() failed to execute.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU, ERROR\_OCCURS\_IN\_AXIS\_XYZ,  
ERROR\_OCCURS\_IN\_AXIS\_XYU, ERROR\_OCCURS\_IN\_AXIS\_XZU,  
ERROR\_OCCURS\_IN\_AXIS\_YZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status()  
for detailed information.

ERROR\_CONTI\_INTERP\_INTERRUPTED: Indicates the continuous interpolation moving is  
interrupted. This code is returned only when **wContiInterpMoveMode** is set as  
INTERP\_NEXT\_CONTINUOUS\_MOTION.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed. This code is  
returned only when **wContiInterpMoveMode** is set as INTERP\_CONTINUE\_START.

ERROR\_CONTI\_INTERP\_NEXT\_NOT\_READY: Indicates the internal Motion-Control ASIC is not  
ready to set the next interpolation segment, please call ps400\_conti\_interp\_next\_ready()  
first.

ERROR\_CONTI\_INTERP\_LINE3\_MOVE: Cannot start ps400\_conti\_line3\_move, please call  
GetLastError() for further system information.

## 5.2.5 ps400\_conti\_arc2\_move

### VC6 / BCB6

short ps400\_conti\_arc2\_move(BYTE bCardID, WORD wArcDirection, long MainAxisCenterPoint, long SlaveAxisCenterPoint, long MainAxisFinishPoint, long SlaveAxisFinishPoint, WORD wContilInterpMoveMode)

### VB6

ps400\_conti\_arc2\_move(ByVal bCardID As Byte, ByVal wArcDirection As Integer, ByVal MainAxisCenterPoint As Long, ByVal SlaveAxisCenterPoint As Long, ByVal MainAxisFinishPoint As Long, ByVal SlaveAxisFinishPoint As Long, ByVal wContilInterpMoveMode As Integer) As Integer

### Description:

This function starts the constant vector-speed, 2-dimension linear interpolation moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wArcDirection: Clockwise (INTERP\_ARC\_DIRECTION\_CLOCKWISE) or Counter-Clockwise (INTERP\_ARC\_DIRECTION\_COUNTER\_CLOCKWISE).

MainAxisCenterPoint: The center point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way.

SlaveAxisCenterPoint: The center point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way

MainAxisFinishPoint: The finish point of main-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way.

SlaveAxisFinishPoint: The finish point of slave-axis. This parameter is the relative offset to the current position. And the negative value indicates that the finish point is in reverse-way

wContilInterpMoveMode:

INTERP\_CONTINUE\_START: indicates the begin of continuous interpolation moving.

INTERP\_NEXT\_CONTINUOUS\_MOTION: indicates the interpolation segment is one part of continuous interpolation moving, and the interrupt of motion checking in involved implicitly.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_CONFIG\_IS\_NEEDED: The continuous interpolation had not been configured. Please call ps400\_conti\_interp\_begin() first.

ERROR\_INVALID\_CONTINUE\_INTERPOLATION\_MOTION: Neither INTERP\_CONTINUE\_START nor INTERP\_NEXT\_CONTINUOUS\_MOTION is assigned to parameter **wContiInterpMoveMode**.

ERROR\_INVALID\_INTERPOLATION\_ARC\_DIRECTION: Neither INTERP\_ARC\_DIRECTION\_CLOCKWISE nor INTERP\_ARC\_DIRECTION\_COUNTER\_CLOCKWISE is assigned to parameter **wArcDirection**.

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z,  
ERROR\_OCCURS\_IN\_AXIS\_U, ERROR\_OCCURS\_IN\_AXIS\_XY,  
ERROR\_OCCURS\_IN\_AXIS\_XZ, ERROR\_OCCURS\_IN\_AXIS\_YZ,  
ERROR\_OCCURS\_IN\_AXIS\_XU, ERROR\_OCCURS\_IN\_AXIS\_YU,  
ERROR\_OCCURS\_IN\_AXIS\_ZU:

Indicates that some error happens to AXIS\_xxxx. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_CONTI\_INTERP\_INTERRUPTED: Indicates the continuous interpolation moving is interrupted. This code is returned only when **wContiInterpMoveMode** is set as INTERP\_NEXT\_CONTINUOUS\_MOTION.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed. This code is returned only when **wContiInterpMoveMode** is set as INTERP\_CONTINUE\_START.

ERROR\_CONTI\_INTERP\_NEXT\_NOT\_READY: Indicates the internal Motion-Control ASIC is not ready to set the next interpolation segment, please call ps400\_conti\_interp\_next\_ready() first.

ERROR\_CONTI\_INTERP\_ARC2\_MOVE: Cannot start ps400\_conti\_arc2\_move, please call GetLastError() for further system information.

## 5.2.6 ps400\_conti\_interp\_end

### VC6 / BCB6

short ps400\_conti\_interp\_end (BYTE bCardID)

### VB6

ps400\_conti\_interp\_end (ByVal bCardID As Byte) As Integer

### Description:

This function completes the continuous-interpolation moving, and clears the related configurations kept in driver.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_INVALID\_RANGE: The assigned value is invalid.

ERROR\_RANGE\_CHANGE: cannot change the settings of **Range** register, please call GetLastError() for further system information.

ERROR\_CONTI\_INTERP\_CLEAR: Cannot clear continuous-interpolation settings, please call GetLastError() for further system information.

## Other Motion Functions

This chapter introduces several helpful functions, including `ps400_stop_move()`, `ps400_drv_hold()` and `ps400_drv_start()`.

### 6.1 ps400\_stop\_move

#### VC6 / BCB6

short ps400\_stop\_move(BYTE bCardID, WORD wAxis, WORD wStopMode)

#### VB6

ps400\_stop\_move(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wStopMode As Integer) As Integer

#### Description:

This function stops current motion with slowdown or stop-sudden mode. If the parameter **wStopMode** is set as STOP\_SUDDEN, the **BLOCK-OPERATION** is applied implicitly to make sure the specific axis stop before starting next moving command. However, if the parameter **wStopMode** is set as STOP\_SLOWDOWN, the `ps400_motion_down()` is necessary to make sure the specific axis stop before starting next moving command.

#### Notice:

As the **BLOCK-OPERATION** is applied to STOP\_SUDDEN stop-mode, the incorrect settings in `ps400_set_inp()` may hold the customer's program in the function, `ps400_stop_move()`, infinitely.

Please make sure the correct settings in `ps400_set_inp()` or disable **INP** feature before calling `ps400_stop_move()`.

#### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wStopMode: STOP\_SLOWDOWN or STOP\_SUDDEN.

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_STOP\_MODE: Neither STOP\_SLOWDOWN nor STOP\_SUDDEN is assigned to parameter **wStopMode**.

ERROR\_OVERLAP\_EVENT\_CREATE: Indicates the Event-Object creating is failed, please call GetLastError() for further system information.

ERROR\_MOTION\_STOP\_SET: Cannot stop current motion, please call GetLastError() for further system information.

## 6.2 ps400\_stop\_move\_all

### VC6 / BCB6

short ps400\_stop\_move\_all(BYTE bCardID, WORD wAxes, WORD wStopMode)

### VB6

ps400\_stop\_move\_all(ByVal bCardID As Byte, ByVal wAxes As Integer, ByVal wStopMode As Integer) As Integer

### Description:

This helpful function stops motion of multiple axes. The Synchronous/Block operation IS NOT enabled in this function. Therefore, please call ps400\_motion\_done() to make sure that all axes are stop before starting next motion.

### Parameters:

bCardID: the specific Card ID that is configured with the on-board Dip-Switch.

wAxes: can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wStopMode: STOP\_SLOWDOWN or STOP\_SUDDEN.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Invalid axis-combination is assigned to parameter **wAxes**.

ERROR\_INVALID\_STOP\_MODE: Neither STOP\_SLOWDOWN nor STOP\_SUDDEN is assigned to parameter **wStopMode**.

ERROR\_MOTION\_STOP\_SET: Cannot stop current motion, please call GetLastError() for further system information.



## 6.3 ps400\_drv\_hold

### VC6 / BCB6

short ps400\_drv\_hold(BYTE bCardID, WORD wAxes)

### VB6

ps400\_drv\_hold(ByVal bCardID As Byte, ByVal wAxes As Integer) As Integer

### Description:

This function holds the motion-starting of the involved axes. And these involved axes will start moving simultaneously when ps400\_drv\_start() is called.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxes: Can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Invalid axis-combination is assigned to parameter **wAxes**.

ERROR\_HOLD\_AXES\_NOT\_RELEASE: Indicates the some axes had been hold, please call ps400\_drv\_start() to release the hold-axes first.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_DRIVE\_HOLD: Cannot hold the motion-starting, please call GetLastError() for further system information.

## 6.4 ps400\_drv\_start

### VC6 / BCB6

short ps400\_drv\_start(BYTE bCardID, WORD wAxes)

### VB6

ps400\_drv\_start(ByVal bCardID As Byte, ByVal wAxes As Integer) As Integer

### Description:

This function starts multiple axes simultaneously that are held by ps400\_drv\_hold().

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxes: Can be any combination of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Invalid axis-combination is assigned to parameter **wAxes**.

ERROR\_HOLD\_AXES\_NOT\_MATCH: The axes that will to be started are not match to the axes that are held by ps400\_drv\_hold().

ERROR\_DRIVE\_START: Cannot start motion of held axes, please call GetLastError() for further system information.

# Advanced Motion Configurations

This chapter introduces some advanced features, including variable-ring counter, manual-pulse-generator, compare-and-trigger and the synchronous-action between axes. The interrupt factors and the axis-related events are introduced in this chapter, too.

The advanced features are special, and maybe not co-exist with normal operation. It's recommended to disable these functions when they are not needed.

## 7.1 ps400\_set\_vring

### VC6 / BCB6

short ps400\_set\_vring(BYTE bCardID, WORD wAxis, WORD wVRINGEnable, DWORD dwRingValue)

### VB6

ps400\_set\_vring(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wVRINGEnable As Integer, ByVal dwRingValue As Long) As Integer

### Description:

This function enables and configures the variable-ring feature for both logic-command and encoder-position counters. After enabling variable-ring feature, these two counters will be reset to zero automatically.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wVRINGEnable: VARIABLE\_RING\_ENABLE\_FEATURE or VARIABLE\_RING\_DISABLE\_FEATURE.

dwRingValue: The total numbers that counter can count. (  $2 < dwRingValue$  ).

For instance, assigning 10,000 to dwRingValue indicates the operation of ring-counter will be: increasing in forward direction ... →9998→9999→0→1→...

decreasing in reserve direction ...→1→0→9999→9998→...

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_RING\_COUNTER: Indicates the parameter **dwRingValue** is less than 2.

ERROR\_INVALID\_FILTER\_ENABLE: Neither VARIABLE\_RING\_ENABLE\_FEATURE nor VARIABLE\_RING\_DISABLE\_FEATURE is assigned to parameter **wVRINGEnable**.

ERROR\_CONFLICT\_WITH\_SOFTLIMIT: Indicates that the ASIC-Internal Comparators are used for software-limit. Please disable software-limit feature with ps400\_set\_softlimit().

ERROR\_CONFLICT\_WITH\_CMPTRIG: Indicates that the ASIC-Internal Comparators are used for Compare & Trigger feature. Please disable Compare & Trigger feature with ps400\_cmptrig\_config().

ERROR\_CONFLICT\_WITH\_SYNCH\_ACTION: Indicates that the ASIC-Internal Comparators are used as the condition of Synchronous-Action. Please disable synchronous-condition with ps400\_set\_synch().

ERROR\_VRING\_SET: Cannot enable/configure the variable-ring feature, please call GetLastError() for further system information.

## 7.2 ps400\_set\_mpg

### VC6 / BCB6

short ps400\_set\_mpg(BYTE bCardID, WORD wAxis, WORD wEXPCConfig, DWORD dwFixedPulse, DWORD dwSpeed, DWORD dwMaxMPGFreq)

### VB6

ps400\_set\_mpg(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wEXPCConfig As Integer, ByVal dwFixedPulse As Long, ByVal dwSpeed As Long, ByVal dwMaxMPGFreq As Long) As Integer

### Description:

This function enables and configures the manual-pulse-generator feature. After enabling manual-pulse-generator feature, the constant-speed motion will be started when every pulse is sent from external manual-pulse-generator.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wEXPCConfig: EXP\_AB\_PHASE\_MPG, EXP\_CW\_CCW\_ACTIVE\_LOW\_MPG or EXP\_DISABLE\_FEATURE.

dwFixedPulse: Indicates the numbers of pulse will be output when each pulse is sent from manual-pulse-generator. For instance, assigning 5 to this parameter, 5 pulses will be output when each pulse is sent from external manual-pulse-generator.

dwSpeed: The constant-speed of output pulse.

dwMaxMPGFreq: The maximum frequency of the manual-pulse-generator. Please check the datasheet of manual-pulse-generator.

**Notice:** the following formula is needed to be satisfied:

$$\text{dwSpeed} \quad \text{dwMaxMPGFreq} \times \text{dwFixedPulse} \times 2.$$

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_MPG\_EXP\_CONFIG: Indicates the invalid MPG setting is assigned to parameter **wEXPCConfig**.

ERROR\_INVALID\_MPG\_SPEED: The value assigned to parameter ***dwSpeed*** is out of range of Speed or is less than ***2 x dwMaxMPGFreq x dwFixedPulse***.

ERROR\_MPG\_SET: Cannot enable/configure the manual-pulse-generator, please call GetLastError() for further system information.

## 7.3 ps400\_cmptrig\_config

### VC6 / BCB6

short ps400\_cmptrig\_config(BYTE bCardID, WORD wAxis, WORD wCmpTrigEnable, WORD wCmpSource, WORD wCmpTrigMode, WORD wOutputLogic, WORD wPulseWidth, WORD wMoveDirection, DWORD dwConstPitch, long\* pVarOffset, DWORD dwOffLen)

### VB6

ps400\_cmptrig\_config(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wCmpTrigEnable As Integer, ByVal wCmpSource As Integer, ByVal wCmpTrigMode As Integer, ByVal wOutputLogic As Integer, ByVal wPulseWidth As Integer, ByVal wMoveDirection As Integer, ByVal dwConstPitch As Long, ByRef pVarOffset As Long, ByVal dwOffLen As Long) As Integer

### Description:

This function enables and configures the Compare-and-Trigger feature. Both constant-pitch and variable-offset Compare-and-Trigger are supported. If the wCmpTrigMode is configured as CMPTRIG\_VARIABLE\_OFFSET, each offset will be loaded into the comparator of Motion-ASIC in ISR (Interrupt-Service-Routine). Therefore, some functions related to interrupt will not be allowed.

These functions are:

ps400\_set\_int\_factor(), ps400\_config\_FRnet()  
and **ENABLE\_BLOCK\_OPERATION** operation mode in  
ps400\_home\_start(), ps400\_t\_line2\_move(), ps400\_t\_line3\_move(), ps400\_s\_line2\_move(),  
ps400\_s\_line3\_move(), ps400\_t\_arc2\_move().

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: AXIS\_X or AXIS\_Y.

wCmpTrigEnable: CMPTRIG\_ENABLE\_FEATURE or CMPTRIG\_DISABLE\_FEATURE.

wCmpSource: CMP\_SRC\_LOGIC\_COMMAND or CMP\_SRC\_ENCODER\_POSITION.

wCmpTrigMode: CMPTRIG\_CONSTANT\_PITCH or CMPTRIG\_VARIABLE\_OFFSET.

wOutputLogic: CMPTRIG\_LOGIC\_ACTIVE\_HIGH or CMPTRIG\_LOGIC\_ACTIVE\_LOW.

wPulseWidth: Can be one of settings:

TRIG\_PULSE\_WIDTH\_100us,  
TRIG\_PULSE\_WIDTH\_200us,  
TRIG\_PULSE\_WIDTH\_1ms,  
TRIG\_PULSE\_WIDTH\_2ms,

TRIG\_PULSE\_WIDTH\_10ms,

TRIG\_PULSE\_WIDTH\_20ms.

wMoveDirection: CMPTRIG\_FORWARD\_MOVE or CMPTRIG\_REVERSE\_MOVE. This parameter is needed when **wCmpTrigMode** = CMPTRIG\_VARIABLE\_OFFSET.

dwConstPitch: The constant-pitch (pulse) is needed when **wCmpTrigMode** = CMPTRIG\_CONSTANT\_PITCH. ( 2 dwConstPitch 2,147,483,647)

pVarOffset: The pointer to the **long**-Array that stores the offsets to be compared. This parameter is needed when **wCmpTrigMode** = CMPTRIG\_VARIABLE\_OFFSET.

**Notice:** there are some limitations for pVarOffset:

1. The 1<sup>st</sup> compare-offset cannot be at start-point.
2. When the parameter **wMoveDirection** is set as CMPTRIG\_FORWARD\_MOVE, the offsets to be compared must increase absolutely
3. When the parameter **wMoveDirection** is set as CMPTRIG\_REVERSE\_MOVE, the offsets to be compared must decrease absolutely.
4. The maximum offsets to be compared are 2048.

dwOffLen: Indicates the numbers of invalid element in **pVarOffset**. This parameter is needed when **wCmpTrigMode** = CMPTRIG\_VARIABLE\_OFFSET. ( 1 dwOffLen 2,048)

#### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_AXIS: Neither AXIS\_X nor AXIS\_Y is assigned to parameter **wAxis** (**wCmpTrigEnable** = CMPTRIG\_ENABLE\_FEATURE).

ERROR\_INVALID\_CMPTRIG\_ENABLE: Neither CMPTRIG\_ENABLE\_FEATURE nor CMPTRIG\_DISABLE\_FEATURE is assigned to parameter **wCmpTrigEnable**.

ERROR\_INVALID\_COMPARE\_SOURCE: Neither CMP\_SRC\_LOGIC\_COMMAND nor CMP\_SRC\_ENCODER\_POSITION is assigned to parameter **wCmpSource**.

ERROR\_INVALID\_CMPTRIG\_TRIGGER\_MODE: Neither CMPTRIG\_CONSTANT\_PITCH nor CMPTRIG\_VARIABLE\_OFFSET is assigned to parameter **wCmpTrigMode**.

ERROR\_INVALID\_CMPTRIG\_LOGIC\_LEVEL: Neither CMPTRIG\_LOGIC\_ACTIVE\_HIGH nor CMPTRIG\_LOGIC\_ACTIVE\_LOW is assigned to parameter **wOutputLogic**.

ERROR\_INVALID\_CMPTRIG\_PULSE\_WIDTH: Indicates no valid settings is assigned to parameter **wPulseWidth**.



ERROR\_INVALID\_MOVE\_DIRECTION: Neither CMPTRIG\_FORWARD\_MOVE nor CMPTRIG\_REVERSE\_MOVE is assigned to parameter **wMoveDirection**.

ERROR\_INVALID\_CONST\_PITCH: Indicates the parameter **dwConstPitch** is out of valid range (2 dwConstPitch 2,147,483,647)

ERROR\_INVALID\_OFFSET\_BUFFER: Indicates the NULL pointer is assigned to parameter **pVarOffset**. (**wCmpTrigMode** = CMPTRIG\_VARIABLE\_OFFSET)

ERROR\_INVALID\_OFFSET\_LEN: Indicates the parameter **dwOffLen** is out of valid range ( 1 dwOffLen 2,048).

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_INVALID\_OFFSET\_DATA: Indicates the offsets to be compared don't increase absolutely or decreases absolutely.

ERROR\_CONFLICT\_WITH\_SOFTLIMIT: Indicates that the AXIS-Internal Comparators are used for software-limit. Please disable software-limit feature with ps400\_set\_softlimit().

ERROR\_CONFLICT\_WITH\_VRING: Indicates that the ASIC-Internal Comparators are used for Variable-Ring counter. Please disable Variable-Ring counter with ps400\_set\_vring().

ERROR\_CONFLICT\_WITH\_SYNCH\_ACTION: Indicates that the ASIC-Internal Comparators are used as the condition of Synchronous-Action. Please disable synchronous-condition with ps400\_set\_synch().

ERROR\_CONFIG\_IS\_NEEDED: Indicates no compare-and-trigger feature had been configured (**wCmpTrigEnable** = CMPTRIG\_DISABLE\_FEATURE).

ERROR\_VARIABLE\_PITCH\_SET: Cannot set the offsets to be compared, please call GetLastError() for further system information.

ERROR\_CMPTRIG\_SET: Cannot enable/configure the compare-and-trigger feature, please call GetLastError() for further system information.

## 7.4 ps400\_set\_int\_factor

### VC6 / BCB6

short ps400\_set\_int\_factor(BYTE bCardID, WORD wAxis, WORD wIntFactor)

### VB6

ps400\_set\_int\_factor(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wIntFactor As Integer) As Integer

### Description:

This function configures the motion-related interrupt-factors. Please call ps400\_get\_int\_status() to get the relevant interrupt-status;

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wIntFactor: The interrupt factor can be the combination of following settings:

INT\_FACTOR\_DISABLE: disables all interrupt factors.

INT\_FACTOR\_PULSE: interrupt will be triggered when pulse is at its active level.

For instance, if the PULSE\_LOGIC\_ACTIVE\_HIGH is configured in

ps400\_set\_pls\_cfg(), the interrupt will be raised at each raising-edge of output-pulse.

INT\_FACTOR\_EXCEED\_CMP\_NEGATIVE: interrupt will be triggered while the content of logic-command/encoder-position counter is larger than COMP- comparator.

INT\_FACTOR\_LESS\_CMP\_NEGATIVE: interrupt will be triggered while the content of logic-command/encoder-position counter is less than COMP- comparator.

INT\_FACTOR\_LESS\_CMP\_POSITIVE: interrupt will be triggered while the content of logic-command/encoder-position counter is less than COMP+ comparator.

INT\_FACTOR\_EXCEED\_CMP\_POSITIVE: interrupt will be triggered while the content of logic-command/encoder-position counter is larger than COMP+ comparator.

INT\_FACTOR\_END\_CONST\_SPEED\_MOVE: interrupt will be triggered when the constant-speed moving is completed.

INT\_FACTOR\_START\_CONST\_SPEED\_MOVE: interrupt will be triggered when the constant-speed moving is started.

INT\_FACTOR\_END\_DRIVING: interrupt will be triggered when the motion is completed.

### Notice:

If the INT\_FACTOR\_START\_CONST\_SPEED\_MOVE is set, the interrupt will be triggered both at the end of Acceleration and Deceleration.

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_INT\_FACTOR: Indicates the invalid interrupt factor is assigned to parameter **wIntFactor**.

ERROR\_CONFLICT\_WITH\_CMPTRIG: Indicates the Compare-and-Triiger feature is enabled, and interrupt-factor cannot co-exist with this feature. Please call ps400\_cmptrig\_config() to disable Compare-and-Triiger feature.

ERROR\_INT\_FACTOR\_SET: Cannot enable/configure the specific interrupt factor, please call GetLastError() for further system information.

## 7.5 ps400\_int\_event\_config

### VC6 / BCB6

```
short ps400_int_event_config(BYTE bCardID, WORD wIntEventEnable, HANDLE  
pEventHandle[])
```

#### Description:

This function binds the Event-objects to the motion-related interrupts. The Event-object will be raised when the motion-related interrupts are triggered on the relative axis. Please refer to the 'INT\_EVENT' sample.

#### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

pEventHandle: The pointer to the **HANDLE**-Array that contains Event Object of each axis. Therefore, this used-provided array must contain 4 **HANDLE** elements. For instance, add the following code to declare the **HANDLE**-Array:

```
HANDLE EventHandle[4];
```

wIntEventEnable: INT\_EVENT\_ENABLE\_FEATURE or INT\_EVENT\_DISABLE\_FEATURE.

#### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_EVENT\_ENABLE: Neither INT\_EVENT\_ENABLE\_FEATURE nor INT\_EVENT\_DISABLE\_FEATURE is assigned to parameter **wSyncEnable**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_INT\_EVENT\_CREATE: Indicates the Event-object creating is failed. Please call GetLastError() for further system information.

ERROR\_INT\_EVENT\_ATTACH: Cannot bind the Event-objects, please call GetLastError() for further system information.

ERROR\_INT\_EVENT\_DETACH: Cannot release the Event-objects, please call GetLastError() for further system information.

## 7.6 ps400\_set\_synch

### VC6 / BCB6

short ps400\_set\_synch(BYTE bCardID, WORD wMainAxis, WORD wSyncEnable, WORD wSyncAxes, WORD wSyncCondition, WORD wSyncActionMainAxis, WORD wSyncActionOtherAxes, WORD wCmpSource, DWORD dwComparatorPositive, DWORD dwComparatorNegative)

### VB6

ps400\_set\_synch(ByVal bCardID As Byte, ByVal wMainAxis As Integer, ByVal wSyncEnable As Integer, ByVal wSyncAxes As Integer, ByVal wSyncCondition As Integer, ByVal wSyncActionMainAxis As Integer, ByVal wSyncActionOtherAxes As Integer, ByVal wCmpSource As Integer, ByVal dwComparatorPositive As Long, ByVal dwComparatorNegative As Long) As Integer

### Description:

This function enables and configures the synchronous condition/actions in main-axis and other axes that the synchronous action will be applied to.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wMainAxis: The main-axis of synchronous-action, this parameter can be one of `AXIS_X`, `AXIS_Y`, `AXIS_Z` or `AXIS_U`.

wSyncEnable: `SYNC_ENABLE_FEATURE` or `SYNC_DISABLE_FEATURE`.

wSyncAxes: The other involved axes of synchronous-action, they be any combination of `AXIS_X`, `AXIS_Y`, `AXIS_Z` or `AXIS_U`. However, this parameter cannot include **wMainAxis**.

wSyncCondition: The conditions of main-axis to start synchronous-actions, including

`SYNC_CONDITION_EXCEED_CMP_POSITIVE`: the value of counter `COMP+`.

`SYNC_CONDITION_LESS_CMP_POSITIVE`: the value of counter `< COMP+`.

`SYNC_CONDITION_LESS_CMP_NEGATIVE`: the value of counter `< COMP-`.

`SYNC_CONDITION_EXCEED_CMP_NEGATIVE`: the value of counter `COMP-`.

`SYNC_CONDITION_START_DRIVING`: moving is started.

`SYNC_CONDITION_END_DRIVING`: moving is completed or terminated.

wSyncActionMainAxis: When the synchronous-condition is satisfied, the synchronous action that can be applied to main-axis, including:

`SYNC_ACTION_NONE`: no synchronous action is applied to main-axis.

`SYNC_ACTION_LOGIC_CMD_LATCH`: stores the content of logic-command counter into **Buffer** Register.

SYNC\_ACTION\_ENCODER\_POS\_LATCH: stores the content of encoder-position counter into **Buffer** Register.

wSyncActionOtherAxes: When the synchronous-condition is satisfied, the synchronous action that can be applied to other axes, including:

SYNC\_ACTION\_NONE: no synchronous action is applied to other axes.

SYNC\_ACTION\_FIXED\_FORWARD\_DRIVE: starts the fixed-pulse moving in forward direction.

SYNC\_ACTION\_FIXED\_REVERSE\_DRIVE: starts the fixed-pulse moving in reverse direction.

SYNC\_ACTION\_CONTINUE\_FORWARD\_DRIVE: starts the velocity moving in forward direction.

SYNC\_ACTION\_CONTINUE\_REVERSE\_DRIVE: starts the velocity moving in reverse direction.

SYNC\_ACTION\_SLOWDOWN\_STOP: stops the current motion with slowdown mode.

SYNC\_ACTION\_SUDDEN\_STOP: stops the current motion immediately.

SYNC\_ACTION\_LOGIC\_CMD\_LATCH: stores the content of logic-command counter into **Buffer** Register.

SYNC\_ACTION\_ENCODER\_POS\_LATCH: stores the content of encoder-position counter into **Buffer** Register.

wCmpSource: CMP\_SRC\_LOGIC\_COMMAND or CMP\_SRC\_ENCODER\_POSITION

dwComparatorPositive: the value to be set into COMP+.

dwComparatorNegative: the value to be set into COMP-.

**Notice:** please refer to ps400\_get\_latch() to read the **Buffer** register.

#### **Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wMainAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wMainAxis**.

ERROR\_INVALID\_SYNCHRONOUS\_AXES: Indicates invalid axes are assigned to parameter **wSyncAxes**.

ERROR\_INVALID\_SYNCH\_ENABLE: Neither SYNC\_ENABLE\_FEATURE nor SYNC\_DISABLE\_FEATURE is assigned to parameter **wSyncEnable**.

ERROR\_INVALID\_SYNCH\_CONDITION: Indicates no valid synchronous-condition is assigned to parameter **wSyncCondition**.

ERROR\_INVALID\_SYNCH\_ACTION: Indicates invalid synchronous-action is assigned to parameter **wSyncActionMainAxis** or **wSyncActionOtherAxes**.

ERROR\_INVALID\_COMPARE\_SOURCE: Neither CMP\_SRC\_LOGIC\_COMMAND nor  
CMP\_SRC\_ENCODER\_POSITION is assigned to parameter **wCmpSource**.

ERROR\_CONFLICT\_WITH\_SOFTLIMIT: Indicates that the AXIS-Internal Comparators are used for  
software-limit. Please disable software-limit feature with ps400\_set\_softlimit().

ERROR\_CONFLICT\_WITH\_VRING: Indicates that the ASIC-Internal Comparators are used for  
Variable-Ring counter. Please disable Variable-Ring counter with ps400\_set\_vring().

ERROR\_CONFLICT\_WITH\_CMPTRIG: Indicates that the ASIC-Internal Comparators are used for  
Compare & Trigger feature. Please disable Compare & Trigger feature with  
ps400\_cmptrig\_config().

ERROR\_SYNCH\_SET: Cannot enable/configure the synchronous condition & actions, please call  
GetLastError() for further system information.

## 7.7 ps400\_synch\_t\_move\_cfg

### VC6 / BCB6

short ps400\_synch\_t\_move\_cfg(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAcceleration, DWORD dwDeceleration, long FixedPulse)

### VB6

ps400\_synch\_t\_move\_cfg(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAcceleration As Long, ByVal dwDeceleration As Long, ByVal FixedPulse As Long) As Integer

### Description:

This function configures the necessary parameters of trapezoidal-profile moving. This function is helpful when the synchronous-action is set as SYNC\_ACTION\_XXXX\_XXXXXXXX\_DRIVE.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: This axis should be one axis of the parameter **wSyncAxes** that is assigned to ps400\_set\_synch().

dwStartSpeed: The Start-Speed in trapezoidal-profile moving.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile moving.

dwAcceleration: The Acceleration in trapezoidal-profile moving.

dwDeceleration: The Deceleration in trapezoidal-profile moving.

FixedPulse: The total numbers of output pulse. This parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than **dwDriveSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().



ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_ACCELERATION: The value assigned to parameter **dwAcceleration** is out of range of Acceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION: The value assigned to parameter **dwDeceleration** is out of range of Deceleration. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

**Notice:** In the case, **dwAcceleration > dwDeceleration** , the following formula should be satisfied, too.

$$\mathbf{dwDeceleration > (dwAcceleration \times dwDriveSpeed) / 4,000,000.}$$

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_T\_MOVE\_START: Cannot configure the parameters of trapezoidal moving, please call GetLastError() for further system information.

## 7.8 ps400\_synch\_s\_move\_cfg

### VC6 / BCB6

short ps400\_synch\_s\_move\_cfg(BYTE bCardID, WORD wAxis, DWORD dwStartSpeed, DWORD dwDriveSpeed, DWORD dwAccelerationRate, DWORD dwDecelerationRate, long FixedPulse)

### VB6

ps400\_synch\_s\_move\_cfg(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwStartSpeed As Long, ByVal dwDriveSpeed As Long, ByVal dwAccelerationRate As Long, ByVal dwDecelerationRate As Long, ByVal FixedPulse As Long) As Integer

### Description:

This function configures the necessary parameters of S-curve moving. This function is helpful when the synchronous-action is set as SYNC\_ACTION\_FIXED\_XXXXXXXX\_DRIVE.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: This axis should be one axis of the parameter **wSyncAxes** that is assigned to ps400\_set\_synch().

dwStartSpeed: The Start-Speed in S-curve moving.

dwDriveSpeed: The Drive-Speed in S-curve moving.

dwAccelerationRate: The Acceleration-Increasing-Rate in S-curve moving. The Acceleration will be assigned to maximum value automatically.

dwDecelerationRate: The Deceleration-Increasing-Rate in S-curve moving. The Deceleration will be assigned to maximum value automatically.

FixedPulse: The total numbers of output pulse. This parameter is a signed 32-bits variable, the negative value indicates motion in reverse-direction

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_START\_SPEED\_EXCEED\_DRIVING\_SPEED: The **dwStartSpeed** is larger than or equal to **dwDriveSpeed**.

ERROR\_INVALID\_START\_SPEED: The value assigned to parameter **dwStartSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter **dwDriveSpeed** is out of range of Speed. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_JERK: The value assigned to parameter **dwAccelerationRate** is out of range of Acceleration Increasing Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_INVALID\_DECELERATION\_RATE: The value assigned to parameter **dwDecelerationRate** is out of range of Deceleration Increasing Rate. Please refer to ps400\_set\_range() and ps400\_get\_range\_settings().

ERROR\_OCCURS\_IN\_AXIS\_X, ERROR\_OCCURS\_IN\_AXIS\_Y, ERROR\_OCCURS\_IN\_AXIS\_Z  
ERROR\_OCCURS\_IN\_AXIS\_U:

Indicates that some error happens to AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U. Please call ps400\_get\_error\_status() for detailed information.

ERROR\_MOTION\_NOT\_COMPLETE: Indicates the previous motion is not completed.

ERROR\_S\_MOVE\_START: Cannot configure the parameters of S-curve moving, please call GetLastError() for further system information.

# Miscellaneous Functions

This chapter introduces some functions that are difficult to be cataloged, including setting the logic-command counter and encoder-position counter, triangle prevention of trapezoidal-profile fixed-pulse driving, changing driving-speed while trapezoidal-profile moving and updating the total numbers of output pulse.

## 8.1 ps400\_t\_change\_v

### VC6 / BCB6

short ps400\_t\_change\_v(BYTE bCardID, WORD wAxis, DWORD dwDriveSpeed)

### VB6

ps400\_t\_change\_v(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwDriveSpeed As Long) As Integer

### Description:

This function changes the Drive-Speed during trapezoidal-profile moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwDriveSpeed: The Drive-Speed in trapezoidal-profile moving.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_DRIVING\_SPEED: The value assigned to parameter ***dwDriveSpeed*** is out of range of Speed. Please refer to `ps400_set_range()` and `ps400_get_range_settings()`.

ERROR\_SPEED\_CHANGE\_FAIL\_IN\_ACC\_DEC: Indicates the Drive-Speed cannot be changed during Acceleration/Deceleration.

ERROR\_INVALID\_OPERATION\_IN\_S\_CURVE: Indicates the Drive-Speed cannot be applied to S-curve moving.

ERROR\_NOT\_CONSTANT\_SPEED\_IN\_T\_MOVE: Indicates the Drive-Speed cannot be changed in non-constant speed area of trapezoidal-profile moving.

ERROR\_T\_DRIVING\_SPEED\_CHANGE: Cannot change the Drive-Speed, please call `GetLastError()` for further system information.

## 8.2 ps400\_t\_set\_avtri

### VC6 / BCB6

short ps400\_t\_set\_avtri(BYTE bCardID, WORD wAxis, WORD wAvTriCfg)

### VB6

ps400\_t\_set\_avtri(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal wAvTriCfg As Integer) As Integer

### Description:

This function enables the triangle prevention of fixed-pulse, trapezoidal-profile moving. After enabling this feature, the Motion-Control ASIC will determine the deceleration-point by the following formula:

*Numbers of output pulse*      $2 \times (\text{pulse number at Acceleration} + \text{pulse number at Deceleration})$ .

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

wAvTriCfg: AVOID\_TRIANGLE\_ENABLE\_FEATURE or AVOID\_TRIANGLE\_DISABLE\_FEATURE.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_INVALID\_AVOID\_TRIANGLE\_CONFIG: Neither AVOID\_TRIANGLE\_ENABLE\_FEATURE nor AVOID\_TRIANGLE\_DISABLE\_FEATURE is assigned to parameter **wAvTriCfg**.

ERROR\_T\_AVOID\_TRIANGLE\_SET: Cannot set the avoid-triangle feature, please call GetLastError() for further system information.

## 8.3 ps400\_change\_p

### VC6 / BCB6

short ps400\_change\_p(BYTE bCardID, WORD wAxis, DWORD dwP)

### VB6

ps400\_change\_p(ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal dwP As Long) As Integer

### Description:

This function changes the total numbers of output pulse during moving.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

dwP: The total numbers of output pulse.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_CONFLICT\_WITH\_INTERPOLATION\_MOVE: Indicates the finish-point of interpolation moving cannot be changed dynamically.

ERROR\_OUTPUT\_PULSE\_CHANGE: Cannot change total number of output pulse, please call GetLastError() for further system information.

## 8.4 ps400\_set\_cmdcounter

### VC6 / BCB6

short ps400\_set\_cmdcounter(BYTE bCardID, WORD wAxis, long IData)

### VB6

ps400\_set\_cmdcounter((ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal IData As Long)  
As Integer

### Description:

This function set the logic-command counter.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

IData: The value to be set to logic-command counter.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_CMD\_COUNTER\_SET: Cannot set the logic-command counter, please call GetLastError() for further system information.



## 8.5 ps400\_set\_enccounter

### VC6 / BCB6

short ps400\_set\_enccounter(BYTE bCardID, WORD wAxis, DWORD IData)

### VB6

ps400\_set\_enccounter((ByVal bCardID As Byte, ByVal wAxis As Integer, ByVal IData As Long)  
As Integer

### Description:

This function set the encoder-counter.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

IData: The value to be set to encoder-position counter.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_POS\_COUNTER\_SET: Cannot set the encoder-position counter, please call GetLastError() for further system information.

# Status

This chapter introduces functions to get the status of PISO-PS400, including `ps400_motion_done()`, `ps400_get_cmdcounter()`, `ps400_get_position()`, `ps400_get_speed()`, `ps400_get_acc()`, `ps400_get_latch()`, `ps400_get_mdi_status()`, `ps400_get_in3()`, `ps400_get_int_status()` and `ps400_get_error_status()`.

## 9.1 ps400\_motion\_done

### VC6 / BCB6

```
short ps400_motion_done(BYTE bCardID, WORD wAxis, BYTE* pDone, WORD* pStopStatus)
```

### VB6

```
ps400_motion_done(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pDone As Byte,  
ByRef pStopStatus As Integer) As Integer
```

### Description:

This function checks the completion of motion and reports the cause of motion-completion.

### Parameters:

`bCardID`: the specific Card ID that is configured with the on-board Dip-Switch.

`wAxis`: can be one of `AXIS_X`, `AXIS_Y`, `AXIS_Z` or `AXIS_U`.

`pDone`: The pointer to the memory that stores the motion-status. The motion-status will be

`MOTION_DONE`: the specific axis is stop.

`MOTION_NOT_DONE`: the specific axis is driving.

`pStopStatus`: The pointer to the memory that stores the cause of motion-completion, including

`DRIVE_FINISH_WITH_SW_LIMIT_POSITIVE`: reaches software limit in forward direction and stops

`DRIVE_FINISH_WITH_SW_LIMIT_NEGATIVE`: reaches software limit in reverse direction and stops

`DRIVE_FINISH_WITH_STOP_COMMAND`: the stop command is executed.

DRIVE\_FINISH\_OUTPUT\_FIXED\_PULSE: completion of fixed-pulse moving.

DRIVE\_FINISH\_WITH\_AUTO\_HOME: completion of automatic-home-search.

DRIVE\_FINISH\_WITH\_LIMIT\_POSITIVE: reaches hardware limit in forward direction and stops

DRIVE\_FINISH\_WITH\_LIMIT\_NEGATIVE: reaches hardware limit in reverse direction and stops

DRIVE\_FINISH\_WITH\_ALARM: the ALARM feature is enabled and is active to stop driving.

DRIVE\_FINISH\_WITH\_EMG: the driving is stopped when EMG is active.

**Return Code:**

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_MOTION\_DONE\_GET: Cannot get motion status, please call GetLastError() for further system information.

## 9.2 ps400\_get\_cmdcounter

### VC6 / BCB6

short ps400\_get\_cmdcounter(BYTE bCardID, WORD wAxis, long\* pData)

### VB6

ps400\_get\_cmdcounter(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pData As Long)  
As Integer

### Description:

This function gets the content of logic-command counter.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pData: The pointer to the memory that stores logic-command counter.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_CMD\_COUNTER\_GET: Cannot get the logic-command counter, please call GetLastError() for further system information.

## 9.3 ps400\_get\_enccounter

### VC6 / BCB6

short ps400\_get\_enccounter(BYTE bCardID, WORD wAxis, long\* pData)

### VB6

ps400\_get\_enccounter(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pData As Long)  
As Integer

### Description:

This function gets the content of encoder-counter.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pData: The pointer to the memory that stores encoder-position counter.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_POS\_COUNTER\_GET: Cannot get the encoder-position counter, please call GetLastError() for further system information.

## 9.4 ps400\_get\_speed

### VC6 / BCB6

short ps400\_get\_speed(BYTE bCardID, WORD wAxis, DWORD\* pSpeed)

### VB6

ps400\_get\_speed(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pSpeed As Long) As Integer

### Description:

This function gets the speed of current motion.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pSpeed: The pointer to the memory that stores speed of current motion.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_SPEED\_GET: Cannot get the current speed, please call GetLastError() for further system information.

## 9.5 ps400\_get\_acc

### VC6 / BCB6

short ps400\_get\_acc(BYTE bCardID, WORD wAxis, DWORD\* pAcc)

### VB6

ps400\_get\_acc(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pAcc As Long) As Integer

### Description:

This function gets the acceleration of current motion.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pAcc: The pointer to the memory that stores acceleration of current motion.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_ACCELERATION\_GET: cannot get the current acceleration, please call GetLastError() for further system information.

## 9.6 ps400\_get\_latch

### VC6 / BCB6

short ps400\_get\_latch(BYTE bCardID, WORD wAxis, long\* pLatchData)

### VB6

ps400\_get\_latch(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pLatchData As Long)  
As Integer

### Description:

This function gets the content of **Buffer** register.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pLatchData: The pointer to the memory that stores data latched in **Buffer** register. Please refer to ps400\_set\_synch() for to latched data into **Buffer** register.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_LATCH\_GET: Cannot get the latched data, please call GetLastError() for further system information.



## 9.7 ps400\_get\_mdi\_status

### VC6 / BCB6

short ps400\_get\_mdi\_status(BYTE bCardID, WORD wAxis, WORD\* pDIStatus)

### VB6

ps400\_get\_mdi\_status(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pDIStatus As Integer) As Integer

### Description:

This function checks the status of motion-related digital inputs.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pDIStatus: The pointer to the memory that stores the motion-related digital inputs. The value stored in this parameter may be the combination of following status:

DI\_STATUS\_ACTIVE\_DRIVING: indicates the specific axis is driving.

DI\_STATUS\_ACTIVE\_LMTP: the hardware limit in forward direction is active.

DI\_STATUS\_ACTIVE\_LMTM: the hardware limit in reverse direction is active.

DI\_STATUS\_ACTIVE\_EMG: the EMG signal is active.

DI\_STATUS\_ACTIVE\_ALARM: the ALARM signal is enabled and active.

DI\_STATUS\_ACTIVE\_HOME: the Home (ORG) signal is active.

DI\_STATUS\_ACTIVE\_NEARHOME: the Near-Home (NORG) signal is active.

DI\_STATUS\_ACTIVE\_INP: the INP signal is enabled and active.

DI\_STATUS\_ACTIVE\_INDEX: The Z-Phase/INDEX signal is active.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_DI\_STATUS\_GET Cannot get motion-related digital inputs, please call GetLastError() for further system information.

## 9.8 ps400\_get\_in3

### VC6 / BCB6

short ps400\_get\_in3(BYTE bCardID, WORD wAxis, BYTE\* pIN3Status)

### VB6

ps400\_get\_in3(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pIN3Status As Byte) As Integer

### Description:

This function gets the status of digital input **IN3**.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pIN3Status: The pointer to the memory that stores the input of IN3. The value stored in this parameter will be 0x01 or 0x00.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_IN3\_GET: Cannot get the digital input **IN3**, please call GetLastError() for further system information.

## 9.9 ps400\_get\_int\_status

### VC6 / BCB6

short ps400\_get\_int\_status(BYTE bCardID, WORD wAxis, WORD\* plntStatus)

### VB6

ps400\_get\_int\_status(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef plntStatus As Integer) As Integer

### Description:

This function gets the status of interrupt factors.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

plntStatus: The pointer to the memory that stores the status of interrupt factors, including

INT\_STATUS\_EXCEED\_CMP\_NEGATIVE,  
INT\_STATUS\_LESS\_CMP\_NEGATIVE,  
INT\_STATUS\_LESS\_CMP\_POSITIVE,  
INT\_STATUS\_EXCEED\_CMP\_POSITIVE,  
INT\_STATUS\_END\_CONST\_SPEED\_MOVE,  
INT\_STATUS\_START\_CONST\_SPEED\_MOVE,  
INT\_STATUS\_END\_DRIVING

Please refer to ps400\_set\_int\_factor() for the setting of relative interrupt factors.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_INT\_STATUS\_GET: Cannot get the status of interrupt, please call GetLastError() for further system information.

## 9.10 ps400\_get\_error\_status

### VC6 / BCB6

short ps400\_get\_error\_status(BYTE bCardID, WORD wAxis, WORD\* pErrorStatus)

### VB6

ps400\_get\_error\_status(ByVal bCardID As Byte, ByVal wAxis As Integer, ByRef pErrorStatus As Integer) As Integer

### Description:

This function gets the error-status of specific axis.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wAxis: Can be one of AXIS\_X, AXIS\_Y, AXIS\_Z or AXIS\_U.

pErrorStatus: The pointer to the memory that stores the error status, including

DRIVE\_ERROR\_STATUS\_SLMTTP: error caused by software limit in forward direction.

DRIVE\_ERROR\_STATUS\_SLMTM: error cause by software limit in reverse direction.

DRIVE\_ERROR\_STATUS\_LMTP: error caused by hardware limit in forward direction.

DRIVE\_ERROR\_STATUS\_LMTM: error caused by hardware limit in reverse direction.

DRIVE\_ERROR\_STATUS\_ALARM: error caused by ALARM signal.

DRIVE\_ERROR\_STATUS\_EMG: error caused by EMG signal.

DRIVE\_ERROR\_STATUS\_HOME: error caused by execution of automatic-home-search.

The Z-Phase/INDEX is already active at the start of Automatic-Home-Search Step-3.

Please refer to ps400\_set\_home\_cfg() for detailed information.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_MULTI\_AXES\_ASSIGNED: Multiple axes are assigned to parameter **wAxis**.

ERROR\_NO\_VALID\_AXIS\_ASSIGNED: No valid axis ID is assigned to parameter **wAxis**.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_ERROR\_STATUS\_GET: Cannot get the error status, please call GetLastError() for further system information.



## FRnet I/O extension

The PISO-PS400 is equipped with FRnet ASIC to connect the remote FRnet I/O extension. The FRnet ASIC provides the real-time status-updating of its remote I/O modules. This chapter introduces the FRnet functions, including `ps400_scan_FRnet_DI()`, `ps400_reset_FRnet()`, `ps400_config_FRnet()`, `ps400_get_FRnet_DI()` and `ps400_set_FRnet_DO()`.

### 10.1 ps400\_scan\_FRnet\_DI

#### VC6 / BCB6

```
short ps400_scan_FRnet_DI(BYTE bCardID, WORD *pDIModules)
```

#### VB6

```
ps400_scan_FRnet_DI(ByVal bCardID As Byte, ByRef pDIModules As Integer) As Integer
```

#### Description:

This function scans the active *FRnet* DI modules.

#### Parameters:

`bCardID`: The specific Card ID that is configured with the on-board Dip-Switch.

`pDIModules`: The pointer to the memory that indicates the active *FRnet* DI modules. Each bit of this parameter stands for the presence of active *FRnet* DI module.

B7								B0
SA15	SA14	SA13	SA12	SA11	SA10	SA9	SA8	

#### Return Code:

`SUCCESS_NO_ERROR`: The function returns successfully.

`ERROR_INVALID_CARD_ID`: There is no active PISO-PS400 card configured with `bCardID`, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_FRNET\_DI\_MODULE\_GET: Cannot scan the active *FRnet* DI modules, please call `GetLastError()` for further system information.

## 10.2 ps400\_reset\_FRnet

### VC6 / BCB6

short ps400\_reset\_FRnet(BYTE bCardID)

### VB6

ps400\_reset\_FRnet(ByVal bCardID As Byte) As Integer

### Description:

This function reset the onboard *FRnet* master controller.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_FRNET\_RESET: Cannot reset *FRnet* controller, please call GetLastError() for further system information.



## 10.3 ps400\_config\_FRnet

### VC6 / BCB6

short ps400\_config\_FRnet(BYTE bCardID, WORD wEnablePeriodic, WORD wPeriodFactor)

### VB6

ps400\_config\_FRnet(ByVal bCardID As Byte, ByVal wEnablePeriodic As Integer, ByVal wPeriodFactor As Integer) As Integer

### Description:

This function enables the periodic-updating of *FRnet* DI modules, and configures the relevant period-factor.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wEnablePeriodic: FRNET\_PERIODIC\_READING\_ENABLE\_FEATURE or  
FRNET\_PERIODIC\_READING\_DISABLE\_FEATURE.

wPeriodFactor: The period-factor to determine the updating-rate of FRnet DI modules.

The updating rate =  $1/T$ ,  $T = 2.88 \text{ ms} * (\text{PeriodFactor} + 1)$ .

The valid range is 0 wPeriodFactor 255.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_INVALID\_FRNET\_PERIODIC\_ENABLE: Neither  
FRNET\_PERIODIC\_READING\_ENABLE\_FEATURE nor  
FRNET\_PERIODIC\_READING\_DISABLE\_FEATURE is assigned to parameter  
**wEnablePeriodic**.

ERROR\_INVALID\_FRNET\_PERIODIC\_FACTOR: Indicates the value assigned to parameter  
**wPeriodFactor** is out of range.

ERROR\_CONFLICT\_WITH\_CMPTRIG: Indicates the Compare-and-Triiger feature is enabled, and interrupt-factor cannot co-exist with this feature. Please call ps400\_cmptrig\_config() to disable Compare-and-Triiger feature.

ERROR\_FRNET\_FREQUENCY\_SET: Cannot configures updating-rate for *FRnet* DI module, please call GetLastError() for further system information.

## 10.4 ps400\_get\_FRnet\_DI

### VC6 / BCB6

```
short ps400_get_FRnet_DI(BYTE bCardID, WORD wSA, WORD *pStatus, WORD  
wEnableDirectAccess = FRNET_ENABLE_DIRECT_ACCESS)
```

### VB6

```
ps400_get_FRnet_DI(ByVal bCardID As Byte, ByVal wSA As Integer, ByRef pStatus As Integer,  
Optional ByVal wEnableDirectAccess As Integer = FRNET_ENABLE_DIRECT_ACCESS) As  
Integer
```

### Description:

This function get the digital-inputs of *FRnet* DI module.

### Parameters:

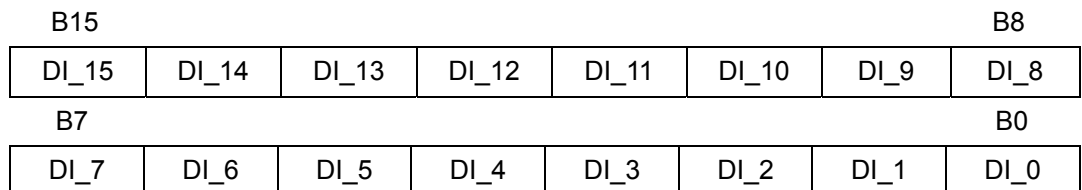
bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wSA: The Group-Address of *FRnet* DI module. One of following Group-Address can be assigned to

this parameter:

FRNET\_SA8,  
FRNET\_SA9,  
FRNET\_SA10,  
FRNET\_SA11,  
FRNET\_SA12,  
FRNET\_SA13,  
FRNET\_SA14,  
FRNET\_SA15.

pStatus: The pointer to the WORD that indicates each digital-input of *FRnet* DI module.



wEnableDirectAccess:

FRNET\_ENABLE\_DIRECT\_ACCESS or FRNET\_DISABLE\_DIRECT\_ACCESS.

The FRNET\_DISABLE\_DIRECT\_ACCESS is only valid when periodic-updating of *FRnet* DI is enabled. Please refer to ps400\_config\_FRnet.

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_INVALID\_FRNET\_ACCESS\_MODE: Neither FRNET\_ENABLE\_DIRECT\_ACCESS nor FRNET\_DISABLE\_DIRECT\_ACCESS is assigned to parameter **wEnableDirectAccess**.

ERROR\_INVALID\_FRNET\_SA\_GROUP\_ADDRESS: Indicates the invalid Group-Address of *FRnet* DI module is assigned to parameter **wSA**.

ERROR\_CONFIG\_IS\_NEEDED: Indicates the periodic-updating had not been configured when FRNET\_DISABLE\_DIRECT\_ACCESS is assigned to the parameter **wEnableDirectAccess**. Please enable periodic-updating with ps400\_config\_FRnet() function.

ERROR\_ACCESS\_VIOLATION\_DATA\_COPY: Some system exception occurs while copying memory, please check the pointer-type parameter you assign to this function.

ERROR\_FRNET\_INPUT: Cannot get the digital-inputs of *FRnet* DI module, please call GetLastError() for further system information.

## 10.5 ps400\_set\_FRnet\_DO

### VC6 / BCB6

short ps400\_set\_FRnet\_DO(BYTE bCardID, WORD wRA, WORD wDOData)

### VB6

ps400\_set\_FRnet\_DO(ByVal bCardID As Byte, ByVal wRA As Integer, ByVal wDOData As Integer) As Integer

### Description:

This function set the digital-outputs of *FRnet* DO module.

### Parameters:

bCardID: The specific Card ID that is configured with the on-board Dip-Switch.

wRA: The Group-Address of *FRnet* DO module. One of following Group-Address can be assigned to

this parameter:

FRNET\_RA0,  
FRNET\_RA1,  
FRNET\_RA2,  
FRNET\_RA3,  
FRNET\_RA7,  
FRNET\_RA5,  
FRNET\_RA6,  
FRNET\_RA7.

wDOData: The 16-bits data to be set to *FRnet* DO module.

B15						B8	
DO_15	DO_14	DO_13	DO_12	DO_11	DO_10	DO_9	DO_8
B7						B0	
DO_7	DO_6	DO_5	DO_4	DO_3	DO_2	DO_1	DO_0

### Return Code:

SUCCESS\_NO\_ERROR: The function returns successfully.

ERROR\_INVALID\_CARD\_ID: There is no active PISO-PS400 card configured with bCardID, or the given Card ID is invalid (for instance, Card ID is assigned to 254).

ERROR\_INVALID\_FRNET\_RA\_GROUP\_ADDRESS: Indicates the invalid Group-Address of *FRnet* DO module is assigned to parameter **wRA**.

ERROR\_FRNET\_OUTPUT: Cannot set the digital-outputs of *FRnet* DO module, please call GetLastError() for further system information.



## Error Code

The Error Codes are divided into three parts: System Error, Parameter Error and Runtime Error.

SUCCESS\_NO\_ERROR 0

### System Error:

ERROR_ROUTINE_FAIL_BASE	-100
ERROR_GET_CARD_ID	-101
ERROR_DEVICE_OPEN	-102
ERROR_DEVICE_CLOSE	-103
ERROR_CARD_RESET	-104
ERROR_RANGE_CHANGE	-105
ERROR_PULSE_MODE_SET	-106
ERROR_ENCODER_MODE_SET	-107
ERROR_LIMIT_SENSOR_SET	-108
ERROR_INP_SIGNAL_SET	-109
ERROR_ALARM_SIGNAL_SET	-110
ERROR_SERVO_ON_SET	-111
ERROR_IN3_SET	-112
ERROR_IN3_GET	-113
ERROR_FILTER_SET	-114
ERROR_SW_LIMIT_SET	-115
ERROR_HOME_CFG_SET	-116
ERROR_HOME_LIMIT_SET	-117
ERROR_START_HOME	-118
ERROR_DI_STATUS_GET	-119
ERROR_ERROR_STATUS_GET	-120
ERROR_CMD_COUNTER_SET	-121
ERROR_CMD_COUNTER_GET	-122
ERROR_POS_COUNTER_SET	-123

ERROR_POS_COUNTER_GET	-124
ERROR_MOTION_DONE_GET	-125
ERROR_SPEED_GET	-126
ERROR_ACCELERATION_GET	-127
ERROR_LATCH_GET	-128
ERROR_MOTION_STOP_SET	-129
ERROR_MOTION_STOP_ALL_SET	-130
ERROR_DRIVE_START	-131
ERROR_DRIVE_HOLD	-132
ERROR_VRING_SET	-133
ERROR_MPG_SET	-134
ERROR_CMPTRIG_SET	-135
ERROR_SYNCH_SET	-136
ERROR_INT_FACTOR_SET	-137
ERROR_INT_STATUS_GET	-138
ERROR_CONTI_MOVE_START	-139
ERROR_CONST_MOVE_START	-140
ERROR_T_MOVE_START	-141
ERROR_S_MOVE_START	-142
ERROR_T_LINE2_START	-143
ERROR_T_LINE3_START	-144
ERROR_S_LINE2_START	-145
ERROR_S_LINE3_START	-146
ERROR_T_ARC2_START	-147
ERROR_CONTI_INTERP_SET	-148
ERROR_CONTI_INTERP_CLEAR	-149
ERROR_CONTI_INTERP_NEXT_READY	-150
ERROR_CONTI_INTERP_LINE2_MOVE	-151
ERROR_CONTI_INTERP_LINE3_MOVE	-152
ERROR_CONTI_INTERP_ARC2_MOVE	-153
ERROR_T_DRIVING_SPEED_CHANGE	-154
ERROR_T_AVOID_TRIANGLE_SET	-155
ERROR_OUTPUT_PULSE_CHANGE	-156
ERROR_OUT1_GET	-157
ERROR_FRNET_DI_MODULE_GET	-158
ERROR_FRNET_FREQUENCY_SET	-159
ERROR_FRNET_INPUT	-160
ERROR_FRNET_OUTPUT	-161

ERROR\_FRNET\_RESET -162

Parameter Error:

ERROR\_INVALID\_PARAMETER\_BASE -200  
ERROR\_INVALID\_CARD\_ID -201  
ERROR\_INVALID\_SCANNED\_INDEX -202  
ERROR\_CARD\_ID\_DUPLICATED -203  
ERROR\_INVALID\_RANGE -204  
ERROR\_INVALID\_PULSE\_MODE -205  
ERROR\_INVALID\_PULSE\_LEVEL -206  
ERROR\_INVALID\_PULSE\_DIRECTION -207  
ERROR\_INVALID\_ENCODER\_MODE -208  
ERROR\_INVALID\_LIMIT\_LOGIC -209  
ERROR\_INVALID\_STOP\_MODE -210  
ERROR\_INVALID\_INP\_ENABLE -211  
ERROR\_INVALID\_INP\_LOGIC\_LEVEL -212  
ERROR\_INVALID\_ALARM\_ENABLE -213  
ERROR\_INVALID\_ALARM\_LOGIC\_LEVEL -214  
ERROR\_INVALID\_SERVO\_SETTING -215  
ERROR\_INVALID\_IN3\_ENABLE -216  
ERROR\_INVALID\_IN3\_LOGIC\_LEVEL -217  
ERROR\_INVALID\_FILTER\_ENABLE -218  
ERROR\_INVALID\_FILTER\_CONFIGURATION -219  
ERROR\_INVALID\_FILTER\_DELAY\_TIME -220  
ERROR\_INVALID\_SOFTWARE\_LIMIT\_ENABLE -221  
ERROR\_INVALID\_SOFTWARE\_LIMIT\_COMPARATOR\_SOURCE -222  
ERROR\_INVALID\_MOVE\_DIRECTION -223  
ERROR\_INVALID\_HOME\_LOGIC\_LEVEL -224  
ERROR\_INVALID\_NEAR\_HOME\_LOGIC\_LEVEL -225  
ERROR\_INVALID\_INDEX\_LOGIC\_LEVEL -226  
ERROR\_INVALID\_AUTO\_HOME\_STEP -227  
ERROR\_INVALID\_BLOCK\_OPEARTION\_MODE -228  
ERROR\_INVALID\_AVOID\_TRIANGLE\_CONFIG -229  
ERROR\_INVALID\_MPG\_EXP\_CONFIG -230  
ERROR\_INVALID\_NHOME\_SEARCH\_SPEED -231  
ERROR\_INVALID\_HOME\_SEARCH\_SPEED -232  
ERROR\_INVALID\_ACCELERATION -233  
ERROR\_INVALID\_DECELERATION -234



ERROR_INVALID_JERK	-235
ERROR_INVALID_DECELERATION_RATE	-236
ERROR_INVALID_RING_COUNTER	-237
ERROR_INVALID_RING_ENABLE	-238
ERROR_INVALID_AXIS	-239
ERROR_INVALID_CONST_PITCH	-240
ERROR_INVALID_OFFSET_BUFFER	-241
ERROR_INVALID_OFFSET_LEN	-242
ERROR_INVALID_OFFSET_DATA	-243
ERROR_INVALID_START_SPEED	-244
ERROR_INVALID_DRIVING_SPEED	-245
ERROR_INVALID_MANUAL_DECELERATION_POINT	-246
ERROR_START_SPEED_EXCEED_DRIVING_SPEED	-247
ERROR_MULTI_AXES_ASSIGNED	-248
ERROR_NO_VALID_AXIS_ASSIGNED	-249
ERROR_INVALID_INTERPOLATION_SLAVE_AXES	-250
ERROR_INTERPOLATION_SLAVE_AXES_DUPLICATED	-251
ERROR_INVALID_SYNCHRONOUS_AXES	-252
ERROR_INVALID_INTERPOLATION_ARC_DIRECTION	-253
ERROR_INVALID_CONTINUE_INTERPOLATION_MOTION	-254
ERROR_INVALID_FRNET_PERIODIC_ENABLE	-255
ERROR_INVALID_FRNET_PERIODIC_FACTOR	-256
ERROR_INVALID_FRNET_SA_GROUP_ADDRESS	-257
ERROR_INVALID_FRNET_RA_GROUP_ADDRESS	-258
ERROR_INVALID_FRNET_ACCESS_MODE	-259
ERROR_INVALID_COMPARE_SOURCE	-260
ERROR_INVALID_MPG_SPEED	-261
ERROR_INVALID_CMPTRIG_ENABLE	-262
ERROR_INVALID_CMPTRIG_TRIGGER_MODE	-263
ERROR_INVALID_CMPTRIG_LOGIC_LEVEL	-264
ERROR_INVALID_CMPTRIG_PULSE_WIDTH	-265
ERROR_INVALID_SYNCH_ENABLE	-266
ERROR_INVALID_SYNCH_CONDITION	-267
ERROR_INVALID_SYNCH_ACTION	-268
ERROR_INVALID_EVENT_ENABLE	-269
ERORR_INVALID_INT_FACTOR	-270

Runtime Error:

ERROR_RUNTIME_BASE	-300
ERROR_OCCURS_IN_AXIS_X	-301
ERROR_OCCURS_IN_AXIS_Y	-302
ERROR_OCCURS_IN_AXIS_XY	-303
ERROR_OCCURS_IN_AXIS_Z	-304
ERROR_OCCURS_IN_AXIS_XZ	-305
ERROR_OCCURS_IN_AXIS_YZ	-306
ERROR_OCCURS_IN_AXIS_XYZ	-307
ERROR_OCCURS_IN_AXIS_U	-308
ERROR_OCCURS_IN_AXIS_XU	-309
ERROR_OCCURS_IN_AXIS_YU	-310
ERROR_OCCURS_IN_AXIS_XYU	-311
ERROR_OCCURS_IN_AXIS_ZU	-312
ERROR_OCCURS_IN_AXIS_XZU	-313
ERROR_OCCURS_IN_AXIS_YZU	-314
ERROR_OCCURS_IN_AXIS_XYZU	-315
ERROR_NO_CARD_FOUND	-316
ERROR_MEMORY_MAP	-317
ERROR_MEMORY_UNMAP	-318
ERROR_ACCESS_VIOLATION_DATA_COPY	-319
ERROR_VARIABLE_PITCH_SET	-320
ERROR_INT_EVENT_ATTACH	-321
ERROR_INT_EVENT_DETACH	-322
ERROR_INT_EVENT_CREATE	-323
ERROR_CONFIG_IS_NEEDED	-324
ERROR_MOTION_NOT_COMPLETE	-325
ERROR_CONFLICT_WITH_SOFTLIMIT	-326
ERROR_CONFLICT_WITH_CMPTRIG	-327
ERROR_CONFLICT_WITH_VRING	-328
ERROR_CONFLICT_WITH_SYNCH_ACTION	-329
ERROR_ARC_DECELERATION_POINT_CALCULATE	-330
ERROR_REASSIGN_SYNCH_MODE_COMMAND	-331
ERROR_OVERLAP_EVENT_CREATE	-332
ERROR_INTERPOLATION_NOT_COMPLETE	-333
ERROR_CONTI_INTERP_INTERRUPTED	-334
ERROR_CONTI_INTERP_INCORRECT_CONFIG	-335
ERROR_CONTI_INTERP_NEXT_NOT_READY	-336
ERROR_SPEED_CHANGE_FAIL_IN_ACC_DEC	-337

ERROR_INVALID_OPERATION_IN_S_CURVE	-338
ERROR_NOT_CONSTANT_SPEED_IN_T_MOVE	-339
ERROR_MOTION_IS_COMPLETED	-340
ERROR_CONFLICT_WITH_INTERPOLATION_MOVE	-341
ERROR_HOLD_AXES_NOT_MATCH	-342
ERROR_BLOCK_OP_CONFLICT_WITH_CMPTRIG	-343
ERROR_CONFLICT_WITH_MPG	-344
ERROR_HOLD_AXES_NOT_RELEASE	-345
ERROR_ZPHASE_ACTIVE_AT_STEP3	-346
ERROR_BLOCK_OP_CONFLICT_WITH_DRV_HOLD	-347
ERROR_AXES_MOVE_CHECK	-360
ERROR_IOCTL_FAILED	-361
ERROR_UNDEFINED_EXCEPTION	-362
ERROR_CONFIG_FILE_LOAD	-370
ERROR_CONFLICT_IN_CONFIG_FILE	-371
ERROR_INVALID_FILE_HANDLE	-372