Y7s Modbus related

`ModBus communication format setting function requires Y7S pulse firmware version 3718_0F or higher.`
`The ModBus communication format setting function requires the Y7S Pulse PRM version to be 3801 or higher.`
`The ModBus communication format setting function requires that the Y7S host computer version is 3713 or higher.`

Pn604 Baud rate.

Pn650.0 Modbus stop bit,
0: 1 stop bit; 1: 2 stop bits.

Pn650.1 Modbus Checksum bit.
0: even parity; 1: no parity; 2: odd parity.

Address setting

Name	Rigister	Function
Parameters area	0000H-0FFFH	Write to RAM＋ EEPROM
Parameters area	1000H-1FFFH	Write to RAM

The above area is the parameter area of the Y7S, and the register number is matched according to the planning of the Pn number + the following bias.
Example:
Register number bit 1100H for Pn100. (Not written to EEPROM.)
Register number bit 0100H for Pn100. (Write to EEPROM)

Virtual DI parameter

Virtual DI for triggering DI inputs via Modbus.

`Virtual Input Signal Setting` for function setting (set to 1)

`Virtual Input Signal Enable switch` for triggering the related DI

```
Example:
Pn5A0.01.
Servo ON is triggered by PnC10.0=1.
```

Parameter	Virtual Input Signal setting	Parameter	Virtual Input Signal Enable Switch
Pn5A0.0	ServoOn（Servo Enable）	PnC10.0	ServoOn（Servo Enable）
Pn5A0.1	Pot	PnC10.1	Pot
Pn5A0.2	Not	PnC10.2	Not
Pn5A0.3	AlmReset	PnC10.3	AlmReset
Pn5A0.4	SpdD (Speed D)	PnC10.4	SpdD (Speed D)
Pn5A0.5	SpdA (Speed A)	PnC10.5	SpdA (Speed A)
Pn5A0.6	SpdB(Speed B)	PnC10.6	SpdB(Speed B)
Pn5A0.7	Zclamp(ZeroClamp)	PnC10.7	Zclamp(ZeroClamp)
Pn5A0.8	PoleDetect(Polarity detection)	PnC10.8	PoleDetect(Polarity detection)
Pn5A0.9	Pcon (Mode change)	PnC10.9	Pcon (Mode change)
Pn5A0.10	Inhibit(Command pulse input inhibit)	PnC10.10	Inhibit(Command pulse input inhibit)
Pn5A0.11	GainSel(Gain switch)	PnC10.11	GainSel(Gain switch)
Pn5A0.12	Csel (Control mode change)	PnC10.12	Csel (Control mode change)
Pn5A0.13	Pcl (Torque limit)	PnC10.13	Pcl (Torque limit)
Pn5A0.14	Ncl (Torque limit)	PnC10.14	Ncl (Torque limit)
Pn5A0.15	Psel(Command pulse input frequency multiplier switching)	PnC10.15	Psel(Command pulse input frequency multiplier switching)

Parameter	Virtual Input Signal setting	Parameter	Virtual Input Signal Enable Switch
Pn5B2.0	VCMP (speed consistency)	PnC20.0	VCMP (speed consistency)
Pn5B2.1	TGON(rotational detection)	PnC20.1	TGON(rotational detection)
Pn5B2.2	SVREADY(servo ready)	PnC20.2	SVREADY(servo ready)
Pn5B2.3	CLT (Torque Control Detection)	PnC20.3	CLT (Torque Control Detection)
Pn5B2.4	VLT (Velocity Control Detection)	PnC20.4	VLT (Velocity Control Detection)
Pn5B2.5	BRAKE	PnC20.5	BRAKE
Pn5B2.6	WARNING	PnC20.6	WARNING
Pn5B2.7	ALARM	PnC20.7	ALARM
Pn5B2.8	COIN(Positioning complete)	PnC20.8	COIN(Positioning complete)
Pn5B2.9	NEAR (Proximity in positioning)	PnC20.9	NEAR (Proximity in positioning)
Pn5B2.10	CPHASE（similar to Z phase signal）	PnC20.10	CPHASE（similar to Z phase signal）
Pn5B2.11	PSELA(Command pulse input frequency multiplier switching response)	PnC20.11	PSELA(Command pulse input frequency multiplier switching response)

Monitor parameters' address

Register	Name	Unit	Register	Symbol	Comment
E000H	Motor rotation/movement speed	Rotary :min -1	1	S	Un000
		Linear :mm/s			
E001H	Command speed	Rotary :min -1	1	S	Un001
		Linear :mm/s			
E002H	Internal torque/thrust command	%	1	S	Un002
E003H	Angle of rotation 1 (number of pulses from the origin)	Pulse	2	U	Un003

Register	Name	Unit	Register	Symbol	Comment
E005H	Angle of rotation 2 (angle from the origin)	deg	1	U	Un004
E006H	Input Signal Monitor		1	-	Un005
E007H	Output Signal Monitor		1	-	Un006
E008H	Input command pulse speed	Rotary :min -1	1	S	Un007
		Linear :mm/s			
E009H	Deviation counter (positional deviation amount)	Command Unit	2	S	Un008
E00BH	Accumulated Load Ratio	% (cycle 10s)	1	U	Un009
E00CH	Regenerative load factor	% (cycle 10s)	1	U	Un00A
E00DH	DB resistors consume power	% (cycle 10s)	1	U	Un00B
E00EH	Input Command Pulse Counter	Pulse	2	S	Un00C
E010H	Feedback pulse counter	Pulse	2	S	Un00D
E012H	Fully closed-loop feedback pulse counter	Pulse	2	S	Un00E
E016H	Total running time	100ms	2	U	Un012
E01AH	Hall Sensor Information	1		-	Un011
E01BH	Feedback pulse counter	Command Unit2		S	Un013
E01DH	Effective Gain Monitor	1		U	Un014
E01EH	Safety Input/Output Signal Monitor	1		-	Un015
E084H	Linear scale pitch	pm	2	U	Un084
E086H	Linear Encoder Pitch Index	Index of 10	1	S	Un085
E600H	Absolute Encoder Multiturn	Pulse	1	S	

Register	Name	Unit	Register	Symbol	Comment
E601H	Absolute encoder pulses within 1 turn	Pulse	2	U	

Internal position

Set Pn000.1 Control method selection to 1: Position control.
Set Pn29A.0 Position source switching to 1.
Pn29B.0 Multi-segment position:
0: Single run end stop; 1: Cycle run; 2: DI switching run; 3: Sequence run.
Meanwhile, set the number of Pn29B.1 position instruction end segments (0-F corresponds to 1-16 segments). Set the operation of each segment according to the specific situation.

Set the operation parameters Pn2A0-Pn2EF for each segment displacement according to the specific conditions, and pay attention to the effect of the electronic gear ratio when setting the displacement amount of each segment.

Setting Pn29C.0
Set Pn29C.0 Residual handling method, 0: continue to run the unfinished segment (effective only if Pn29B BIT0 is not set to 2); 1: restart from the first segment.
Pn29C.2 Displacement instruction type selection 0: relative position instruction; 1: absolute displacement instruction.
If Pn29B.0 Multi-segment Position Mode is set to 3: Sequential Operation, also set Pn29C.3 Sequential Operation Start Segment Selection, which determines the start segment for the second and each subsequent end run after the first run in Sequential Mode.

If the external input signal is required to be used as the multi-segment position enable signal, it is necessary to set Pn51A.0 Multi-segment position command enable, and assign the pins according to the actual wiring condition. Alternatively, configure Pn5A1, Pn5A3, and PnC11 to use virtual DI inputs to change the multi-segment position enable signal, as illustrated in the DI switching runs below.

Factory settings:0
0: SI0(CN1-40) Enable when input signal in ' ON (L level) ' state.
1: SI1(CN1-41)Enable when input signal in ' ON (L level) ' state.
2: SI2(CN1-42) Enable when input signal in ' ON (L level) ' state.
3: SI3(CN1-43)Enable when input signal in ' ON (L level) ' state.
4: SI4(CN1-44)Enable when input signal in ' ON (L level) ' state.
5: SI5(CN1-45)Enable when input signal in ' ON (L level) ' state.
6: SI6(CN1-46) Enable when input signal in ' ON (L level) ' state.
7: The signal has been fixed as ' Enable'.
8: The signal has been fixed as ' Disable '.
9: SI0(CN1-40) Enable when input signal in ' OFF (H level) ' state.
A: SI1(CN1-41) Enable when input signal in ' OFF (H level) ' state.
B: SI2(CN1-42)Enable when input signal in ' OFF (H level) ' state.
C: SI3(CN1-43) Enable when input signal in ' OFF (H level) ' state.
D: SI4(CN1-44) Enable when input signal in ' OFF (H level) ' state.
E: SI5 (CN1-45) Enable when input signal in ' OFF (H level) ' state.
F: SI6 (CN1-46) Enable when input signal ' OFF (H level) ' state

Stopping after a single run

For example, set Pn29B.0 Multi-Segment Position Mode to 0: Stop after Single Run,

Pn29B.1 Terminal Segment Number to 3 (Segment 4)

Pn29C.0 Residual Handling Mode to 0: Continue to run unfinished segments.

Pn29C.2 Displacement Instruction Type Selection to 0: Relative displacement Instruction.

When the servo enable and multi-segment position enable signals are enabled respectively, the motor will run from segment 1 to 4 according to the set parameters, and stop at the end of the run. The motor will wait for the set wait time between each segment.

After the end, disconnect the servo enable signal or the internal position enable signal and re-enable it, and the motor will start running again from the first segment and stop at the fourth segment.

Cyclic operation

Parameter setting is similar to the single run stop, according to the specific situation, set the number of end segments, residual handling method, displacement command type selection and each segment displacement specific parameters, unlike the single run end stop, when the motor has run to the end segment, the motor will start again from 1 segment to repeat the run.

Internal position Virtual DI

If you need to use the physical IO to control the DI switching operation mode, you must first set up the Pn519 to assign the individual pins.

– Pn519	Input signal selection 8	–	8888
0	Internal Position CMD1	–	8
1	Internal Position CMD2	–	8
2	Internal Position CMD3	–	8
3	Internal Position CMD4	–	8

The following table shows the running segments for different input cases of CMD1-CMD4.

段落序号	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CMD1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
CMD2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
CMD3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
CMD4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Operation Process:

To use the communication DI function, there are three steps:
Step 1: Find the parameter number and Bit corresponding to the input function in the Virtual DI table and the following parameter description.
Step 2: Set the corresponding Bit in Pn5A0/Pn5A1 to 1 to enable the virtual input function.
Note: After the virtual DI corresponding function is turned on, the physical DI signal of this function is invalid.
Step 3: Set the corresponding Bit in Pn5A2/Pn5A3 to adjust the polarity of virtual DI input.
Step 4: Use the corresponding Bit in PnC10/PnC11 to control the DI state.

Pn5A1 virtual IO switch	**Pn5A3 IO Input properties**	**PnC11 Virtual IO input**
Set to1 to enable function	0: High active; 1: Low active	Set to 1 to enable the input signal
Bit0 Internal position 0 switch	Bit0 Internal position selection	Bit0 Internal position selection 0
Bit1 Internal position 1 switch	Bit1 Internal position selection	Bit1 Internal position selection 1
Bit2 Internal position 2 switch	Bit2 Internal position selection	Bit2 Internal position selection 2
Bit3 Internal position 3 switch	Bit3 Internal position selection	Bit3 Internal position selection 3
Bit4 Internal position enable switch	Bit4 Internal position enable	Bit4 Internal position enable
Bit5 Homing start switch	Bit5 Homing start enable	Bit5 Homing start enable
Bit6 Home point switch	Bit6 Home point enable	Bit6 Home point enable

Corresponds to the part of multi-segment position function enable:
The servo enable signal is given by the external DI as follows.

1. Set function first: Pn5A1=0x0010
   Pn5A1.4=1 (enable signal of multi-segment position)
2. Corresponding to the given virtual DI signal: PnC11=0x0010

Converted to Modbus telegrams, to control internal position enable is as follows;

```
01 06 05 A1 00 10 D9 28 (virtualization of the internal position enable signal)
01 06 0C 11 00 10 DB 53 (internal position enable signal trigger)
01 06 0C 11 00 00 DA 9F (internal position enable signal off)
```

Note: The internal position trigger must be retriggered after the internal position enable pin is set to 0 to be executed.

When DI switching mode is used, Pn5A1= 001F. where Pn5A1.0~Pn5A1.3 are the virtualization options for CMD1~CMD4 signals. If the driver has been enabled, the internal position execution segments are determined by changing the PnC11 parameter, as follows.

```
1.01 06 05 A1 00 1F 99 2C (Virtualization of internal position enable signal and
CMD1~4 signals)*1
2.01 06 0C 11 00 10 DB 53 (execution of internal position segment 1)
3.01 06 0C 11 00 00 DA 9F (internal position enable signal reset)
4.01 06 0C 11 00 1F 9B 57 (performs internal position 16)
5.01 06 0C 11 00 00 00 DA 9F (internal position enable signal reset)
6.01 06 0C 11 00 11 1A 93 (performs internal position 2)
```

```
Note 1*: 1F=0001 1111

Corresponding to Pn51A : Enable virtual DI fucntion of CMD1~4 and internal
position start
```

Sequential operation

Parameter setting is similar to single run stop and cycle run, according to the specific situation, set the number of end segments, residual handling method, displacement command type selection and specific parameters of each segment displacement, unlike single run end stop and cycle, when the motor runs to the end segment, the motor will re Pn29C.3 Sequence Run Start Segment Selection of the set segment to start running the second round and each round after the second round. . At the same time, sequential operation differs from single-run end stop and cyclic operation in that there is no waiting time between each segment of sequential operation, and when the previous segment is completed, the next segment is run directly.

Homing method intro：

First set Pn6A0.0 Origin offset processing method
0: Set the origin as the offset value;
1: Set the origin as the offset value superimposed on the original.
Set Pn6A0.2 origin return mode, the mode list as follow:

Homing method	Description
0	No
1	Homing starts in negative direction. Change to low speed when encounter OFF→ON status of NL and then go back to find nearest Z pulse
2	Homing starts in positive direction. Change to low speed when encounter OFF→ON status of PL and then go back to find nearest Z pulse position as the origin

Homing method	Description
3	If HSW is inactive then homing starts in positive direction, otherwise in negative direction Change to low speed when encounter ON→OFF status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin
4	If HSW is inactive then homing starts in positive direction, otherwise in negative direction Change to low speed when encounter OFF→ON status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse position as the origin.
5	If HSW is inactive then homing starts in negative direction, otherwise in positive direction Change to low speed when encounter ON→OFF status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse
6	If HSW is inactive then homing starts in negative direction, otherwise in positive direction Change to low speed when encounter ON→OFF status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin.
7	If HSW is inactive then homing starts in positive direction, otherwise in negative direction Change to low speed when encounter ON→OFF status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin
8	If HSW is inactive then homing starts in positive direction, otherwise in negative direction Change to low speed when encounter OFF→ON status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse position as the origin
9	Homing always starts in positive direction no matter HSW is inactive or active. Change to low speed when encounter OFF→ON status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin
10	Homing always starts in positive direction no matter HSW is inactive or active. Change to low speed when encounter ON→OFF status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse position as the origin.
11	If HSW is inactive then homing starts in negative direction, otherwise in positive direction Change to low speed when encounter ON→OFF status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse position as the origin.
12	If HSW is inactive then homing starts in negative direction, otherwise in positive direction Change to low speed when encounter OFF→ON status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin.

Homing method	Description
13	Homing always starts in negative direction no matter HSW is inactive or active. Change to low speed when encounter OFF→ON status of HSW when running in positive direction and then keep running in positive direction to find nearest Z pulse position as the origin
14	Homing always starts in negative direction no matter HSW is inactive or active. Change to low speed when encounter ON→OFF status of HSW when running in negative direction and then keep running in negative direction to find nearest Z pulse position as the origin
15	Reserved
16	Reserved
17	Similar to Method 1, but not to find Z pulse position but the position when encountering OFF→ON status of NL as origin in negative direction.
18	Similar to Method 2, but not to find Z pulse position but the position when encountering OFF→ON status of PL as origin in positive direction.
19	Similar to Method 3, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in negative direction.
20	Similar to Method 4, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in positive direction.
21	Similar to Method 5, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in positive direction.
22	Similar to Method 6, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in negative direction.
23	Similar to Method 7, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in negative direction.
24	Similar to Method 8, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in positive direction.
25	Similar to Method 9, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in negative direction.
26	Similar to Method 10, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in positive direction.
27	Similar to Method 11, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in positive direction.
28	Similar to Method 12, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in negative direction.
29	Similar to Method 13, but not to find Z pulse position but the position when encountering OFF→ON status of HSW as origin in positive direction

Homing method	Description
30	Similar to Method 14, but not to find Z pulse position but the position when encountering ON→OFF status of HSW as origin in negative direction.
31	Reserved
32	Reserved
33	After starting, find the nearest Z pulse position in negative direction
34	After starting, find the nearest Z pulse position in positive direction
35	Take current position as the origin
36	Take Pn6A4 sets position as the origin.

NL: Negative limit signal **PL: Positive limit signal**
HSW: Home signal

Homing by Virtual DI

In the following process the related homing parameters are set as you need.

– Pn6A0	Homing setting	–	0000
0	Home position offset processing ...	–	0
1	Appointment parameters (Do n...	–	0
2~3	Homing Method	–	00
Pn6A1	High-speed search home speed	rpm	0
Pn6A2	Low-speed search home speed	rpm	0
Pn6A3	Home searching Acc./Dec. time	ms	0
Pn6A4	Home offset	–	0

```
Note: there are two more input signal settings, in the following process, only
use the Homing start as the Virtual input.

Homing signal:
1.Homing start Pn51A.1
2. Home signal Pn51A.2
```

Virtual DI operation process for Homing start signal:

By setting Pn5A1= 0020, where 5A1.5 is the home search start signal virtualization option, in this case that the driver has been enabled, by changing PnC11=0020 that is, the home search start signal is set to high level, homing start, the specific message is as follows.

```
01 06 05 A1 00 20 D9 3C (Homing start signal by using virtual IO)
01 06 0C 11 00 20 DB 47 (Start homing operation)
01 06 0C 11 00 00 DA 9F (turn off the Homing signal when the homing is completed)
```

First configure **Pn5A1**

01 06 05 a1 00 60 d8 cc

Set the home search start signal and home signal of the virtual IO to on.

Then set **Pn5A3** virtual IO input polarity.

01 06 05 a3 00 00 79 24

Set the polarity of home search start signal and home signal of virtual IO to high valid.

Write 0 (properties set to low validity) or 1 (properties set to high validity) to the corresponding bit of PnC11 to input the virtual IO signals so that the motor operates the corresponding segment according to the input signals.