

Application Note

SI-EP3 & SI-EP3/V conformance to PROFIdrive

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Introduction

PROFIdrive is a standardized method, within the PROFINET protocol of accessing and controlling a drive. It allows for the replacement of a drive that conforms to the PROFIdrive profile with any other conforming drive regardless of manufacturer. The PROFIdrive profile describes a number of drive classes providing a set of standards for each drive class. The SI-EP3 and SI-EP3/V communication options conform to portions of PROFIdrive. The SI-EP3 and SI-EP3/V are a Class 1 (standard drive/option) so the critical portions to support are the control and set point words (standard telegram 1) and the fault diagnostics.

This document is specific to drive profile class one (Standard Drive) and the Yaskawa SI-EP3 series PROFINET interface.

Refer to the *Yaskawa AC Drive 1000-Series PROFINET Technical Manual* (SIEPYEACOM07) or (SIEPYEACOM06) for additional information on the SI-EP3 series.

Refer to *Adding SI-EP3 to PROFINET Using Siemens Step 7 Software*, (AN.AFD.28) for an example of adding a Yaskawa AC Drive with the SI-P3 interface to a PROFINET network.

All Yaskawa documents may be downloaded from www.yaskawa.com.

Select PROFIdrive Profile

Right click on the SI-EP3 Memory map

Select Object Properties

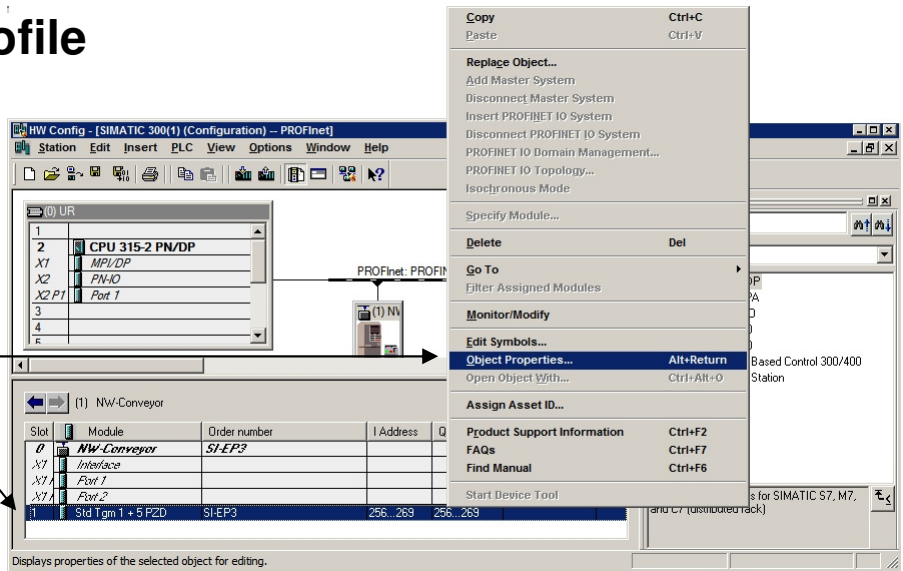


Figure 1 -- Select Edit Profinet Drive Parameters

Select Control Word Selection

Select either Yaskawa or PROFIdrive for Control & Status Word types

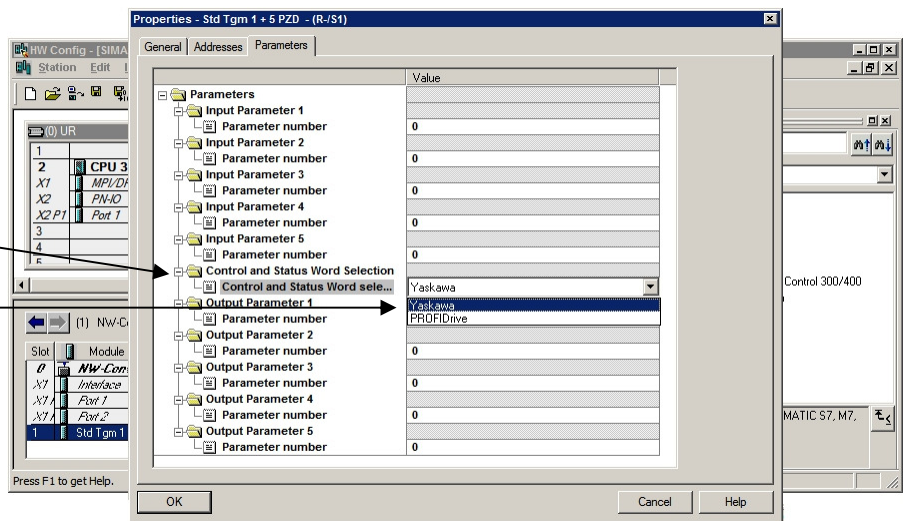


Figure 2 -- Select PROFIdrive or Yaskawa Control & Status Words

Required & Optional Properties

Telegram(s)

Header

Table 1 -- PPO Header Produce				
Name	Bits	Description		
PKE	0 ~ 10	PNU (See Parameters below)		
	11	0		
	12 ~ 15	Task ID (See Task ID below)		
IND	Bits	F6-33 = 0	Bits	F6-33 = 1
	0 ~ 7	Parameter Sub-Index Byte	0 ~ 15	Parameter Sub-Index Word
	8 ~ 15	Reserved		
PWE	0 ~ 31	Parameter Write Data		

Table 2 -- PPO Header Consume				
Name	Bits	Description		
PKE	0 ~ 10	PNU (See Parameters below)		
	11	0		
	12 ~ 15	Response ID (See Response ID below)		
IND	Bits	F6-33 = 0	Bits	F6-33 = 1
	0 ~ 7	Parameter Sub-Index Byte	0 ~ 15	Parameter Sub-Index Word
	8 ~ 15	Reserved		
PWE	0 ~ 31	Parameter Read Data		

PPO 1

Table 3 -- Standard Telegram 1 Produce (Required)	
Definition	
STW	Control Word
NSOLL_A	Frequency Reference

Table 4 -- Standard Telegram 1 Consume (Required)	
Definition	
ZSW	Status Word
NIST_A	Output Frequency (U1-02 w/o Feedback or U1-05 w/ Feedback)

PPO 2

Table 5 -- Standard Telegram 1 w/ 5 PZD Produce (Optional)	
Definition	
STW	Control Word
NSOLL_A	Frequency Reference
PZD 1	Configurable – F7-33 ¹
PZD 2	Configurable – F7-34 ¹
PZD 3	Configurable – F7-35 ¹
PZD 4	Configurable – F7-36 ¹
PZD 5	Configurable – F7-37 ¹

Table 6 -- Standard Telegram 1 w/ 5 PZD Consume (Optional)	
Definition	
ZSW	Status Word
NIST_A	Output Frequency (U1-02 w/o Feedback or U1-05 w/ Feedback)
PZD 1	Configurable – F7-23 ¹
PZD 2	Configurable – F7-24 ¹
PZD 3	Configurable – F7-25 ¹
PZD 4	Configurable – F7-26 ¹
PZD 5	Configurable – F7-27 ¹

1 Value other than zero supersedes default value

20 Word Telegram

Table 7 – 20 Word Telegram Produce (Optional)	
Word	Definition
0	STW Control Word
1	NSOLL_A Frequency Reference
2	Torque Reference
3	Torque Compensation
4	Reserved
5	Reserved
6	Analog Output 1 (AM)
7	Analog Output 2 (FM)
8	Digital Outputs
9	Reserved
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	Reserved
15	Configurable – F7-33 ¹
16	Configurable – F7-34 ¹
17	Configurable – F7-35 ¹
18	Configurable – F7-36 ¹
19	Configurable – F7-37 ¹

1 Value other than zero supersedes default value

Table 8 – 20 Word Telegram Consume (Optional)		
Word	Definition	
0	ZSW	Status Word
1	NIST_A	Output Frequency (U1-02 w/o Feedback or U1-05 w/ Feedback)
2	Torque Reference	U1-09
3	PG Count	
4	Motor Speed	U1-05
5	Frequency Reference	U1-01
6	Output Current	U1-03
7	Analog Input 1	U1-13
8	DC Bus Voltage	U1-07
9	Fault Code	U2-01
10	Alarm Code	
11	Output Power	U1-08
12	Analog Input 2	U1-14
13	Digital Inputs	U1-10
14	Analog Input 3	U1-15
15	Configurable – F7-23 ¹	
16	Configurable – F7-24 ¹	
17	Configurable – F7-25 ¹	
18	Configurable – F7-26 ¹	
19	Configurable – F7-27 ¹	

1 Value other than zero supersedes default value

Control Word

Table 9 -- Control Word			
Bit(s)	Name	Value	Description
0	OFF 1	0	Emergency OFF
		1	Ready to Operate
1	OFF 2	0	Emergency OFF
		1	Continue Operation
2	OFF 3	0	Emergency Stop
		1	Continue Operation
3	OPERATION_ENABLE	0	OPERATION INHIBIT
		1	OPERATION ENABLE
4	RAMP_OUT_ZERO	0	Stop (programmed stop type)
		1	Run
5	RAMP_HOLD	0	Halt Ramping (Freeze Ramp)
		1	Normal Operation
6	RAMP_IN_ZERO	0	Force Ramp Function to Zero
		1	Normal Operation
7	RESET	0	Normal Operation
		0→1	0 to 1 Transition Resets
8	INCHING_1	0	Stop
		1	Jog FWD
9	INCHING_2	0	Stop
		1	Jog REV
10	REMOTE	0	Local Control
		1	Remote Control (PROFIBUS-DP)
11	Reserved		
12			
13			
14			
15			

Status Word

Table 10 -- Status Word			
Bit(s)	Name	Value	Description
0	RDY_ON	0	Not Ready
		1	Ready to Switch ON
1	RDY_RUN	0	OFF 1 ON
		1	Ready to Operate
2	RDY_REF	0	OPERATION INHIBIT
		1	OPERATION ENABLE
3	TRIPPED	0	No Fault
		1	Fault
4	OFF2_STA	0	OFF 2 Active
		1	OFF 2 Inactive
5	OFF3_STA	0	OFF 3 Active
		1	OFF 3 Inactive
6	SWC_ON_INHIB	0	SWITCH-ON INHIBIT INACTIVE
		1	SWITCH-ON INHIBIT ACTIVE
7	ALARM	0	No Alarm
		1	Alarm
8	AT_SETPOINT	0	Not at Set Point
		1	At Set Point
9	REMOTE	0	Local Control
		1	Remote Control (PROFINET)
10	Reserved		
11			
12			
13			
14			
15			

Task ID

Table 11 -- Task ID	
ID	Description
0	No Action
1	Read Parameter Value
2	Write Parameter Value (WORD)
3	Write Parameter Value (DBL WORD)
4	Reserved
5	Reserved
6	Read Parameter Value From Array
7	Write Parameter Value in Array (WORD)
8	Write Parameter Value in Array (DBL WORD)
9	Read Number of Array Elements

Response ID

Table 12 -- Response ID	
ID	Description
0	No Action
1	Transfer Parameter Value (WORD)
2	Transfer Parameter Value (DBL WORD)
3	Transfer Parameter Array Value
4	Transfer Parameter Array Value (WORD)
5	Transfer Parameter Array Value (DBL WORD)
6	Transfer Number of Array Elements
7	Task Error

Parameters

Table 13 -- Parameter(s) (Required)		
PNU	R/W	Function
922	R	Telegram selection
944	R	Fault message counter
947	R	Fault number (Same as U1-01)
964	R	Drive unit identification 0: Manufacturer 1: Device Type 2: Version 3: Firmware Date (yyyy) 4: Firmware Date (dd/mm)
965	R	Profile ID (0x0318 – Profile 3 v4.0)
967	R	Control word ¹
968	R	Status word ¹
975		

Table 14 -- Parameter(s) (Optional)			
PNU	R/W	Function	
971	R/W	Reset	0→1 Positive transition is Reset SI-EP3
			0 Normal
977	R/W	Save to NVRAM	0→1 Positive transition is Save to NVRAM
			0 Normal
61000	R	Station Name	
61001	R	Station IP address	
61001	R	Station MAC	
61003	R	Station Gateway	
61004	R	Station Subnet Mask	

1 Dependant on the parameter selection at configuration. Refer to Figures 1 & 2 above.

