YASKAWA
The Drive for Quality™

Subject: Application Note	Product: SI-P3 and SI-P3/V	Doc#: AN.AFD.25
Title: SI-P3 & SI-P3/V Conformance to PROFIdrive		

Application Note

SI-P3 & SI-P3/V conformance to PROFIdrive

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Introduction

PROFIdrive is a standardized method, within the Profibus-DP 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-P3 and SI-P3/V communication options conform to portions of PROFIdrive. The SI-P3 and SI-P3/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-P3 series PROFIBUS-DP interface.

Drive parameter F6-32 must be set to 0 (PPO type) to enable communications listed below.

Refer to ***Yaskawa AC Drive 1000-Series PROFIBUS-DP Technical Manual***, (SIEP C730600 42) or (SIEP C730600 23) for additional information on the SI-P3 series.

Refer to ***Adding SI-P3 to PROFINET Using Siemens Step 7 Software***, (AN.AFD.27) 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.

Required & Optional Properties

Telegram Header(s)

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		

Telegram(s)

PPO 1

Table 3 -- Standard Telegram 1 Produce (Required)	
Definition	
PKE	Telegram Header
IND	
PWE	
STW	Control Word[1]
HSW	Frequency Reference

Table 4 -- Standard Telegram 1 Consume (Required)	
Definition	
PKE	Telegram Header
IND	
PWE	
ZSW	Status Word[2]
HIW	Actual Frequency[3]

PPO 2

Table 5 -- Standard Telegram 1 w/ 4 PZD Produce (Optional)	
Definition	
PKE	Telegram Header
IND	
PWE	
STW	Control Word[1]
HSW	Frequency Reference
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	

Table 6 -- Standard Telegram 1 w/ 4 PZD Consume (Optional)	
Definition	
PKE	Telegram Header
IND	
PWE	
ZSW	Status Word[2]
HIW	Actual Frequency[3]
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	

PPO 3

Table 7 -- Standard Telegram 1 Produce (Optional)	
Definition	
STW	Control Word[1]
HSW	Frequency Reference

Table 8 -- Standard Telegram 1 Consume (Optional)	
Definition	
ZSW	Status Word[2]
HIW	Actual Frequency[3]

PPO 4

Table 9 -- Standard Telegram 1 w/ 4 PZD Produce (Optional)	
Definition	
STW	Control Word[1]
HSW	Frequency Reference
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	

Table 10 -- Standard Telegram 1 w/ 4 PZD Consume (Optional)	
Definition	
ZSW	Status Word[2]
HIW	Actual Frequency[3]
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	

PPO 5

Table 11 -- Standard Telegram 1 w/ 8 PZD Produce (Optional)	
Definition	
PKE	Telegram Header
IND	
PWE	
STW	Control Word[1]
HSW	Frequency Reference
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	
PZD 7[4]	
PZD 8[4]	
PZD 9[4]	
PZD 10[4]	

Table 12 -- Standard Telegram 1 w/ 8 PZD Consume (Optional)	
Definition	
PKE	Telegram Header
IND	
PWE	
ZSW	Status Word[2]
HIW	Actual Frequency[3]
PZD 3[4]	
PZD 4[4]	
PZD 5[4]	
PZD 6[4]	
PZD 7[4]	
PZD 8[4]	
PZD 9[4]	
PZD 10[4]	

[1] See **Control Word** Below

[2] See **Status Word** Below

[3] Output Frequency (U1-02) w/o Feedback, Motor Speed (U1-05) w/ Feedback

[4] Configurable – See PNU 915 & PNU 916 Descriptions
Refer to the ***Yaskawa AC Drive PROFIBUS-DP 1000 Series Option PROFIBUS-DP Technical Manu***al (SIEP C730600 42) or (SIEP C730600 23) for information on PNU implementation

Control Word

Table 13 -- Control Word			
Bit(s)	**Name**	**Value**	**Description**
0	OFF 1	Reserved	
1	OFF 2	Reserved	
2	OFF 3	Reserved	
3	OPERATION_ENABLE	0	Stop & Baseblock
		1	Not Baseblock
4	RAMP_OUT_ZERO	0	Stop
		1	Run
5	Ramp Function	Reserved	
6	Ramp Enable	Reserved	
7	RESET	0	
		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 14 -- Status Word			
Bit(s)	**Name**	**Value**	**Description**
0	RDY_ON	Reserved (Always 1)	
1	RDY_RUN	Reserved (Always 1)	
2	RDY_REF	0	Not Ready
		1	Ready
3	TRIPPED	0	No Fault
		1	Fault
4	OFF2_STA	Reserved (Always 1)	
5	OFF3_STA	Reserved (Always 1)	
6	SWC_ON_INHIB	Reserved (Always 0)	
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 (PROFIBUS-DP)
10	Reserved		
11			
12			
13			
14			
15			

Task ID

Table 15 -- 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 16 -- 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 17 -- Parameter(s) (Required)			
PNU	**R/W**	**Function**	
947	R	Fault Number	
948	R	Elapsed Time at Fault	
964	R	Device Identification	Values (decimal)
		0: Manufacturer	273
		1: Device Type	1
		2: Version	0
		3: Firmware Data (yyyy)	2007
		4: Firmware Date (dd/mm)	0220
		5: Number of Drive Objects	1
965	R	Profile Code (0x0302)	

Table 18 -- Parameter(s) (Optional)		
PNU	**R/W**	**Function**
900	W	PPOI 1
901	W	PPO 2
902	W	PPO 3 (DP V1 Only)
903	W	PPO 4 (DP V1 Only)
904	W	Current PPO
905	W	PPO 5
907	R	PPOI 1
908	R	PPO 2
909	R	PPO 3 (DP V1 Only)
910	R	PPO 4 (DP V1 Only)
911	R	Current PPO
912	R	PPO 5
915[1]	R/W	Assign MODBUS Write Command to PZD in PPO Write
916[1]	R/W	Assign MODBUS Response to PZD in PPO Read
918	R	Node Address
963	R	Baud Rate
967	R/W	V2 Control Word
968	R	V2 Status Word
971	R/W	1 to 1 Transition Saves to NVRAM

[1] Refer to the ***Yaskawa AC Drive PROFIBUS-DP 1000 Series Option PROFIBUS-DP Technical Manu***al (SIEP C730600 42) or (SIEP C730600 23) for information on PNU implementation

Notes