

# YASKAWA Drive PROFINET Function Block for Use in TIA Portal User Instructions

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual. This Page Intentionally Blank

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## PROFINET Function Block For Use in TIA Portal

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## **1** Document Overview

This document shows the steps to successfully integrate Yaskawa drives into TIA Portal. Additionally, it shows the steps required to quickly and easily integrate it into the PLC logic.

#### Library Overview

The Yaskawa VFD PROFINET Library allows you to integrate Yaskawa drives controlled over PROFINET into TIA Portal projects quickly and easily.

The library has function blocks that are designed to let you easily interface with the drive to decrease development time.

The library supports S7-1200 and S7-1500 controllers. There are separate libraries for 4 different versions of TIA Portal: V15\_1, V16, V17 & V18.

Note: These instructions assume that you have already created a TIA Portal project and you have already added a PLC controller to the project.

## 2 Library Contents

This library contains 9 different function blocks. There are blocks for the SI-EP3 PROFINET Option card for and for the JOHB-SMP3 Multi-Protocol Ethernet Option card. Some function blocks are only available for use on the JOHB-SMP3.

Eurotion Block	Eurotian Block Name	Drive Object Module (Telegram)	Availability		
FUNCTION BLOCK	Function Block Name	Configured in PLC	SI-EP3	JOHB-SMP3	
Standard	fbVFD_Yaskawa_Standard	Std Tgm 1	Yes	Yes	
Standard + 5 Configurable	fbVFD_Yaskawa_Standard + 5 PZD	Std gm 1 + 5 PZD	Yes	Yes	
Standard + 10 Configurable	fbVFD_Yaskawa_Standard + 10 PZD	Std Tgm 1 + 10 PZD	-	Yes	
P-Drive	fbVFD_Yaskawa_PROFIDrive	Std Tgm 1	Yes	Yes	
P-Drive + 5 Configurable	fbVFD_Yaskawa_PROFIDrive + 5 PZD	Std Tgm 1 + 5	Yes	Yes	
P-Drive + 10 Configurable	fbVFD_Yaskawa_PROFIDrive + 10 PZD	Std Tgm 1 + 10	-	Yes	
Gateway Master <1>	fbVFD_Yaskawa_Gateway_Master	Gateway + 10 PZD	_	Yes	
Gateway Slave <1>	fbVFD_Yaskawa_Gateway_Slave	-	-	Yes	
P-Drive Gateway Master <1>	fbVFD_Yaskawa_Gateway_Master_P- Drive	Gateway + 10 PZD	_	Yes	

<1> These function blocks will only operate correctly when you install a JOHB-SMP3 on a GA800, GA700, GA500, FP605 or HV600 drive. If you install a JOHB-SMP3 on a 1000-series drive, these function blocks will NOT operate correctly.

#### Yaskawa Standard Function Blocks

- The control word uses a simple Boolean Run Forward / Run Reverse interface. (For example: Fwd Run, Rev Run, and Fault Reset.)
- The status word uses simple Boolean status signals. (For example: Running, Ready, and Fault.)
- The frequency reference is unipolar, accepting positive values only (normally in units of 0.01 Hz).
- Can include 0, 5, or 10 configurable registers (PZDs) for additional cyclic information exchange.
- Set the Control/Status Configuration in the PLC parameters to **0: Yaskawa Specific**

#### Yaskawa P-Drive Function Blocks

- The control word (STW) is set up for PROFIDrive operation. (For example: Ready To Operate, Emergency Off, and Inhibit Operation.)
- The status word (ZSW) is set up for PROFIDrive operation. (For example: Ready To Switch On, Ready To Operate, and Fault.)
- The frequency reference is bi-polar.
- Can include 0, 5, or 10 configurable registers (PZDs) for additional cyclic information exchange.
- Set the Control/Status Configuration in the PLC parameters to 1: Yaskawa P-Drive

#### Standard Gateway Function Block (Gateway Master)

• Uses the gateway feature that lets you connect one drive (Master) to a PROFINET network and use a low-speed RS-485 connection to communicate with up to 4 additional (Slave) drives.



- The control word for the master drive uses a simple Boolean Run Forward / Run Reverse interface (For example: Fwd Run, Rev Run and Fault Reset). The status word (ZSW) is set up for PROFIDrive operation. (For example: Ready To Switch On, Ready To Operate, and Fault.)
- The status word uses simple Boolean status signals (For example: Running, Ready, and Fault.)
- All slave drives use a simple Boolean Run Forward / Run Reverse interface.
- Includes 10 configurable registers (PZDs) for additional cyclic information exchange with the Master Drive (only).
- Set the Control/Status Configuration in the PLC parameters to 0: Yaskawa Specific

#### P-Drive Gateway Function Block (Gateway Master)

• Uses the gateway feature that lets you connect one drive (Master) to a PROFINET network and use a low-speed RS-485 connection to communicate with up to 4 additional (Slave) drives.



- The control word (STW) is set up for PROFIDrive operation. (For example: Ready To Operate, Emergency Off, and Inhibit Operation.) The control word for the master drive uses a simple Boolean Run Forward/Run Reverse interface. (For example: Fwd Run, Rev Run, and Fault Reset.) The status word (ZSW) is set up for PROFIDrive operation (For example: Ready To Switch On, Ready To Operate, and Fault.)
- The status word (ZSW) is set up for PROFIDrive operation (For example: Ready To Switch On, Ready To Operate, and Fault.)
- The frequency reference is bi-polar.
- All slave drives use a simple Boolean Run Forward / Run Reverse interface.
- Includes 10 configurable registers (PZDs) for additional cyclic information exchange with the Master Drive (only).
- Set the Control/Status Configuration in the PLC parameters to 1: Yaskawa P-Drive

#### Gateway Slave Function Block

- Used with a Gateway Master Function Block (either Standard or P-Drive).
- One Gateway Slave Function block is necessary for each slave drive.
- The frequency reference is unipolar, accepting positive values only (usually in 0.01 Hz units).
- Simple Boolean Run Forward / Run Reverse interface.

IX I

## 3 Import the Library Into Your Project

- 1. Download the most recent version of the library from the Yaskawa website at <a href="https://www.yaskawa.com/products/drives/industrial-ac-drives/industrial-network-communication-protocols/profinet">https://www.yaskawa.com/products/drives/industrial-network-communication-protocols/profinet</a>.
- **Note:** Make sure that the library version that you download aligns with the version of Portal that you are using for development. Look under Help > Installed Software to verify your version.
- 2. On the right-hand side of Portal, select the Libraries tab and expand Global libraries.
- 3. Right-click in the blank space in the Global libraries tab, then select Retrieve library...

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	Long Functions						
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	> Info (Global libraries)						

- 4. After the file explorer opens, navigate to the location where you saved the downloaded library in Step 1.
- **Note:** If you cannot find your library in this file explorer, make sure that library version you downloaded matches the version of TIA Portal you are using.

Retrieve arch	ived global library					×
Look in:	Yaskawa Libra	aries	🖂 🧿 🤌 📂	<b>.</b>		
Quick access	Name 🌇 Yaskawa VFD	PROFINet V15_1.zal15_1	Date modified 4/8/2022 4:11 PM	Type Siemens TIA Portal V15_1 compressed library	Size 537 KB	
Desktop Libraries						
Unis PC						
Network	File name: Files of type:	Yaskawa VFD PROFINet V1 Archives for global libraries Open as read-only	5_1.zal15_1		~	Open Cancel
Network	Files of type:	Archives for global libraries	5_1.zal15_1		~	Cancel

**5.** After you select the archived library, the software will ask you where you want to save the uncompressed version of the library. Select a destination and click **OK**.

6. Make sure that the library is shown in the **Global libraries** tab to confirm that you have successfully added the library.

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Ull Buttons-and-Switches	
Long Functions	
Monitoring-and-control-objects	
L Documentation templates	
► S7-1200/1500	
Master copies	
Common data	
Languages & resources	
Info (Global libraries)	

7. Expand the Yaskawa library folder, then expand Types, then S7-1200 / 1500.

**8.** There are several different function blocks that can be used depending upon the telegram you want to use in your application:

Function Block	Standard	Drive Object Module (Telegram)	Availability		
FUNCTION BIOCK	Configured in PLC		SI-EP3	JOHB-SMP3	
Standard Telegram 1	fbVFD_Yaskawa_Standard	0: Yaskawa Standard	Vaa	Vaa	
(Std Tgm 1)	fbVFD_Yaskawa_PROFIDrive	1: Yaskawa P-Drive	Tes	res	
Standard Telegram 1	fbVFD_Yaskawa_Standard + 5 PZD	0: Yaskawa Standard			
+ 5 Configurable PZDs (Std Tgm 1 + 5 PZD)	fbVFD_Yaskawa_PROFIDrive + 5 PZD	1: Yaskawa P-Drive	Yes	Yes	
Standard Telegram 1	fbVFD_Yaskawa_Standard + 10 PZD	0: Yaskawa Standard			
+ 10 Configurable PZDs (Std Tgm 1 + 10)	fbVFD_Yaskawa_PROFIDrive + 10 PZD	1: Yaskawa P-Drive		Yes	
Gateway Master	fbVFD_Yaskawa_Gateway_Master	0: Yaskawa Standard			
Telegram + 10 Configurable PZDs	fbVFD_Yaskawa_Gateway_Master_P- Drive	1: Yaskawa P-Drive	-	Yes	
(Gateway + 10 PZD)	fbVFD_Yaskawa_Gateway_Slave	n/a			

Below shows how the function blocks are organized within TIA Portal:

▼ 🛄 Yaskawa
▼ 🔄 Types
<ul> <li>\$7-1200/1500</li> </ul>
fbVFD_Yaskawa_PROFIDrive
bVFD_Yaskawa_PROFIDrive + 5 PZD
fbVFD_Yaskawa_Standard
bVFD_Yaskawa_Standard + 5 PZD
<ul> <li>JOHB-SMP3(only)</li> </ul>
fbVFD_Yaskawa_Gateway_Master
fbVFD_Yaskawa_Gateway_Master_P-Drive
fbVFD_Yaskawa_Gateway_Slave
fbVFD_Yaskawa_PROFIDrive + 10 PZD
bVFD_Yaskawa_Standard + 10 PZD
Resources
Master copies
🕨 🙀 Common data
Languages & resources

**9.** Depending on the telegram you want to use in your application, drag the appropriate block from your global libraries to **Program blocks** in the left-hand side of Portal to import the library into your project.



## 4 Add the Drive to Your Hardware Configuration

 Download the appropriate GSD (.GSDML) file for the option card: JOHB-SMP3: Most installations will use: GSDML-V2.4-Yaskawa-JOHB-SMP3-20220222 https://www.yaskawa.com/MPE

SI-EP3: Most installations will use: GSDML-V2.3-Yaskawa-SIEP3-20150604

https://www.yaskawa.com/products/drives/industrial-ac-drives/industrial-network-communication-protocols/profinet

- 2. Select Options, then Manage General Station Description Files (GSD) to add the .GSDML file.
- **3.** Open the hardware configuration of your project in the Network View.
- **4.** Drag the applicable option card into your hardware configuration. (Examples shown below use the JOHB-SMP3, but the procedure is the same for the SI-EP3).

Pn	oject Edit View Insert Online Options	Tools Window Help	Totally Integrated Automation
	Project tree	Yaskawa(R13) > Devices & networks	Hardware catalog
	Devices	🚰 Topology view 🛛 🛔 Network view 🛛 🛐 Device view	Options 🖭
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		^	✓ Catalog
	Name		<search> MI MT 0</search>
	Yaskawa(R13)	PLC 1	Filter Profile: <all></all>
	Povicer & petrodyr	CPU 1212C	Controllers
svie		F K	▶ 🛅 HM
	Device configuration		PC systems
	Q Online & diagnostics	Num t	Drives & starters
	<ul> <li>Program blocks</li> </ul>	PN/IE_1	Image: Imag
	Add new block		Detecting & Monitoring
	🖀 Main [OB1]		Distributed I/O
	😴 fbVFD_Yaskawa_Standar		Power supply and distribution
	<ul> <li>\$7-1200/1500</li> </ul>		Field devices
	<		Other field devices
	✓ Reference projects		Additional Ethernet devices
	Vackaus/07)		CIENTENS AC
	(K/)		Vaskawa America, Inc
			▼ iii JOHB-SMP3
		Image: Second s	JOHB-SMP3 Profinet Option Card
		Properties	SI-EP3
			Image: Encoders
		General J Closs-references Compile	- Find Gateway
		Show all messages	Sensors
			PROFIBUS DP
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	ta Dataila view		
	Details view		
	Name		> Information
	Portal view  Overview	📥 Devices & ne	📑 💙 The project 'Yaskawa(R13)' was succes

- **5.** Drag the existing network onto the green square on the JOHB-SMP3 (DP-NORM) icon to add the drive to the appropriate PROFINET network.
- **Note:** Make sure to assign your drive to the correct PLC as its IO controller. In the figure below, the drive is assigned to PLC\_1 as indicated by the blue text.

PLC_1 CPU 1212C		JOHB-SMP3 JOHB-SMP3 Prof PLC_1	DP-NORM
	PN/IE_1		

**6.** Double-click on the drive to enter the Device view.

7. Navigate to your hardware catalog and expand Module > Drive Object. Select the telegram that you want to use for your application, then drag it into the first blank row on the Device overview tab. In most cases, this should align with the function block that you added to the project in Step 9 on page 11.

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ÿ.	Devices & networks	ÿ.	Port 2	0 0 X1 P2		-
å	▼ []] PLC_1 [CPU 1212C DC/DC/DC]		📔 Std Tgm 1 🥜	0 1	The Drive Object	101
	Device configuration				Gateway + 10 PZD	8
	Program blocks				IQ40 Profile	
	Add new block	DP-NORM	1		Std Tgm 1	ne
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		e		>	> Information	
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8. Specify whether you are using a Standard Yaskawa telegram or the PROFIDrive telegram. Click on the telegram that was just added in the Device overview window, then go to **Properties > General > Module Parameters** and select either "Yaskawa Standard" or "Yaskawa P-Drive" (PROFIDrive) in the drop-down list to complete adding the drive to your hardware configuration.

Project Edit View Insert Online Options	Tools Window Help	Co colino . Il								Totally Integrated Automat	tion
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Devices & networks     The PLC_1 [CPU 1212C DC/DC/DC]			Port	2 0	0 X1 P2	(0.71	(1. (7	Port 2	10110 (1100	▼ 🛄 Module	
Device configuration	P-NORM		Staligm I_	0		60/I	040/	sta igm i	JURB-SIMPS	Drive Object	9
Online & diagnostics										Gateway + 10 PZD	
Add new block		~								Std Tgm 1	ne
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fbVFD_Yaskawa_Standar	Std Tgm 1_1 [Std Tgm 1]				🖳 Pro	operties	<ul> <li>Info</li> </ul>	Diagnost	tics	Std Tgm 1 + 5 PZD	
► S7-1200/1500	General IO tags Sy	stem constan	ts Texts				_			1	5
K Reference projects	▼ General	Module na	arameters						~	-	8
Nereferice projects	Catalog information	Carta la							=		3
Yaskawa(R7)	Module parameters	Control	and Status Word Sele	ction							0
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Name		< =	- 1- 11						>	> Information	
Portal view     Overview	JOHB-SMP3								📑 < The pro	ject 'Yaskawa(R13)' was succes	

## 5 Connect the Drive to the PROFINET Network

- 1. Connect one of the RJ-45 ports on the option card to the PROFINET network.
  - In the **Project Tree**, expand **Online Access**, then find the network interface that is being used to connect the PC to the PLC and click **Update accessible devices**.



- 2. After the search is complete, click on the newly found drive and then select **Online & diagnostics.** If the option card does not yet have a station name assigned, it will show up as "accessible device" followed by the [MAC address].
- Note: Yaskawa PROFINET option cards will start with a MAC address of "00-20-B5"



**3.** Assign the drive a PROFINET device name.

Expand **Functions**, then click on **Assign name**. In the box labeled **PROFINET device name**, set / change the station name for the drive. Then click **Assign name**.

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3.2 Gen1 to Gigabit Ethernet Adapter + Accessible device [00-20-85-52-4C-74] + Accessible device [00-20-85-52-4C-74]	_ # = ×
Assign PROFINET device name	^
Imme       Configured PROFINET device         PROFINET device name:       yaskawa-ga800-drive1         Device type:       JOHB-SMP3	
Accessible devices in the network:	
IP address MAC address Device PROFINET device name Status	
B	Help       Image: Solution: Solution

4. Modify the hardware configuration to set the assigned IP address of the drive.

In the Devices & networks window, click on the Network view tab [1], then click on the drive [2].

Select the **Properties** tab [3], then select the **General** tab [4], then expand **PROFINET** interface [X1], and select **Ethernet** addresses [5]. Make sure that the **Set IP** address in the project radio button [6] is selected, and enter the IP address you assigned to the drive in Step 3.

In the PROFINET area underneath the IP address, uncheck **Generate PROFINET device name automatically** [7] and enter the PROFINET device name [8] you set in Step 3.



**5.** Recompile and download the updated hardware configuration to verify a successful connection. If successful, both "NS" and "MS" LEDs on the drive will be lit.

## 6 Add the Yaskawa Function Block to the Program

**1.** Drag the block from the Project tree into a rung of ladder to add an instance of the function block into the program.



**2.** After you drag the block into a rung, you will be prompted to declare the block as either single or multi-instance. Consider the existing architecture of your code before you make your selection.

When you declare the function block as single instance, it will create a global data block that will allow you to access the inputs and outputs of the function block anywhere in the program.

When you declare the function block as multi-instance, it can improve the organization of your code when you use many drives throughout the project.

- **3.** Choose a name for the instance memory, considering existing naming conventions. If no naming conventions already exist, consider the following:
  - Example Single Instance Name: dbIns\_Drive1
  - . Example Multi-Instance Name: #VFD\_Drive1

Call options	×
Single instance	Data block Name fbVFD_Yaskawa_Standard_DB Number  Manual Automatic If you call the function block as a single instance, the function
DB Multi instance	block saves its data in its own instance data block.
Parameter instance	more
	OK Cancel

## Link the Yaskawa Function Block to the Applicable Drive

#### Using S7-1200/1500 PLCs

The 1200/1500 version of the block interfaces with the drive using the hardware identifier number of the telegram.

1. To find the hardware identifier number for the telegram, navigate back to the Device view for the drive by double clicking on it from the Network view.

Click on the telegram in the **Device overview** tab and then click on **Properties > General > System Constants** to find the hardware identifier number.

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	Name ▼ _ Yaskawa(R13)	^	POR SURA		_		<b>**</b>	Module JOHB-SMP3 Interface	Rack O O	Slot 0 0 X1	I address	Q address	Type JOHB-SMP3 Profine JOHB-SMP3	Article no. JOHB-SMP3	
	Bevices & networks							Port 1	0	0 X1 P1			Port 1		_
	P.C. 1 [CPU 1212C DC/DC/DC]      Device configuration     Q. Online & diagnostics      Adnew block      Adnew block      Min [O81]      BN/FD_Yaskawa_Standard [F81]      BV/FD_Yaskawa_Standard [F81]      BV/FD_Yaskawa_Standard_D8 [D81]      Eschnology objects      GE External source files		<ul> <li>Std Tgm 1_1</li> </ul>	р-нолм ) i [Std Tgm 1]			<	Std Tgm 1_1	0	1	6871	6467	Std Tgm 1	JOHB-SMP3	> >
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	Name Address	JOHB-SMP	P3 🔹 fb∧	Jain_Driv									🔝 💙 The pr	oject 'Yaskawa(	(R13)

2. The TIA Portal automatically creates tags for all hardware identifier numbers. To locate the hardware identifier number for a drive, navigate to **Default Tag Table > System Constants**. Here, there will be a tag of datatype Hw\_SubModule that will have the "Drive name" + "~" + "Telegram name".

In our example it has the name is *JOHB-SMP3~Std\_Tgm\_1\_1*. Use CTRL + C to copy this entire tag name onto the clipboard for use later. Make sure that this number matches the number in Step 1.

Project tree         Image: Constant set of the system is a set of the system is	_ ₽ ■ X
Devices         Tags         User constants           Image         Default tag table         Comment           Name         Name         Data type         Value         Comment           Main [081]         1         2         JOHB-S/MP3-HODevice         Hw_Device         270           & Main [07b1]         3         3         3         JOHB-S/MP3-HoteFace         273         3           & More Stava_Standard [FB1]         33         34         JOHB-S/MP3-Interface Port_1         Hw_Interface         274            % More Stava_Standard_DB [D61]         34         33         34         ZiOHB-S/MP3-Interface Port_2         Hw_Interface         275	y System constants 
Default tag table           Name         Default tag table           Name         Data type         Value         Comment           Main [081]         All 5_JIDH5-JMP3-HODevice         Hw_Device         270           Main [070;	
Default tag table           Name         Data type         Value         Comment                • Main [081]             • Main [074]	^
Name         Data type         Value         Comment           Image: State of the st	^
Main [OB1]         And [OB1]         Image: Control [F82]	^
3         2         J OHB-SMP3-Interface         Hw_interface         273           3         2         J OHB-SMP3-Interface         Hw_interface         273           4         5         J OHB-SMP3-Interface-Port_1         Hw_interface         274           5         6         FVFD_Yaskawa_Standard (FB1)         34         Q J OHB-SMP3-Interface-Port_2         Hw_interface         275	
BVFD_Yaskawa_Standard [F81]         33         JUHB-SMP3-Interface-Port_1         Hw_Interface         274           BVFD_Yaskawa_Standard_DB [D81]         34         JUHB-SMP3-Interface-Port_2         Hw_Interface         275	
bVFD_Yaskawa_Standard_DB[DB1] 34 😓 JOHB-SMP3-Interface-Port_2 Hw_Interface 275	
▶ 🚡 \$7-1200/1500 35 🐷 JOHB-SMP3-Head Hw SubModule 276	
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a Show all tags	
💕 Add new tag table	=
📸 Default tag table [36]	
▶ PLC data types	
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Q Online backups	•
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Device proxy data	
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C General	-
► ] Yaskawa (R7)	
Name: JOHB-SMP3-Std_Tgm_1_1	
Data type: Hw SubModule	
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< Portal view 🗄 Overview 📩 JOHB-SMP3 🐲 fbMain_Driv 💥 Default tag t	The project 'Yaskawa(R13)

3. After you add the Yaskawa function block into your project, you must link the input hwIODriveTelgram to the tag located in the previous step.

Use CTRL + V to paste the tag name from the clipboard and press ENTER. To confirm the tag is correct, ensure that the green number above the tag matches the value in Step 1.

**Note:** The tag name needs to be in quotations to register as a tag and show the green number.



## 8 Example Block Usage

This section shows an example use case for the Yaskawa Standard telegram block.

In the example system, the drive takes start, stop, reset and speed setpoint commands from an HMI. The start and stop buttons originate from outside of the calling function block and are written to the local static variable #bRunForward, which is then an input to the Yaskawa function block.

This particular drive is only being commanded to run forward, so the bInReverseRun input is given a permanent "false".

The frequency reference fFrequencyRef (controlled from the HMI), is converted from a 0.00 - 60.00 real value to a 0 - 6000 integer value, which the function block sends to the drive. The outputs of the function block write drive status variables to a few local variables: #bDriveReady, #bDriveRunning and #bDriveFaulted

You can use these variables to monitor or control related logic elsewhere in the program. For example, in Network 1, the variable #bDriveFaulted is used to unlatch the forward Run command when the drive encounters a fault.

Additionally, since this block is declared as single instance, you can globally access its inputs and outputs. For example: "fbVFD\_Yaskawa\_Standard\_DB".bOutFault, "fbVFD\_Yaskawa\_Standard\_DB".bOutRunning, and "fbVFD\_Yaskawa\_Standard\_DB".bOutReady."



## 9 Gateway Program Example

The gateway function lets you connect one PROFINET option to a Master Drive and use the built-in RS-485 connection to connect that Master drive to a maximum of four Slave drives. The gateway function is available when you use a JOHB-SMP3 on a GA800, GA700, GA500, or FP605 drive. Refer to the drive Technical Manual for more information about how to set this up.



Some of the following steps are abbreviated; see the previous example in this document for details about where to find the various menus and other information.

PLC programming example for a Master and 4 Slave drives:

**1.** On the JOHB-SMP3 option card, use the Gateway + 10PZD drive object module from the hardware catalog.



2. Create logic to handle the Run commands for the master and 4 slave drives. In this example, the master and each of the slave drives have their own Run and Stop push buttons on an HMI. There is also an interlock for each drive that will remove the Run command if a particular drive has a fault.

<ul> <li>Network 1: Simple logic to start an</li> </ul>	nd stop the Master VFD based on push	buttons.
Comment		
*dbiHM*. bMasterFwdPushB utton 	"dbHM". bMasterStopPush Button	#bMasterRunFwd
#bMasterRunFwd ed		
<ul> <li>Network 2: Simple logic to start an Comment</li> </ul>	nd stop the Slave 1 VFD based on push	buttons.
*dbHM*. bSlaveTPxdPush8 utton	*dbHM*. bSlave1StopPush Button	#bSlave1RunFwd
#bSlave1RunFwd ed		
<ul> <li>Network 3: Simple logic to start an</li> </ul>	nd stop the Slave 2 VFD based on push	buttons.
"dbHA", bSlave2ProdhubB urdu "dbHA", bSlave2RunProd ed I	rábutar bSikopTush button	#bSlave2RunFvvd ( )
<ul> <li>Network 4: Simple logic to start an</li> </ul>	nd stop the Slave 3 VFD based on push	buttons.
Comment *dbHM*. bSlave3FwdPushB utton	"dbHMI". bSlave3StopPush Button	#bSlave38unFwd
"dbHM". bSlave3RunFvid #bSlave3RunFvid ed	<u>и</u>	( )
* Network 5: Simple logic to start an Comment	N	( )

**3.** Create logic to scale the frequency references for the master and all four slave drives. In this example, the frequency references come across from the HMI as a "real" values and are converted to the properly scaled "int" values used by the Yaskawa function blocks.



4. From the Yaskawa Function Block Library, drag the Yaskawa > Types > S7-1200/1500 > JOHB-SMP3(only) > fbVFD\_Yaskawa\_Gateway\_Master function block into the project. This function block will control only the master drive.

Set the hwlODriveTelegram to the value copied from the JOHB-SMP3 configuration (Device View > Gateway + 10 PZD\_1 > System Constants).

Set the value of wInNumOfSlaves to the number of slave drives in the project. For this example, this is set to the maximum value of 4.

Connect other signals as needed to the function block.



#### 9 Gateway Program Example

5. From the Yaskawa library, drag 4 of the Yaskawa > Types > S7-1200/1500 > JOHB-SMP3(only) > fbVFD\_Yaskawa\_Gateway\_Slave function blocks into the project. These function blocks will control each of the slave drives.

Set the **hwIODriveTelegram** to the SAME value as copied from the JOHB-SMP3 configuration (Device View > Gateway + 10 PZD\_1 > System Constants).

Set the value of **winSlaveNumber** for each of the 4 slave drives.

Connect other signals as necessary.



## **10 Monitor Drive Information**

Often it will be useful to monitor the data the drive is exchanging with the PLC for troubleshooting and commissioning. There two primary ways of accomplishing this:

- 1. Monitoring the instance data of the block
- 2. Monitoring and changing variables from a watch table

To monitor the instance data of the block:

- 1. Locate and open the instance data block for the function block controller the drive.
- **2.** Click **Monitor all** to view the online information.
- 3. View the live information in the Monitor value column.
- 4. To modify the values (for example, wInFrequencyRef or bInForwardRun), double-click on the value in the Monitor value column.

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× 50 57.1200/1500	-	10 00 0	binDib	Bool	false	EALCE							Command Dio	🕨 💷 Ene	ergy Suite		11
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Technology objects		21	wOutFraguatory	Ward	16#0	16#0000							Current output frequency		\$7-300		- 11
Energy objects		22	hOutPeady	Rool	falza	FALSE							VED is in ready state		▼ 1 S7-1200/150	00	
External source files		23 .00	bOutRunning	Bool	falza	FALSE							Running in forward direction		to VFD_Y	askawa_PROF	G 🗌
PLC tags		24 -	bOutReverse	Bool	false	FALSE		Ĩ	Ĩ	Ĩ			Running in reverse direction		fbVFD_Yr	askawa_PROF	G 🛛
PLC data types		25 -00	bOutFault	Bool	false	FALSE		Ĩ	Ĩ	Ĩ			Fault signal is active		fbVFD_Yr	askawa_Stan	5
Watch and force tables		26 -00 -	bOutAlarm	Bool	false	FALSE		Ĩ	Ĩ	Ĩ			Alarm signal is active		fbVFD_Yr	askawa_Stan	5
Online backups		27 -00	bOutZeroSpeed	Bool	false	FALSE			Ĩ	Ĩ			At zero speed		Resource	5	- 11
Traces		28 -00 •	bOutAtSpeed	Bool	false	FALSE		<b>P</b>		Ø			At setpoint speed	- • 💷	Master copies		- 11
OPC UA communication		29 -00 •	bOutResetActive	Bool	false	FALSE		<b>P</b>		Ø			Reset signal is active	- • st	Common data		- 11
Device proxy data		30 -00 •	bOutNetReference	Bool	false	FALSE		<b>P</b>	<b>P</b>	Ø			Frequency setpoint from PROFINet	- • 📧	Languages & reso	urces	- 11
Program info		31 -00 =	bOutNetControl	Bool	false	FALSE							VFD is being controlled from PROFINet comman				- 11
PLC supervisions & alarms		32 📲 🗉	bOutZeroServo	Bool	false	FALSE		Image: A start and a start		Image: A start and a start							
PLC alarm text lists		33 📲 🔹	bOutOPEFault	Bool	false	FALSE		Image: A start and a start	<b>V</b>								- 11
Online card data		34 📲 🗉	bOutDuringUV	Bool	false	FALSE		Image: A start and a start	<b>v</b>	Image: A start and a start							
🕨 📔 Local modules 🗹		35 📲 🗉	bOut2ndMotor	Bool	false	FALSE		<b>V</b>	Image: A start and a start	<b>V</b>							- 11
Ungrouped devices		36 📲	InOut														- 11
Security settings		37 📲	Static														18
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Languages & resources																	- 11
Online access	~																
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To monitor and change variables from a watch table:

- **1.** In the project tree, navigate to Watch and force tables.
- **2.** Add a new watch table.
- **3.** Add the instance data variables that you want to monitor to the watch table.

#### **10 Monitor Drive Information**

**4.** Click the monitor all icon (shown in the figure below with the glasses) to view the live values in the "Monitor value" column.

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Add new device	2					<ul> <li>Project library</li> </ul>	
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PLC_1 [CPU 1511-1 PN]	<b>2 0 4</b>					Add new type	
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g Program blocks	• •					<ul> <li>\$7-1200/1500</li> </ul>	
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- Main_1 [UB1]	2					🖏 V 0.0.8	
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	<				>	BVFD Yaskawa Standard + 5 PZD	
tails view			Reporties	Linfo Diac	nostics	> Info (Project library)	
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**5.** To easily add all the instance data to the watch table, click the bottom-right corner of a single item and drag it toward the bottom of the screen.

ct tree	🛛 🖣 Proje	act1 > PLC 1 (CPU 1511-1 PN) > Watch	and force tables	Watch table 1		_ # <b>#</b> >	Libraries	
vices							Ontions	
	🔲 🔂 🥩 :	* * * * * * * * * *					til Library view	
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T Device configuration	5		11				Add new type	
Q Online & diagnostics	6		V				<ul> <li>Yaskawa VPD Library</li> </ul>	
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fbMaster (FB5)	0 10							
fbVFD_Yaskawa_Standard (FB4)	0 11						BVPD_Taskawa_PROPIDINE + 5 P2D	
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dbins_Motor1 (DB1)	9 13						DVPD_Taskawa_standard + 5 r2D	
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System blocks	16							
Technology objects	17							
Energy objects	18							
External source files	19							
PLC tags	20							
PLC data types	21							
<ul> <li>Watch and force tables</li> </ul>	22							
Add new watch table	23							
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OPC UA communication	28						Buttons-and-Switches	
🖳 Device proxy data	29						Drive_Lib_\$7_1200_1500	
Program info	30						Drive_Lib_\$7_300_400	
🕞 PLC supervisions & alarms	31						Energy Suite	
PLC alarm text lists	32						Long Functions	
Online card data	33						Monitoring-and-control-objects	
Local modules	✓ 34		<add new=""></add>				Documentation templates	
Ungrouped devices							<ul> <li>Yaskawa VFD PROFINet V15</li> </ul>	
Security settings							<ul> <li>Types</li> </ul>	
Common data							Yaskawa VFD Library	
Documentation settings							57:300	
Languages & resources							<ul> <li>57-1200/1500</li> </ul>	
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Card Reader/USB memory				and the second second			bvFD_Yaskawa_PROFIDrive + 5 PZD	
			2 ro	ws will be added.			fbVFD_Yaskawa_Standard	
							fbVFD_Yaskawa_Standard + 5 PZD	
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rtal view 😳 Querview	PIC 1 20	fhAdartar (EBS) 👘 feBitrToWor 👘 feBV	Standar felliordi	with the distance of the second se	uno verte III Mate	h table 1		

6. To modify the values (for example, wInFrequencyRef or bInForwardRun), enter the desired value in the **Modify** value column. Click the **Modify all selected values once and now** button (the button with a lightning bolt with an "!" next to it).

## 11 Detailed Block Tables

#### S7-1200/1500 Blocks

#### fbVFD\_Yaskawa\_Standard

Input Variables	Туре	Description
wInFrequencyRef	Word	Setpoint frequency (0-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInForwardRun	Bool	Command forward run
bInReverseRun	Bool	Command reverse run
bInFaultReset	Bool	Command fault reset
bInFaultEF0	Bool	Command EF0 Drive Fault
bInDI1	Bool	Command DI1
bInDI2	Bool	Command DI2
bInDI3	Bool	Command DI3
bInDI4	Bool	Command DI4
bInDI5	Bool	Command DI5
bInDI6	Bool	Command DI6
bInDI7	Bool	Command DI7
bInDI8	Bool	Command DI8
bInDI9	Bool	Command DI9
bInDI10	Bool	Command DI10
bInDI11	Bool	Command DI11
bInDI12	Bool	Command DI12
Output Variables	Туре	Description
wOutFrequency	Word	Current output frequency
bOutReady	Bool	Drive is in ready state
bOutRunning	Bool	Running in forward direction
bOutReverse	Bool	Running in reverse direction
bOutFault	Bool	Fault signal is active
bOutAlarm	Bool	Alarm signal is active
bOutZeroSpeed	Bool	At zero speed
bOutAtSpeed	Bool	At setpoint speed
bOutResetActive	Bool	Reset signal is active
bOutNetReference	Bool	Frequency setpoint from PROFINET
bOutNetControl	Bool	Drive is being controlled from PROFINET commands.
10.77	D 1	

# bOutZeroServoBoolZero Servo completedbOutOPEFaultBooloPE (Parameter Setting) FaultbOutDuringUVBoolDrive in Undervoltage ConditionbOut2ndMotorBool2nd Motor Selected

#### ■ fbVFD\_Yaskawa\_Standard + 5 PZD

Input Variables	Туре	Description
wInFrequencyRef	Word	Setpoint frequency (0-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInForwardRun	Bool	Command forward run
bInReverseRun	Bool	Command reverse run
bInFaultReset	Bool	Command fault reset
bInFaultEF0	Bool	Command EF0 Drive Fault
bInDI1	Bool	Command DI1

#### **11 Detailed Block Tables**

Input Variables	Туре	Description
bInDI2	Bool	Command DI2
bInDI3	Bool	Command DI3
bInDI4	Bool	Command DI4
bInDI5	Bool	Command DI5
bInDI6	Bool	Command DI6
bInDI7	Bool	Command DI7
bInDI8	Bool	Command DI8
bInDI9	Bool	Command DI9
bInDI10	Bool	Command DI10
bInDI11	Bool	Command DI11
bInDI12	Bool	Command DI12
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
InCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
Output Variables	Туре	Description
wOutFragueney	337 1	
wOurrequency	Word	Current output frequency
bOutReady	Bool	Drive is in ready state
bOutReady bOutRunning	Word       Bool       Bool	Current output frequency         Drive is in ready state         Running in forward direction
bOutReady bOutRunning bOutReverse	Bool Bool Bool	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction
bOutReady bOutRunning bOutReverse bOutFault	Word       Bool       Bool       Bool       Bool	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active
bOutReady bOutRunning bOutReverse bOutFault bOutAlarm	Word       Bool       Bool       Bool       Bool       Bool       Bool	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active
bOutReady bOutRunning bOutReverse bOutFault bOutAlarm bOutZeroSpeed	Word       Bool       Bool       Bool       Bool       Bool       Bool       Bool	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed
bOutReady bOutRunning bOutReverse bOutFault bOutAlarm bOutZeroSpeed bOutAtSpeed	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed         At setpoint speed
bOutReady bOutRunning bOutReverse bOutFault bOutAlarm bOutZeroSpeed bOutAtSpeed bOutAtSpeed	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active
bOutReady bOutRunning bOutReverse bOutFault bOutAlarm bOutZeroSpeed bOutAtSpeed bOutAtSpeed bOutResetActive bOutNetReference	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET
bOutReady bOutRunning bOutReverse bOutReverse bOutFault bOutAlarm bOutZeroSpeed bOutAtSpeed bOutAtSpeed bOutResetActive bOutNetReference bOutNetControl	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutResetActive         bOutNetReference         bOutNetControl         bOutZeroServo	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutResetActive         bOutNetReference         bOutZeroServo         bOutZeroServo	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutResetActive         bOutNetReference         bOutZeroServo         bOutZeroServo         bOutZeroServo         bOutOPEFault         bOutDuringUV	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutNetReference         bOutNetControl         bOutZeroServo         bOutOPEFault         bOutDuringUV         bOut2ndMotor	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition         2nd Motor Selected
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutResetActive         bOutNetControl         bOutZeroServo         bOutOPEFault         bOutDuringUV         bOut2ndMotor         iOutMonPZD1	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition         2nd Motor Selected         Drive to PLC Parameter 1 Received Value
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutResetActive         bOutNetReference         bOutZeroServo         bOutOPEFault         bOutDuringUV         bOutDuringUV         bOutAlor         iOutMonPZD1         iOutMonPZD2	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition         2nd Motor Selected         Drive to PLC Parameter 1 Received Value         Drive to PLC Parameter 2 Received Value
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutNetReference         bOutZeroServo         bOutOPEFault         bOutDuringUV         bOut2ndMotor         iOutMonPZD1         iOutMonPZD3	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition         2nd Motor Selected         Drive to PLC Parameter 1 Received Value         Drive to PLC Parameter 2 Received Value         Drive to PLC Parameter 3 Received Value
bOutRequency         bOutReady         bOutRunning         bOutReverse         bOutFault         bOutAlarm         bOutZeroSpeed         bOutAtSpeed         bOutResetActive         bOutNetReference         bOutOPEFault         bOutOPEFault         bOutDuringUV         bOutMonPZD1         iOutMonPZD3         iOutMonPZD4	Word Bool Bool Bool Bool Bool Bool Bool Boo	Current output frequency         Drive is in ready state         Running in forward direction         Running in reverse direction         Fault signal is active         Alarm signal is active         Alarm signal is active         At zero speed         At setpoint speed         Reset signal is active         Frequency setpoint from PROFINET         Drive is being controlled from PROFINET commands.         Zero Servo Completed         oPE (Parameter Setting) Fault         Drive in Undervoltage Condition         2nd Motor Selected         Drive to PLC Parameter 1 Received Value         Drive to PLC Parameter 3 Received Value         Drive to PLC Parameter 4 Received Value

## ■ fbVFD\_Yaskawa\_Standard + 10PZD

Input Variables	Туре	Description
wInFrequencyRef	Word	Setpoint frequency (0-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInForwardRun	Bool	Command forward run
bInReverseRun	Bool	Command reverse run
bInFaultReset	Bool	Command fault reset
bInFaultEF0	Bool	Command EF0 Drive Fault
bInDI1	Bool	Command DI1
bInDI2	Bool	Command DI2
bInDI3	Bool	Command DI3
bInDI4	Bool	Command DI4

Input Variables	Туре	Description
bInDI5	Bool	Command DI5
bInDI6	Bool	Command DI6
bInDI7	Bool	Command DI7
bInDI8	Bool	Command DI8
bInDI9	Bool	Command DI9
bInDI10	Bool	Command DI10
bInDI11	Bool	Command DI11
bInDI12	Bool	Command DI12
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
InCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
iInCmdPZD6	Int	PLC to Drive Parameter 6 Command Value
InCmdPZD7	Int	PLC to Drive Parameter 7 Command Value
iInCmdPZD8	Int	PLC to Drive Parameter 8 Command Value
iInCmdPZD9	Int	PLC to Drive Parameter 9 Command Value
iInCmdPZD10	Int	PLC to Drive Parameter 10 Command Value
Output Variables	Туре	Description
wOutFrequency	Word	Current output frequency
bOutReady	Bool	Drive is in ready state
bOutRunning	Bool	Running in forward direction
bOutReverse	Bool	Running in reverse direction
bOutFault	Bool	Fault signal is active
bOutAlarm	Bool	Alarm signal is active
bOutZeroSpeed	Bool	At zero speed
bOutAtSpeed	Bool	At setpoint speed
bOutResetActive	Bool	Reset signal is active
bOutNetReference	Bool	Frequency setpoint from PROFINET
bOutNetControl	Bool	Drive is being controlled from PROFINET commands.
bOutZeroServo	Bool	Zero Servo Completed
bOutOPEFault	Bool	oPE (Parameter Setting) Fault
bOutDuringUV	Bool	Drive in Undervoltage Condition
bOut2ndMotor	Bool	2nd Motor Selected
iOutMonPZD1	Int	Drive to PLC Parameter 1 Received Value
iOutMonPZD2	Int	Drive to PLC Parameter 2 Received Value
iOutMonPZD3	Int	Drive to PLC Parameter 3 Received Value
iOutMonPZD4	Int	Drive to PLC Parameter 4 Received Value
iOutMonPZD5	Int	Drive to PLC Parameter 5 Received Value
iOutMonPZD6	Int	Drive to PLC Parameter 6 Received Value
iOutMonPZD7	Int	Drive to PLC Parameter 7 Received Value
iOutMonPZD8	Int	Drive to PLC Parameter 8 Received Value
iOutMonPZD9	Int	Drive to PLC Parameter 9 Received Value
iOutMonPZD10	Int	Drive to PLC Parameter 10 Received Value
	1	

#### ■ fbVFD\_Yaskawa\_PROFIDrive

Input Variables	Туре	Description
iInFrequencySetPoint	Int	Setpoint frequency (-6000-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInOnOff1	Bool	Proceed to ready operate

#### **11 Detailed Block Tables**

Input Variables	Туре	Description
bInOff2	Bool	Continue operation (OFF2 inactive)
bInOff3	Bool	Continue operation (OFF3 inactive)
bInOperationEnable	Bool	Proceed to ENABLE OPERATION
bInRampOutZero	Bool	Normal operation (Stop inactive)
bInRampHold	Bool	Normal operation (Force ramp function generator inactive)
bInRampInZero	Bool	Normal operation (Force ramp function generator inactive)
bInReset	Bool	Reset signal enable
bInRemoteCMD	Bool	Network control enabled
Output Variables	Туре	Description
iOutFrequency	Int	Drive current output frequency
bOutRdyOn	Bool	ZSW, Bit 0: Ready to switch on
bOutRdyRun	Bool	ZSW, Bit 1: Ready to operate
bOutRdyRef	Bool	ZSW, Bit 2: Enable operation
bOutFault	Bool	ZSW, Bit 3: Fault present
bOutOff2STA	Bool	ZSW, Bit 4: OFF2 inactive
bOutOff3STA	Bool	ZSW, Bit 5: OFF3 inactive
bOutSwcOnInhib	Bool	ZSW, Bit 6: SWITCH-ON INHIBIT active
bOutAlarm	Bool	ZSW, Bit 7: Warning/alarm
bOutSpeedError	Bool	ZSW, Bit 8: Not at setpoint speed
bOutRemote	Bool	ZSW, Bit 9: Drive control location: REMOTE
bOutAtSetpoint	Bool	ZSW, Bit 10: Measured drive frequency is equal to setpoint with tolerances
bOutSafeTorqOff	Bool	ZSW, Bit 14: Safe Torque Off Alarm (JOHB-SMP3 Only)

## ■ fbVFD\_Yaskawa\_PROFIDrive + 5 PZD

Input Variables	Туре	Description
iInFrequencySetPoint	Int	Setpoint frequency (-6000-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInOnOff1	Bool	STW, Bit 0: Proceed to ready operate
bInOff2	Bool	STW, Bit 1: Continue operation (OFF2 inactive)
bInOff3	Bool	STW, Bit 2: Continue operation (OFF3 inactive)
bInOperationEnable	Bool	STW, Bit 3: Proceed to ENABLE OPERATION
bInRampOutZero	Bool	STW, Bit 4: Normal operation (Stop inactive)
bInRampHold	Bool	STW, Bit 5: Normal operation (Force ramp function generator inactive)
bInRampInZero	Bool	STW, Bit 6: Normal operation (Force ramp function generator inactive)
bInReset	Bool	STW, Bit 7: Reset signal enable
bInRemoteCMD	Bool	STW, Bit 10: Network control enabled
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
iInCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
Output Variables	Type	Description

Output Variables	Туре	Description
iOutFrequency	Int	Drive current output frequency
bOutRdyOn	Bool	Ready to switch on
bOutRdyRun	Bool	Ready to operate
bOutRdyRef	Bool	Enable operation
bOutFault	Bool	Fault present
bOutOff2STA	Bool	OFF2 inactive
bOutOff3STA	Bool	OFF3 inactive

Output Variables	Туре	Description
bOutSwcOnInhib	Bool	SWITCH-ON INHIBIT active
bOutAlarm	Bool	Warning/alarm
bOutSpeedError	Bool	Not at setpoint speed
bOutRemote	Bool	Drive control location: REMOTE
bOutAtSetpoint	Bool	Measured drive frequency is equal to setpoint with tolerances
bOutSafeTorqOff	Bool	Safe Torque Off Alarm (JOHB-SMP3 Only)
iOutMonPZD1	Int	Drive to PLC Parameter 1 Received Value
iOutMonPZD2	Int	Drive to PLC Parameter 2 Received Value
iOutMonPZD3	Int	Drive to PLC Parameter 3 Received Value
iOutMonPZD4	Int	Drive to PLC Parameter 4 Received Value
iOutMonPZD5	Int	Drive to PLC Parameter 5 Received Value

#### ■ fbVFD\_Yaskawa\_PROFIDrive + 10 PZD

Input Variables	Туре	Description
iInFrequencySetPoint	Int	Setpoint frequency (-6000-6000)
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
bInOnOff1	Bool	STW, Bit 0: Proceed to ready operate
bInOff2	Bool	STW, Bit 1: Continue operation (OFF2 inactive)
bInOff3	Bool	STW, Bit 2: Continue operation (OFF3 inactive)
bInOperationEnable	Bool	STW, Bit 3: Proceed to ENABLE OPERATION
bInRampOutZero	Bool	STW, Bit 4: Normal operation (Stop inactive)
bInRampHold	Bool	STW, Bit 5: Normal operation (Force ramp function generator inactive)
bInRampInZero	Bool	STW, Bit 6: Normal operation (Force ramp function generator inactive)
bInReset	Bool	STW, Bit 7: Reset signal enable
bInRemoteCMD	Bool	STW, Bit 10: Network control enabled
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
iInCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
iInCmdPZD6	Int	PLC to Drive Parameter 6 Command Value
iInCmdPZD7	Int	PLC to Drive Parameter 7 Command Value
iInCmdPZD8	Int	PLC to Drive Parameter 8 Command Value
iInCmdPZD9	Int	PLC to Drive Parameter 9 Command Value
iInCmdPZD10	Int	PLC to Drive Parameter 10 Command Value
Output Variables	Tuno	Description
	Type	Description
IOutFrequency	Int	Drive current output frequency
bOutRdyOn	Bool	Ready to switch on
bOutRdyRun	Bool	Ready to operate
bOutRdyRef	Bool	Enable operation
bOutFault	Bool	Fault present
bOutOff2STA	Bool	OFF2 inactive
bOutOff3STA	Bool	OFF3 inactive
bOutSwcOnInhib	Bool	SWITCH-ON INHIBIT active
bOutAlarm	Bool	Warning/alarm
bOutSpeedError	Bool	Not at setpoint speed
bOutRemote	Bool	Drive control location: REMOTE
bOutAtSetpoint	Bool	Measured drive frequency is equal to setpoint with tolerances

Bool

Int

bOutSafeTorqOff

iOutMonPZD1

Safe Torque Off Alarm (JOHB-SMP3 Only)

Drive to PLC Parameter 1 Received Value

#### **11 Detailed Block Tables**

	_	
Output Variables	Туре	Description
iOutMonPZD2	Int	Drive to PLC Parameter 2 Received Value
iOutMonPZD3	Int	Drive to PLC Parameter 3 Received Value
iOutMonPZD4	Int	Drive to PLC Parameter 4 Received Value
iOutMonPZD5	Int	Drive to PLC Parameter 5 Received Value
iOutMonPZD6	Int	Drive to PLC Parameter 6 Received Value
iOutMonPZD7	Int	Drive to PLC Parameter 7 Received Value
iOutMonPZD8	Int	Drive to PLC Parameter 8 Received Value
iOutMonPZD9	Int	Drive to PLC Parameter 9 Received Value
iOutMonPZD10	Int	Drive to PLC Parameter 10 Received Value

#### ■ fbVFD\_Yaskawa\_Gateway\_Master

Input Variables	Туре	Description
hwIODriveTelegram	HW_IO	Name of telegram begin used with Yaskawa drive
wInNumOfSlaves	Int	Number of slave drives connected to the master
wInFrequencyRef	Word	Setpoint frequency (0-6000)
bInForwardRun	Bool	Command forward run
bInReverseRun	Bool	Command reverse run
bInFaultReset	Bool	Command fault reset
bInFaultEF0	Bool	Command EF0 Drive Fault
bInDI1	Bool	Command DI1
bInDI2	Bool	Command DI2
bInDI3	Bool	Command DI3
bInDI4	Bool	Command DI4
bInDI5	Bool	Command DI5
bInDI6	Bool	Command DI6
bInDI7	Bool	Command DI7
bInDI8	Bool	Command DI8
bInDI9	Bool	Command DI9
bInDI10	Bool	Command DI10
bInDI11	Bool	Command DI11
bInDI12	Bool	Command DI12
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
InCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
iInCmdPZD6	Int	PLC to Drive Parameter 6 Command Value
InCmdPZD7	Int	PLC to Drive Parameter 7 Command Value
iInCmdPZD8	Int	PLC to Drive Parameter 8 Command Value
iInCmdPZD9	Int	PLC to Drive Parameter 9 Command Value
iInCmdPZD10	Int	PLC to Drive Parameter 10 Command Value
Output Variables	Туре	Description
wOutFrequency	Word	Current output frequency
bOutReady	Bool	Drive is in ready state
bOutRunning	Bool	Running in forward direction
bOutReverse	Bool	Running in reverse direction
bOutFault	Bool	Fault signal is active
bOutAlarm	Bool	Alarm signal is active
bOutZeroSpeed	Bool	At zero speed

Output Variables	Туре	Description
bOutAtSpeed	Bool	At setpoint speed
bOutResetActive	Bool	Reset signal is active
bOutNetReference	Bool	Frequency setpoint from PROFINET
bOutNetControl	Bool	Drive is being controlled from PROFINET commands.
bOutZeroServo	Bool	Zero Servo Completed
bOutOPEFault	Bool	oPE (Parameter Setting) Fault
bOutDuringUV	Bool	Drive in Undervoltage Condition
bOut2ndMotor	Bool	2nd Motor Selected
iOutMonPZD1	Int	Drive to PLC Parameter 1 Received Value
iOutMonPZD2	Int	Drive to PLC Parameter 2 Received Value
iOutMonPZD3	Int	Drive to PLC Parameter 3 Received Value
iOutMonPZD4	Int	Drive to PLC Parameter 4 Received Value
iOutMonPZD5	Int	Drive to PLC Parameter 5 Received Value
iOutMonPZD6	Int	Drive to PLC Parameter 6 Received Value
iOutMonPZD7	Int	Drive to PLC Parameter 7 Received Value
iOutMonPZD8	Int	Drive to PLC Parameter 8 Received Value
iOutMonPZD9	Int	Drive to PLC Parameter 9 Received Value
iOutMonPZD10	Int	Drive to PLC Parameter 10 Received Value

## ■ fbVFD\_Yaskawa\_Gateway\_Slave

Input Variables	Туре	Description
hwIODriveTelegram	HW_IO	Name of telegram begin used with Gateway Master drive
iInSlaveNumber	Int	Slave number $(1 \sim 4)$
wInFrequencyRef	Int	Setpoint frequency (0-6000)
bInForwardRun	Bool	Slave drive command forward run
bInReverseRun	Bool	Slave drive command reverse run
bInExternalFault	Bool	Slave drive command EF0 Drive Fault
bInFaultReset	Bool	Slave drive command fault reset
bInComRef	Bool	Force slave drive to use PROFINET frequency reference
bInComCtrl	Bool	Force slave drive to use PROFINET run/stop commands
Quémut Variables	Turne	Description
Output variables	туре	Description
wOutFrequency	Word	Slave drive output frequency
bOutRunning	Bool	Slave drive is running
bOutReverse	Bool	Slave drive is running in reverse
bOutReady	Bool	Slave drive is ready
bOutFault	Bool	Slave drive fault signal is active
bOutFreqCmdFlt	Bool	Slave Drive Upper/Lower Limit Fault
bOutNoResponse	Bool	Slave Drive Response has timed out
bOutCommError	Bool	Slave Drive detected a fault
bNoResponse10Times	Bool	Slave Drive fault has occurred from a slave 10 consecutive times
bOutBroadcastAtRun	Bool	Slave Drive operates as specified by the broadcast message command
bOutComErrorMaster	Bool	Slave Drive cannot communicate with the master because of a communications error
bOutComRef	Bool	Slave Drive uses PROFINET frequency reference
bOutComCtrl	Bool	Slave Drive uses PROFINET run/stop commands

## ■ fbVFD\_Yaskawa\_Gateway\_Master\_P-Drive

Input Variables	Туре	Description
iInFrequencySetPoint	Int	Setpoint frequency (-6000 - 6000)
hwIODriveTelegramHW_IO	HW_IO	Name of telegram being used with Yaskawa drive
bInOff1Bool	Bool	Proceed to ready operate
bInOff2	Bool	Continue operation (OFF2 inactive)
bInOff3	Bool	Continue operation (OFF3 inactive)
bInOperationEnable	Bool	Proceed to ENABLE OPERATION
bInRampOutZero	Bool	Normal operation (Stop inactive)
bInRampHold	Bool	Normal operation (Force ramp function generator inactive)
bInRampInZero	Bool	Normal operation (Force ramp function generator inactive)
bInReset	Bool	Reset signal enable
bInRemoteCMD	Bool	Network control enabled
iInCmdPZD1	Int	PLC to Drive Parameter 1 Command Value
InCmdPZD2	Int	PLC to Drive Parameter 2 Command Value
iInCmdPZD3	Int	PLC to Drive Parameter 3 Command Value
iInCmdPZD4	Int	PLC to Drive Parameter 4 Command Value
iInCmdPZD5	Int	PLC to Drive Parameter 5 Command Value
iInCmdPZD6	Int	PLC to Drive Parameter 6 Command Value
InCmdPZD7	Int	PLC to Drive Parameter 7 Command Value
iInCmdPZD8	Int	PLC to Drive Parameter 8 Command Value
iInCmdPZD9	Int	PLC to Drive Parameter 9 Command Value
iInCmdPZD10	Int	PLC to Drive Parameter 10 Command Value
Output Variables	Type	Description
iOutFrequency	Int	Drive current output frequency
bOutRdvOn	Bool	ZSW Bit 0: Ready to switch on
bOutRdvRun	Bool	ZSW. Bit 1: Ready to operate
bOutRdyRef	Bool	ZSW. Bit 2: Enable operation
bOutFault	Bool	ZSW. Bit 3: Fault present
bOutOff2STA	Bool	ZSW. Bit 4: OFF2 inactive
bOutOff3STA	Bool	ZSW, Bit 5: OFF3 inactive
bOutSwcOnInhib	Bool	ZSW. Bit 6: SWTICH-ON INHIBIT active
bOutAlarm	Bool	ZSW. Bit 7: Warning/alarm
bOutSpeedError	Bool	ZSW, Bit 8: Not at setpoint speed
bOutRemote	Bool	ZSW, Bit 9: Drive control location: REMOTE
bOutAtSetpoint	Bool	ZSW, Bit 10: Measured drive frequency is equal to setpoint with tolerances
bOutSafeTorgOff	Bool	Safe Torque Off Alarm
iOutMonPZD1	Int	Drive to PLC Parameter 1 Received Value
iOutMonPZD2	Int	Drive to PLC Parameter 2 Received Value
iOutMonPZD3	Int	Drive to PLC Parameter 3 Received Value
iOutMonPZD4	Int	Drive to PLC Parameter 4 Received Value
iOutMonPZD5	Int	Drive to PLC Parameter 5 Received Value
iOutMonPZD6	Int	Drive to PLC Parameter 6 Received Value
iOutMonPZD7	Int	Drive to PLC Parameter 7 Received Value
iOutMonPZD8	Int	Drive to PLC Parameter 8 Received Value
iOutMonPZD9	Int	Drive to PLC Parameter 9 Received Value
iOutMonPZD10	Int	Drive to PLC Parameter 10 Received Value
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#### **Revision History**

The revision dates and the numbers of the revised manuals appear on the bottom of the back cover.

Date of Publication	Revision Number	Section	Revised Content
February 2023	<2>	2, 4, and 9	Updated to include the Multi-Protocol Ethernet Card (JOHB-SMP3).
September 2018	<1>	_	Typographical error corrections.
July 2018	_	_	First Release.

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## YASKAWA Drive PROFINET Function Block for Use in TIA Portal User Instructions

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

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