

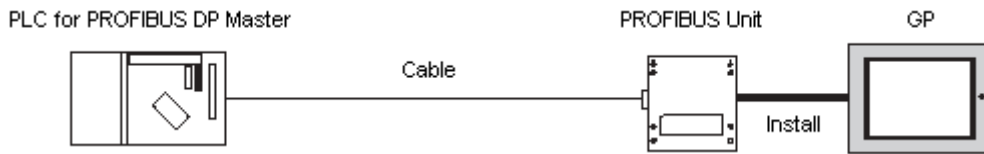
# PROFIBUS-DP Slave Connection

## (System Requirements)

The sample data are created with the following connection configuration (including the devices).

When using the sample data, you may need to change settings of the model depending on the display or device that you use.

### ● Connection Configuration



### ● Communication Driver

PROFIBUS DP Slave

### ● Display Unit

GP Model . . . . . GP3300L

PROFIBUS Unit . . . . . CA5-PFSALL/EX01



PROFIBUS Unit

Screen Creation Software . . . . . GP-Pro EX Ver1.02

\*Prepare GP-Pro EX CD-ROM for importing GSD files and an interpreter program.

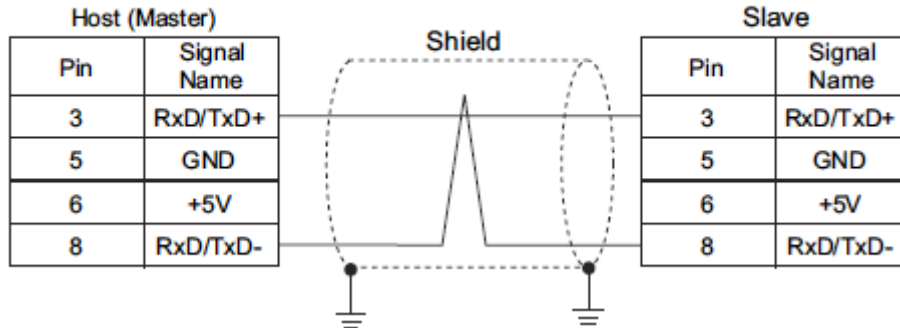
### ● Device/PLC

CPU Model . . . . . SIEMENS CPU313C-2DP

Ladder Software . . . . . SIEMENS STEP7 V5.1

## ● Cable

The following wire connection diagram should be used when making a cable for the PROFIBUS.



## ● Communication Method

Direct I/O method and packet transfer are used.

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Note:

- You cannot use packet transfer in PROFIBUS Master except the Siemens SIMATIC Series.
  - Up to 4 GP units can be connected in case of packet transfer.
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**(Procedure)**

The procedure to confirm the communication between GP and PLC is introduced by using the sample program.

**1. Install PROFIBUS unit on GP.**



before installation



after installation (back)



after installation (side)

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**Note:**

PROFIBUS unit (CS5-PFSALL/EX-01) doesn't have any rotary or dipswitches to set communication speed or node number. The connection speed is controlled by the master side (step7) and the slave address can be adjusted in the offline menu of the AGP.

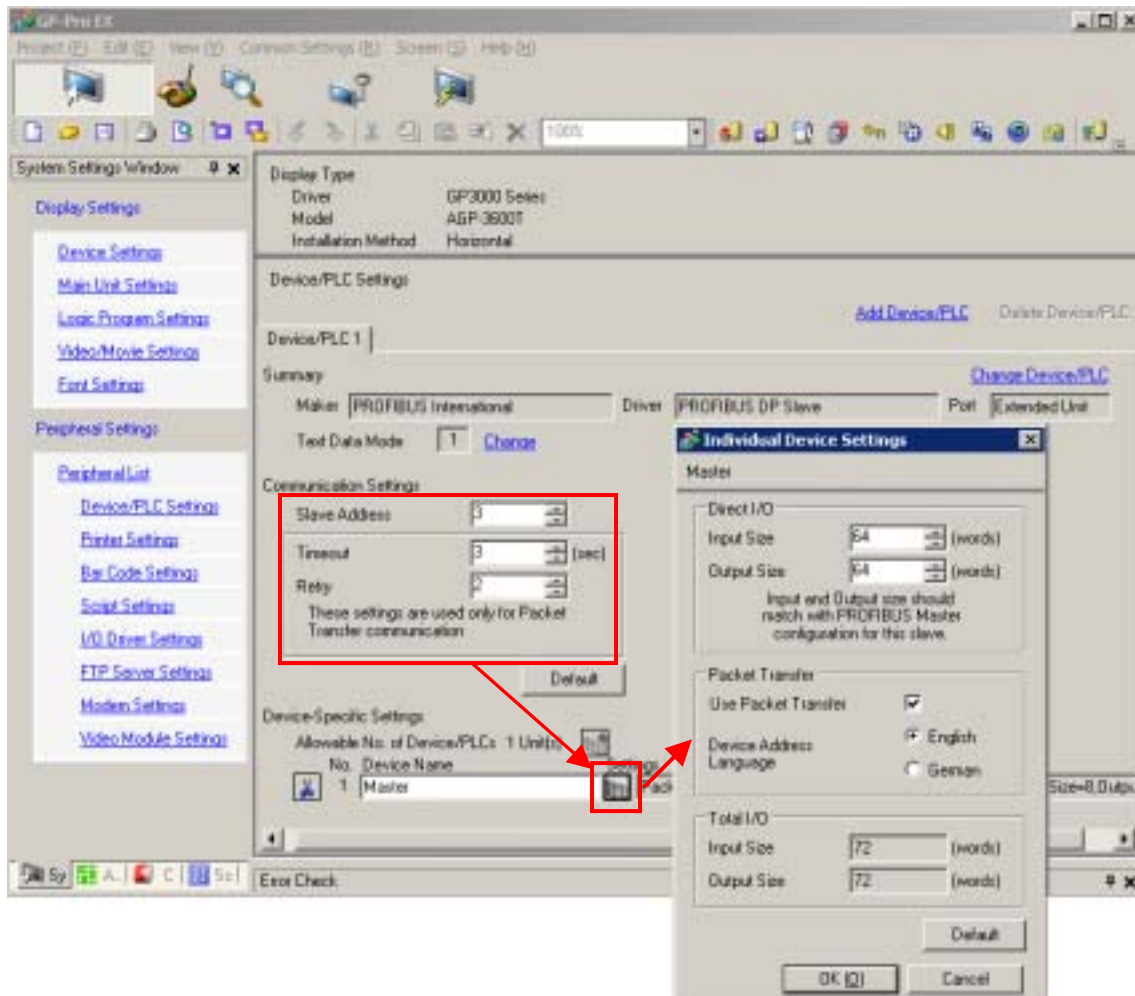
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**2. Connect GP+PROFIBUS units to the device/PLC by a cable (a user fabricated cable) .**

### 3. Transfer the project file to GP.

Follow [System Settings Window] → [Device/PLC Settings] for transfer settings of the project file.

#### ◆ Settings for GP



#### (Communication Settings)

Setup Item	Setup Description
Slave Address	3
Timeout	3
Retry	2

**(Device Settings)**

<b>Setup Item</b>	<b>Setup Description</b>
Direct I/O *1	Input Size 64 Words Output Size 64 Words
Packet Transfer *2	Use Packet Transfer/English
Total I/O *3	Input Size 72 Words Output Size 72 Words

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\*1 You can set the input size and output size for Direct I/O in the range between 1 and 112 words. However, they must be identical to the settings on the PROFIBUS DP Master (PLC Ladder Software).

\*2 Address Description

The descriptions are different between when selecting [English] and when selecting [German] as follows.

		[English]	[German]
Direct I/O	Direct I/O Input	PI	PI
	Direct I/O Output	PQ	PQ
Packet Transfer	Data Block	DB	DB
	Input	I	E
	Output	Q	A
	Internal Marker	M	M

\*3 When you use packet transfer, the actual input and output area size will be the values added by 8 words to each size entered in [Direct I/O]. This is because PROFIBUS unit is recognized as I/O device for the packet transfer and 8 words of External device memory must be assigned to both input and output sizes. Therefore, confirm the input and output sizes displayed in [Total I/O] to the settings on PROFIBUS DP master.

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4. Start up the project file STEP7 downloaded from Otasuke Pro!

5. Install the GSD file.

The GSD files are used to confirm the transfer specifications of PROFIBUS DP device. Information including vendor information, supported transmission rate, timing information, supported options/features, available I/O signals, etc is in the GSD files.

GP and PROFIBUS units are used as slave devices in PROFIBUS network. Digital offers the GSD files in the following 2 ways, but also offers the BMP files to display the icon of PROFIBUS unit on [HW Config] of STEP7.

	File Type	GSD File Saved in
GP-Pro EX CD-ROM	GSD File	CD-ROM Drive \\FIELDDBUS\\PROFIEBUS\\PFE_08DF.gsd
	BMP File	CD-ROM Drive \\FIELDDBUS\\PROFIEBUS\\PFE_08DF.bmp
Otasuke Pro	GSD File	<a href="http://www.pro-face.com/otasuke/download/exdriver/plc/profibus_dp.htm">http://www.pro-face.com/otasuke/download/exdriver</a> /plc/profibus_dp.htm
	BMP File	

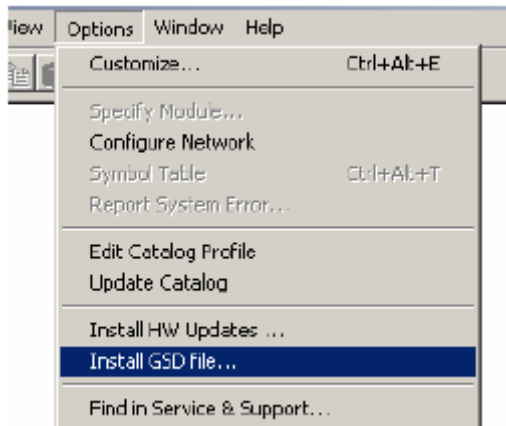
#### Procedure to install GSD file

1. Copy the GSD file and BMP file from GP-Pro EX CD-ROM or "Otasuke Pro!" Save them in the PC that STEP7 has been installed in.

2. Select SIMATIC 300 Station on STEP7, and then select [Hardware].



3. After [HW Config] starts up, select [Install GSD file] from [Option] on the menu bar.



4. Select [Browse] on the [Install GSD files] dialog box. Specify the GSD file saved in Procedure1, and click [Install].



5. On [Catalog] of the hardware, open [PROFIBUS DP]→[Additional Field Devices]→[MMI]. After [Proface CA5-PFSALL/EX-01] displays, drag and drop it on the line of [PROFIBUS (1) :DP master system].

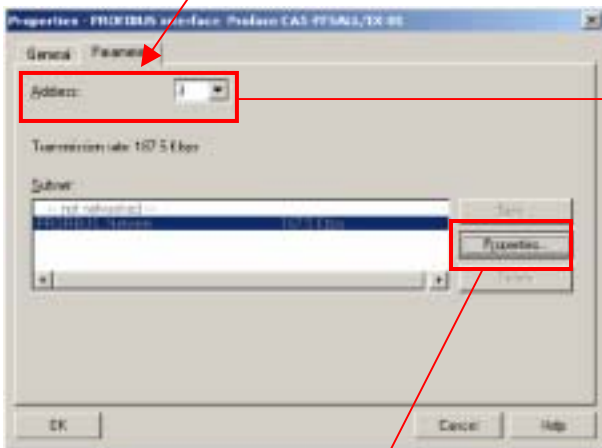
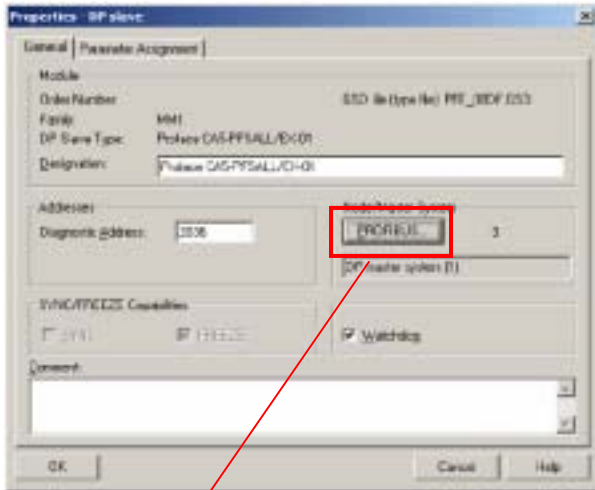


Note: The place to display [Proface CA5-PFSALL/EX-01] or the operation may differ depending on the version of STEP7.

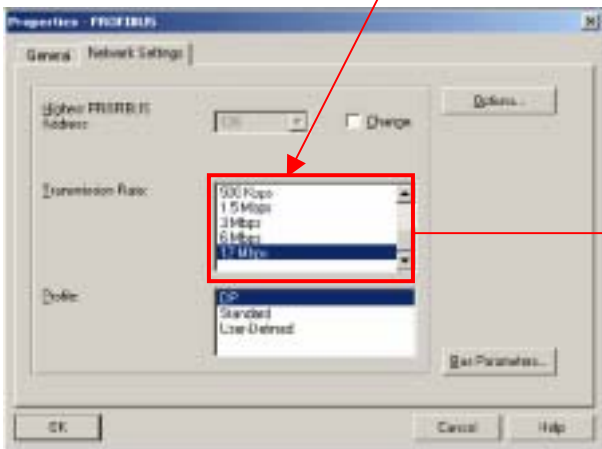
**6. Confirm the settings of PROFIBUS on STEP7.**

**◆ Setting up properties of [Proface CA5-PFSALL/EX-01] of [HW Config]**

Double click the AGP icon.



In this sample, "3" is set for Address of the PROFIBUS unit.



In this sample, Transmission Rate is set with 187.5kbps, but you can change the rate here.



◆ **Setting up Input/Output addresses of [Proface CA5-PFSALL/EX-01] of [HW Config]**

Input/output addresses of Proface CA5-PFSALL/EX-01 are displayed at the bottom of the [HW Config] screen.

Slot	D	Order Number / Designation	I Address	Q Address
1	16A	PLC Direct I/O 64 Words Input	256...287	
2	16A	→ FLC Direct I/O 64 Words Inpu	288...319	
3	16A	→ FLC Direct I/O 64 Words Inpu	320...351	
4	16A	→ FLC Direct I/O 64 Words Inpu	352...383	
5	16A	PLC Direct I/O 64 Words Output		256...287
6	16A	→ FLC Direct I/O 64 Words Outp		288...319
7	16A	→ FLC Direct I/O 64 Words Outp		320...351
8	16A	→ FLC Direct I/O 64 Words Outp		352...383
9	191	PLC Packet Transfer	384...399	384...399

For Direct I/O

Input/Output  
Address

For Packet Transfer

Input/Output  
Address

In case of packet transfer, it is necessary to specify the start addresses of input and output addresses used for packet transfer by OB1.

Note:

In the Siemens STEP 7 [HW Config], the Direct I/O module should always be configured in the first slot.

## ◆ Setting Up Interpreter program

It is necessary to install the Interpreter Program on STEP7 to use packet transfer. (If you use only direct I/O method, it is not necessary.) Also the installed Interpreter program is necessary to be called by OB.

### **【Contents of Interpreter program (FB99)】**

FB99 : Profibus DP/Interbus interpreter function[GP2000&AGP Series]

If you have problems with this interpreter program please contact your Pro-face distributor. This function does not affect any memory areas within the PLC other than those written to by the GP/AGP unit. The one exception being the Marker word addresses you specify when you call FB 99 from OB1.  
Support of AGP is added from V4.0  
Expand double word Write from V4.01

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#### Note:

There is a library file of STEP7 in \FIELDDBUS\PROFIEBUS\PF\_AGPSL.ZIP of GP-Pro EX CD-ROM. You can

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### **【Details of OB1】**

Call FB99 in OB1. Specify the start addresses of input address and output address that you use for packet transfer.

OB1 : "Main Program Runp (Cycle)"

```
Main Program
Network 1: AGP/DP-PROFIBUS INTERPRETER CALL
Call FB 99 (AGP/DP - Packet Interpreter program to interpret the PACKET sent by
AGP/DP and perform the requested operation.
Please Specify the
IP_ADDR & OP_ADDR:
    as configured in ST HW Config in Decimal
ERR_BYTE: Interpreter error due to bad data format
POSSIBLE ERRORS:
- Bad device type (D, M, I, O)
- Bad Data block address (word address over range)
- Attempt to write to a input
- Invalid Data block operations
- Interpreter general error
TEMP_OUT: Output byte 0 previous scan value
```

```
CALL FB 99 , ID99
IP_ADDR :=#164 // IP ID 191:Packet Transfer 1 ADDRESS as config. in HW Config.
OP_ADDR :=#164 // OP ID 191:Packet Transfer 2 Address as config. in HW Config.
ERR_BYTE :=#255
TEMP_OUT :=#255
GP_STATUS:=#255
```

CALL FB99, DB99


IP\_ADDR :=384

OP\_ADDR :=384

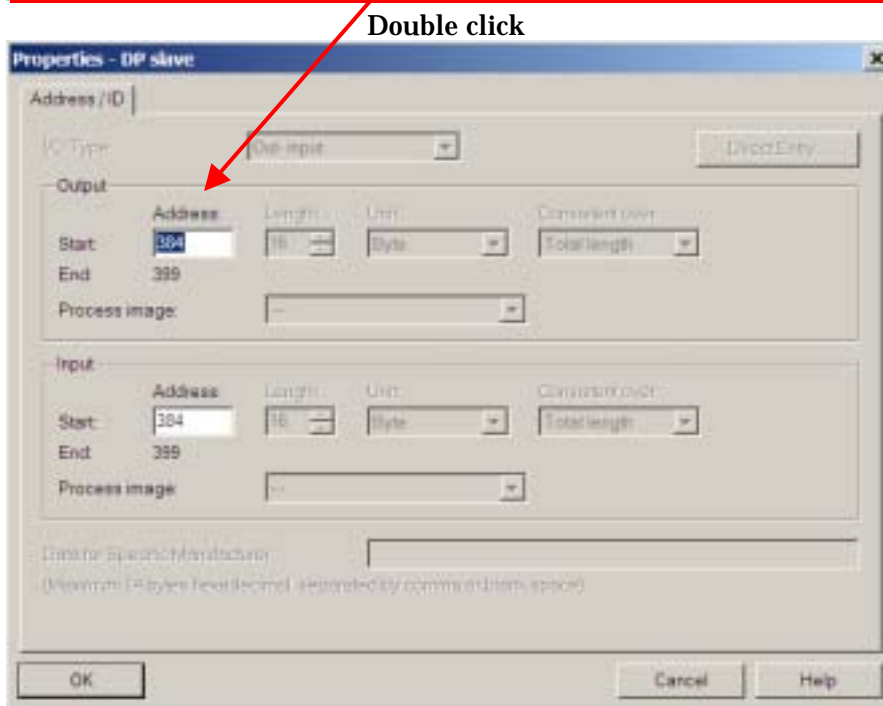
ERR\_BYTE:=MB10

TEMP\_OUT:=MB11

GP\_STATUS:=MB12

You can confirm the start addresses of input/output addresses by clicking the  icon on [HW Config] and then double clicking [PLC Packet Transfer] displayed at the bottom of the screen. In this sample, both input/output word addresses are set with 384.

Slot	D	Order Number / Designation	I Address	Q Address
1	16A	PLC Direct I/O 64 Words Input	256...287	
2	16A	→ PLC Direct I/O 64 Words Inpu	288...319	
3	16A	→ PLC Direct I/O 64 Words Inpu	320...351	
4	16A	→ PLC Direct I/O 64 Words Inpu	352...383	
5	16A	PLC Direct I/O 64 Words Output		256...287
6	16A	→ PLC Direct I/O 64 Words Outp		288...319
7	16A	→ PLC Direct I/O 64 Words Outp		320...351
8	16A	→ PLC Direct I/O 64 Words Outp		352...383
9	191	PLC Packet Transfer	384...399	384...399



Note

[ERR\_BYTE] is used by AGP to monitor and display online error message.

**[Details of DB99]**

The FB99 uses a Data Block (This sample is used DB99) to save data used by the interpreter program. This requires 40 bytes of PLC memory. Don't use this memory area for anything else. It is possible to use other DBs just by editing the value.

	Address	Declaration	Name	Type	Initial value	Actual value	Comment
1	0.0	in	IP_AD...	INT	0	0	First Profibus Input word address
2	2.0	in	OP_A...	INT	0	0	First Profibus Output word address
3	4.0	stat	ERR...	BYTE	0#15#0	0#15#0	Profibus error request
4	6.0	in_out	TENP...	BYTE	0#15#0	0#15#0	Temporary PLC output byte
5	7.0	in_out	GP_S...	BYTE	0#15#0	0#15#0	Temporary GP/AGP request buffer
6	8.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	Input Packet to GP/AGP
7	9.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
8	10.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
9	11.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
10	12.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
11	13.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
12	14.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
13	15.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
14	16.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
15	17.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
16	18.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
17	19.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
18	20.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
19	21.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
20	22.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
21	23.0	stat	IM_PA...	BYTE	0#15#0	0#15#0	
22	24.0	stat	OUT...	BYTE	0#15#0	0#15#0	Output Packet from PLC to GP/AGP
23	25.0	stat	OUT...	BYTE	0#15#0	0#15#0	
24	26.0	stat	OUT...	BYTE	0#15#0	0#15#0	
25	27.0	stat	OUT...	BYTE	0#15#0	0#15#0	
26	28.0	stat	OUT...	BYTE	0#15#0	0#15#0	
27	29.0	stat	OUT...	BYTE	0#15#0	0#15#0	
28	30.0	stat	OUT...	BYTE	0#15#0	0#15#0	
29	31.0	stat	OUT...	BYTE	0#15#0	0#15#0	
30	32.0	stat	OUT...	BYTE	0#15#0	0#15#0	
31	33.0	stat	OUT...	BYTE	0#15#0	0#15#0	
32	34.0	stat	OUT...	BYTE	0#15#0	0#15#0	
33	35.0	stat	OUT...	BYTE	0#15#0	0#15#0	
34	36.0	stat	OUT...	BYTE	0#15#0	0#15#0	
35	37.0	stat	OUT...	BYTE	0#15#0	0#15#0	
36	38.0	stat	OUT...	BYTE	0#15#0	0#15#0	
37	39.0	stat	OUT...	BYTE	0#15#0	0#15#0	

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**Note**

**When using multiple AGPs, each AGP requires a separate FB99 call and separate Data Blocks.**

**e.g. When 2 AGPs is connected,**

**CALL FB99,DB99//AGP #1**

**IP\_ADDR :=\*\*\***

**OP\_\_ADDR := \*\*\***

**ERR\_BYTE:= \*\*\***

**TEMP\_OUT:= \*\*\***

**GP\_STATUS : =\*\*\***

**CALL FB99,DB100//AGP #2**

**IP\_ADDR :=\*\*\***

**OP\_\_ADDR := \*\*\***

**ERR\_BYTE:= \*\*\***

**TEMP\_OUT:= \*\*\***

**GP\_STATUS : =\*\*\***

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