# **Communication with Gate PN** TECHNICAL NOTE V20200120

It is useful to share information with Pluto controllers, sometimes getting information from it is needed, other times sending information to it. With the use of a gateway, Pluto can communicate with other control systems and form a part of a larger network. In this example, it is explained how to get variables information from an AS-i Pluto and the procedure to send information to it, using the gateway Gete PN.

## Material needed

For this example, the material used is the one listed below:

• <u>Gate PN:</u> REF 2TLA020071R9300

Gateway for 2-way communication between the Pluto bus and Ethernet. Ethernet protocol PROFINET.



Figure 1.- Gate PN

• Pluto AS-i: REF 2TLA020070R1100

Safety PLC with AS-i bus and Pluto safety bus. Totally 12 I/O: 4 failsafe inputs + 4 non-failsafe outputs/failsafe inputs + 2 individual failsafe relay outputs + 2 individual failsafe transistor outputs.



Figure 2.- Pluto AS-i

• Computer with Pluto Manager software

Pluto Manager is a software tailored for the safety PLC Pluto. Programming is done in ladder and together with the function block creates the structure of your safety functions. The software comes with predefined function blocks approved by TÜV to facilitate the work on designing the safety functions.

The software can be downloaded from the ABB web, it needs a free license. Contact with technical support to get the license.



Figure 3.- Computer with Pluto Manager

• Pluto cable USB: REF 2TLA020070R5800

Pluto programming and on-line monitoring cable from a PC USB port to the Pluto programming port.



Figure 4.- Pluto USB cable

• IDFIX DATA: REF 2TLA020070R2300

Identifier read/write, for assigning an address to the Pluto it is connected to and for storage of the AS-i safety codes. **Must** be used with Pluto AS-i and Pluto B42 AS-i and can be used for all Pluto types.



Figure 5.- IDFIX DATA

• Power supply 24Vdc (CP-E): REF 1SVR427031R0000

Power supply needed for the AS-i bus and Pluto.



Figure 6.- Power supply

• Controller for getting the information from the gateway AC500. The module CM579 PINIO is needed to integrate the PROFINET protocol.



Figure 7.- AC500

## **Connection diagram**

The connection diagram for this example is the next one:

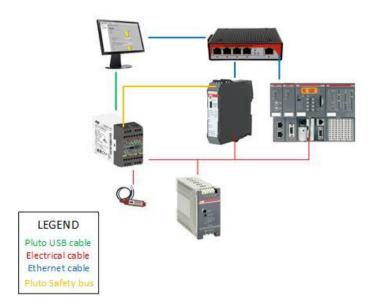


Diagram 1.- Connection diagram example

In the table 1 there are explained connector by connector de electrical connections needed.

Device 1	Connector 1	Device 2	Connector 2
Pluto AS-i	СН	Gate-PN	СН
Pluto AS-i	CL	Gate-PN	CL
Pluto AS-i	ID	IDFIX-DATA	Black
Pluto AS-i	0 V	IDFIX-DATA	Blue
Pluto AS-i	0 V	CP-E	L-
Pluto AS-i	24 V	CP-E	L+
Gate-PN	1	CP-E	L+
Gate-PN	0 V	CP-E	L-
AC500	L+	CP-E	L+
AC500	М	CP-E	L-

Table 1.- Electrical connections

Note that for this example there is a switch for all the ethernet connections instead of following the connection diagram 2:

• computer->AC500 CM-579 PINIO ->Gate-PN



Diagram 2.- Connection diagram 2

This is because with a switch with all the ethernet connections on it, it is possible to apply the ping command to the PINIO module and to the gateway. It is a windows tool that permits checking if the device has got the right IP direction, among other things.

### **Configuration in Pluto Manager**

Before starting with the configuration, it is important to understand how the gateway works. By default, every Pluto PLC shares its global variables with the other devices connected to the Pluto safety bus. In case of the Pluto AS-i, the global variables are the next one:

Table 2.- Pluto global data for Pluto AS-i family (x is Pluto node number and y is the safety node)

Byte	MSB				· · ·			LSB
0	ASIx.7	ASIx.6	ASIx.5	ASIx.4	ASIx.3	ASIx.2	ASIx.1	Ix.0
1	ASIx.15	ASIx.14	ASIx.13	ASIx.12	ASIx.11	ASIx.10	ASIx.9	ASIx.8
2	GMx.3	GMx.2	GMx.1	GMx.0	Qx.3	Qx.2	Qx.1	Qx.0
3	GMx.11	GMx.10	GMx.9	GMx.8	GMx.7	GMx.6	GMx.5	GMx.4

There are other registers that are filled automatically: There are two registers that contain the information about which Pluto is active in the Pluto safety bus. When a Pluto is active the corresponding bit is set to "1".

#### Table 3. Pluto status coding

Byte	MSB							LSB
0	Pluto 7	Pluto 6	Pluto 5	Pluto 4	Pluto 3	Pluto 2	Pluto 1	Pluto 0
1	Pluto 15	Pluto 14	Pluto 13	Pluto 12	Pluto 11	Pluto 10	Pluto 9	Pluto 8
2	Pluto 23	Pluto 22	Pluto 21	Pluto 20	Pluto 19	Pluto 18	Pluto 17	Pluto 16
3	Pluto 31	Pluto 30	Pluto 29	Pluto 28	Pluto 27	Pluto 26	Pluto 25	Pluto 24

In case other information is needed, there are available 32 registers for additional data from Pluto. These registers can contain different information, depending on the configuration applied to the gateway. This information can be predefined blocks or specific registers or bites that are required by another device.

When sending information to the Pluto is needed, there are 8 registers available. It will be explained how to configure them later.

#### Reading information

#### Configuration of the gateway Gate PN in Pluto Manager:

In case of reading global variables, there is no need of any other configuration in the Pluto Manager, since the gateway receives this information when it is connected to the Pluto safety bus.

If extra information is needed, the additional data registers must be configured. For this example, we are going to configure the additional register 0 for receiving information from the Pluto 1 using the function block "ToGateway\_User\_C".

 Table 4.- User defined block type C

Byte	MSB							LSB
0	Reg_0.7	Reg_0.6	Reg_0.5	Reg_0.4	Reg_0.3	Reg_0.2	Reg_0.1	Reg_0.0
1	Reg_0.15	Reg_0.14	Reg_0.13	Reg_0.12	Reg_0.11	Reg_0.10	Reg_0.9	Reg_0.8
2	Bit_7	Bit_6	Bit_5	Bit_4	Bit_3	Bit_2	Bit_1	Bit_0
3	Bit_15	Bit_14	Bit_13	Bit_12	Bit_11	Bit_10	Bit_9	Bit_8

In order to configure the gateway, connect the PC to the gateway with the Pluto cable USB and follow the next steps:

1. Check the communication port is the right one, it has to contain "(VCP0)" if there is only one Pluto cable connected.

Pluto Manager - [Preferences] File Search Tools Windo	w Help
🗃 🗐 🕹 در الم	Start Bus St AS-I St Bus
Preferences     Project ASi_GatePN     Project ASi_GatePN     Project ASi_GatePN     I/O Options	Preferences Communication Directories Updates via internet Language Encoding Appearance Etc
AS 4 Options Variables Variables Variables	Communication Port     Screen update interval       COM10     (VCP0)       COM30     (Serial0)       Network     Solone

Figure 8.- Configuration communication port

2. The configuration of the gateway is done through the Terminal Window tool, click on it. When it is opened, if the gateway is connected, it will appear "pn\_gw>". Indicating that the configuration can start.

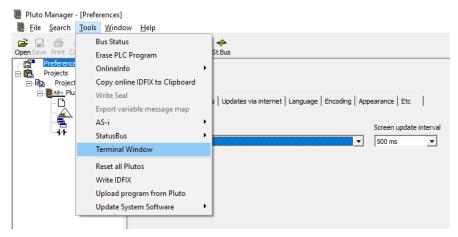


Figure 9.- Terminal window

3. Pressing the "h" key, the help menu will be displayed. There are the most common commands used.

PlutoMa	nager Terminal Window		
Se	nd File Close 🗎 Copy		
pn_gw>			^
pn_gw>			
pn_gw>			
pn_gw>			
I	[Pluto node[.address]]	read input	
Q	[Pluto node[.address]]	read output	
GM	[Pluto node[.address]]	read global memory	
м	[Pluto node[.address]]	read memory bit	
R	[Pluto node[.address]]	read register	
DR	[Pluto node[.address]]	read double register	
S	[Pluto node[.address]]	read sequence step	
SM	[Pluto node[.address]]	read system memory bit	
SR	[Pluto node[.address]]	read system register	
SDR	[Pluto node[.address]]	read system double register	
ASIS	[Pluto node[.address]]	read AS-i safety input	
ASI	[Pluto node[.address[.sub]]]	read AS-i input	
ASQ	[Pluto node[.address[.sub]]]	read AS-i output	
GW	[gateway node.address]	read gateway register	
ADD	[gateway node[.area]]	read gateway additional data	
TO	[gateway node[.area[.reg]]]		
BG	view gateway nodes on Pluto 1	bus	
BS	view Pluto nodes on Pluto bu	8	
BC	view gateway configuration		
1			~

Figure 10.- Help command

4. Using the "BG" and "BS" commands is possible to check the gateways and Plutos connected to the Pluto safety bus respectively.

Send I	3- I	Close	Bb Com	- L
	ile	Close	Copy	
pn_gw>b	g			
Gateway	0 : Conne	cted (	Gateway	8
Gateway			Gateway	
Gateway	2 : -		Gateway	10
Gateway	3:-		Gateway	11
Gateway			Gateway	12
Gateway			Gateway	
Gateway			Gateway	
Gateway	7:-		Gateway	15
				-
pn_gw>b				
				-
	node number s speed: 40			
Pluco bu	s speed: 4	UU KDIUS		_
		Pluto 1	6 : -	
Pluto 0				
	: AS-i v2			
Pluto 1	: AS-i v2 : -	Pluto 1		
Pluto 1 Pluto 2	: -		8 : -	
Pluto 1 Pluto 2 Pluto 3	: -	Pluto 1	8:- 9:-	
Pluto 1 Pluto 2 Pluto 3 Pluto 4	: - : - : -	Pluto 1 Pluto 1	8 : - 9 : - 0 : -	

Figure 11.- Use of BG and BS commands

5. The "BC" (12.1) command is used to check if there is any configuration already stored in the gateway. If there is any configuration, use the "ADDC" (12.2) command to erase it.

PlutoManager Terminal Window
Send File Close Ba Copy
Data to Pinto
Packet area 0: Enabled
Facket area 1: Enabled
Packet area 2: Enabled
Packet area 3: Enabled
PROFINET write timeout: 0 ms
Pluto bus update time: 100 ms
Additional data configuration Area Pluto IO-type   Area Pluto IO-type   Area Pluto IO-type   Area Pluto IO-type
1 * 1 USER: 1
pn gw> adde 2
Clear additional data configuration [Yes/No] ? y
Configuration cleared.
pn_gw> bc 1
Data to Pluto
Packet area 0: Enabled
Packet area 1: Enabled
Packet area 2: Enabled Packet area 3: Enabled
PROFINET write timeout: 0 ms
Pluto bus update time: 100 ms
Additional data configuration
No configuration
pn_gw>

Figure 12.- Checking and erasing configuration of the gateway

- 6. Use the "ADDS" command to configure the additional data. Then select the additional data area desired, the Pluto node that will send the information and the information that will be sent. In this example:
  - Additional data 1 (13.1).
  - Pluto node 1 (13.2).
  - Information sent by user 1 (13.3). This parameter is set in the function block of the PLC code.

Send File Close B Copy	
on_gw> adds 1	
Configure additional data area [0-31] : 1 Receive data from Pluto node number [0-31] : 1 2	
IO-type :	
- 0 = Not. used	
- 1-99 = User block	
- 100 = Error Code	
- 100 - FIGI COLE - 101 - B46 120-147	
- 101 = 546 120-147 - 102 = AS-i node 16-31 safe input	
- 102 = AS-1 node 10-SI sale input	
- 104 = AS-i node 4- 7 standard input	
- 104 = AS-1 node 4- 7 standard input	
- 105 = AS-i node 12-15 standard input	
- 106 = AS-1 node 12-15 standard input	
- 108 = AS-i node 20-23 standard input	
- 109 = AS-i node 24-27 standard input	
- 110 = AS-i node 28-31 standard input	
- 111 = Pluto global	
-112 = B42 AS-i 120-I47	
- 112 - 542 AS-1 120-147	
- 114 = D45 120-147	
Select IO-type [0-255] : 1 3	
Configuration done.	
configuration done.	

Figure 13.- Configuration of additional data

The terminal window can be closed, the configuration with the Pluto Manager is done. Note that the IP has not been configurated, this is because the IP is set by the PLC controller.

#### Configuration of AC500 with Automation Builder

Once the controller and extra modules are configurated (PM573 + DC532 + CM572 + CM570-PINIO in this case). The mandatory modules are the PM573 and the CM570-PINIO, the other ones can be installed but will not be used.

The next steps must be followed to configure the gateway:

1. Add the device GATE-PN by loading the GSDML file, the latest version can be downloaded from the "Gate PN webpage". The GSDML file is added to the Automation Builder program by clicking in:

Tools (14.1)->Device Repository...(14.2)->Install

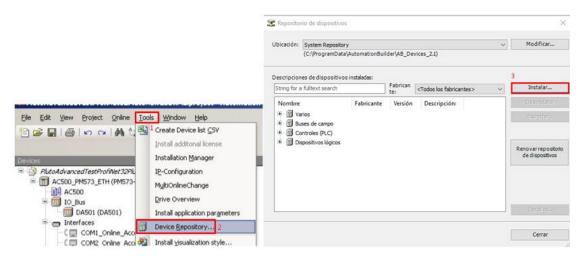


Figure 14.- Adding GSDML file (1)

Then select the file and click in open. Make sure the option "file configuration PROFINET" is selected (Figure 15). Otherwise an error message will appear (Figure 16).

> - ^ 🚹 📙	< 12_0	GATE-EIP-EC-S	53-PN-MT	Description	files > GAT	E-PN	0 1	Search GATE-	PN		2	
ganize 👻 Ne	w folder								8== -		0	
ABB	^	Name		×		Date modified	Тур	be	Size			
Attachments		GSDML	V2.31-ABE	-GATE_PN-	20151104.x	11/11/2015 14:37	XIV	IL Document		94 KB		
This PC 3D Objects Desktop Documents Downloads	ł											
E Pictures												
Videos												
System (C:)	~										_	
	File na	me: GSDML-	V2.31-ABB-	GATE_PN-2	0151104.xml		~	Archivos de				
								Archivos de o Archivos de o			descripción de	therCAT

Figure 15.- Adding GSDML file (2)

stalar descripción de dispositivo				×		Repositorio de dispositivos				
→  ↑  ↑  ↓  A	TE-PN võ	Search GATE-PIN		ρ	Ubi	icación: System Repository				~
Arganize   New folder		855	•	0		(C:\ProgramData)		lder\AB_De	evices_2.1)	
a ABB ^ Name	Date modified Type	e Si	ize							
Attachments GSDML-V2.31-ABB-GATE_PN-20151104.x	11/11/2015 14:37 XML	L Document	94 KB		Des	scripciones de dispositivos	instaladas:			
O Documents					St	tring for a fulltext search		Fabrican te:	<todos fabricantes="" los=""></todos>	~
This PC						Nombre	Fabricante	Versión	Descripción:	٦
3D Objects						- M Varios				- 1
Desktop						Buses de campo				- 1
1 Documents						Controles (PLC)				- 1
🕹 Downloads						Dispositivos lógicos				- 1
Music										- 1
E Pictures										_
Videos					8	🗄 😝 C: \Users\ESGUGOM\C	neDrive - ABB\/	BB Proyect	os\Jokab SEU (PC)\Programas\Plut	٥١
System (C:)						- 😣 No es ningún arch	ivo de descripci	ón EtherCAT	r	- 1
		Archivos de configu								
File name: GSDML-V2.31-AB8-GATE_PN-20151104.xml	~			descripción de disp	VMI (TD)					- 1
		Archivos de configu	aración de P	ROFIBUS DP V5.0 (*.e	AML (* Smi)					
				FINET IO (GSDML*.x)						
		Archivos de descrip Archivos EDS y DCF		oositivo (*.devdesc.xr						
		10-Link Device Desc								

Figure 16.- Adding GSDML file (2)

2. Then, all the modules/objects must be added by doing right click and add aobject. These modules are the registers that let the Pluto send or receive information. When all the modules are added, the object GATE\_PN must look like the one in the figure 17.

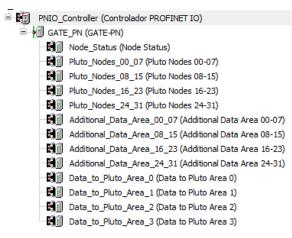


Figure 17.- Configuration GATE\_PN objects

3. Configure the gateway also has to be done here. In fact, if the configuration here is different from the one of the Pluto Manager, it will be overwritten by this one. Then, it is important that the information introduced in the Pluto Manager is the same than the one of the Pluto Manager.

The parameters to configure (at least) are the next one:

- Name (18.1).
- IP direction (18.2).
- Gate Node Address: introduce the same than in Pluto Manager (18.3).

le mapeado E/S	Nombre de la est gate	n		1	
netros PNIO	Parámetros IP			2	
ions	Dirección IP	100 . 100 . 100		-	
FINET IO Device	Máscara de subred Puerta de enlace pre				
ormación	Comunicación	0.0.0			
	Factor de reducción Phase RT Class Parámetros de usuari	os valores	VLAN	ID	0 \$
	Parámetros Gateway Data to Pluto	Valor		Valores permitidos	
	Timeout [ms]	0		060000	
	Pluto Data to Pluto cyc	etime			
				0,050	
	Cycletime [ms]	100		0250	
		3	Address 0	0250	3

Figure 18.- Configuring GATE\_PN

- 4. After that, configuring the controller is needed. The configuration needed is the next one:
  - IP direction (19.1).
  - Configuration for slaves: Stablish a compatible range of IP directions (19.2).

PROFINET IO Controller	Identificación
Asignarnombre de dispositivo de E/S	1 Dirección IP 100 . 100 . 100 . 1
ista de mapeado E/S	Máscara de subred 255 . 255 . 0 . 0
	Puerta de enlace predeterminada 0 . 0 . 0 . 0
	Nombre de la estación controller
	Configuración para esclavos
	2 Primera dirección IP 100 . 100 . 100 . 0
	Última dirección IP 100 . 100 . 100 . 100
	Última dirección IP         100         100         100           Máscara de subred         255         255         0         0

Figure 19.- Configuring profinet controller (1)

- The next steps must be done in order:
  - In the "Assign IO-Device name" menu, press search (20.1), it will appear the slave configurated in the previous step.
  - Click on it (20.2).

- Select name and IP direction previously configured (20.3).
- Press "Assign IO-Device name" and "Assign IP configuration" (20.4).

FINET IO Controller gnarnombre de dispositivo de	1 Buscar						
a de mapeado E/S	Nombre de dispositivo	Tipo de dispositivo	Dirección de IP	Dirección MAC	ID del vendedor	ID del dispositivo	Función del dispositivo
	gatepn	Pluto Gateway	100.100.100.2	00-0C-62-08-01-C3	388	1000	1
	2						
	<						
	3						
	3			4		_	
		iositivo de E/S: gatepr	ı	~ 4			
	3			4	Asignar nombre de disp	positivo	Iniciar señal de LED
	3 Configurar nombre de dispu Tipo dedispositivo deE/S s	seleccionado: Pluto (	Sateway	~ 4	Asignar nombre de disp de E/S	positivo	Iniciar señal de LED
	3 Configurar nombre de dispo	seleccionado: Pluto (	Sateway	× 4	Asignar nombre de dis de E/S	positivo	Iniciar señal de LED
	3 Configurar nombre de dispu Tipo de dispositivo de E/Ss Dirección MAC del dispositi	seleccionado: Pluto ( ivo de E/S selec 00-0C	Gateway -62-08-01-C3		Asignar nombre de disş de E/S	positivo	Iniciar señal de LED
	3 Configurar nombre de dispu Tipo dedispositivo deE/S s	seleccionado: Pluto ( ivo de E/S selec 00-0C	Sateway		Asignar nombre de disş de E/S	positivo	Îniciar señal de LED
	3 Configurar nombre de dispo Tipo de dispositivo de E/S s Dirección MAC del dispositi Dirección de IP:	seleccionado: Pluto ( ivo de E/S selec 00-0C	Sateway -62-08-01-C3 00.100.2	~ ~	Asignar nombre de disp de E/S	Dositivo 1	Iniciar señal de LED
	3 Configurar nombre de dispu Tipo de dispositivo de E/Ss Dirección MAC del dispositi	seleccionado: Pluto ( ivo de E/S selec 00-0C	Sateway -62-08-01-C3 00.100.2		Asignar nombre de disg de E/S Asignar la configuració		Iniciar señal de LED zablecimiento de fábrica
	3 Configurar nombre de dispo Tipo de dispositivo de E/S s Dirección MAC del dispositi Dirección de IP:	seleccionado: Pluto ( ivo de E/S seleci 00-0C 100. 11 255.22	Sateway -62-08-01-C3 00.100.2		de E/S		

**Figure 20.-** Configuring profinet controller (2)

With these configurations is possible to read the global variables from the Pluto AS-i (PLC code explained later).

rámetros PNIO	Busc	car		Filtro Mostrar te	odo		-			
NIO Module Asignación E/S	Var	riable	Asignación	Canal	Dirección	Tipo		Valor actual	Unidad	Descripción
NIO MODULE Asignación 2/3		*		Node 00 Data	%ID2.1	UDINT	0			
ista de mapeado E/S	8-	*		Node 01 Data	%ID2.2	UDINT	131200			
		🍫		BitO	%IX2.8.0	BOOL	FALSE			
formación		🍫		Bit1	%IX2.8.1	BOOL	FALSE			
				Bit2	%IX2.8.2	BOOL	FALSE			
		🍫		Bit3	%IX2.8.3	BOOL	FALSE			
	_			Bit4	%IX2.8.4	BOOL	FALSE			
				Bit5	%IX2.8.5	BOOL	FALSE			
		🍫		Bit6	%IX2.8.6	BOOL	FALSE			
		🍫		Bit7	%IX2.8.7	BOOL	FALSE			
				Bit8	%IX2.9.0	BOOL	FALSE			
		🍫		Bit9	%IX2.9.1	BOOL	TRUE			
				Bit10	%IX2.9.2	BOOL	FALSE			
				Bit11	%IX2.9.3	BOOL	FALSE			
		🍫		Bit12	%IX2.9.4	BOOL	FALSE			
		🍫		Bit13	%IX2.9.5	BOOL	FALSE			
				Bit14	%IX2.9.6	BOOL	FALSE			
				Bit15	%IX2.9.7	BOOL	FALSE			
		🍫		Bit16	%IX2.10.0	BOOL	FALSE			
		🍫		Bit17	%IX2.10.1	BOOL	FALSE			
		🍫		Bit18	%IX2.10.2	BOOL	FALSE			
		🍫		Bit19	%IX2.10.3	BOOL	FALSE			
				Bit20	%IX2.10.4	BOOL	FALSE			
		🍫		Bit21	%IX2.10.5	BOOL	FALSE			
				0400	9/TVD 10 ¢	8001	EAL SE			
									Resta	blecer asignad

Figure 21.- Reading global variables

5. Configuring the objects can be the next step if reading additional data is needed. For this example, it is configured the additional data area 1 for receiving information from the Pluto1 using the function "ToGateway\_UserNumber\_1".

Additional_Data_Area_00_	.07 x					
Parámetros PNIO	Información de módulo					
PNIO Module Asignación E/S	Número de identificació	Número de identificación 16#02000301				
Lista de mapeado E/S	Número de ranura	6				
Información	Parámetros de usuario					
	Establecer to dos los v predeterminados	alores				
	Parámetros	Valor	Valores permitidos			
	Additional Data Area 00					
	From Pluto Node	Pluto 00	031			
	IO type	UNUSED	0114			
	Additional Data Area 01					
	From Pluto Node	Pluto 01	031			
	IO type	ToGateway_UserNumber_1	0114			
	Additional Data Area 02					
	From Pluto Node	Pluto 00	031			
	IO type	UNUSED	0114			
	Additional Data Area 03					
	From Pluto Node	Pluto 00	031			
	IO type	UNUSED	0114			
	Additional Data Area 04					
	and the second sec	Let a see				

Figure 22.- Configuring objects

Now it is also possible to read information from the additional data 1. The PLC code in Pluto Manager will be explained later.

Parámetros PNIO	Buscar		Filtro Mostrar todo		-			
PNIO Module Asignación E/S	Variable	Asignación	Canal	Dirección	Tipo	Valor act	al Unidad	Descripción
Five Five and the standing for the standing of			Additional Data Area 00	%ID2.33	UDINT	0		
Lista de mapeado E/S	۰. 🍫		Additional Data Area 01	%ID2.34	UDINT	11		
	۰. *		Additional Data Area 02	%ID2.35	UDINT	0		
Información	🗄 - 🍫		Additional Data Area 03	%ID2.36	UDINT	0		
	۰. ۲۰		Additional Data Area 04	%ID2.37	UDINT	0		
	🗄 - 🍫		Additional Data Area 05	%ID2.38	UDINT	0		
	- *		Additional Data Area 06	%ID2.39	UDINT	0		
	😟 🍫		Additional Data Area 07	%ID2.40	UDINT	0		

Figure 23.- Reading additional data 1

#### PLC code – Pluto Manager

• Reading global variables:

Since the AS-i inputs and the safety outputs are global variables, a basic network is enough to check this communication.



Figure 24.- PLC code Reading global variables

• Reading additional data:

In order to read the additional data 1 previously configured, the function block used is the block "ToGateway User\_A". This block sends two register values to the configured user, in this case, user "No" 1.

SM_1Hz SM1.3	ToGateway User_A NonSafe	Dato_1 GM1.0	
····   ····-	Send Q	< >-	
1	No		
11	Reg_0		
0	Reg_1		

Figure 25.- PLC code Reading additional data

The connectors have the next functions:

- <u>Send:</u> When enabled, data is transmitted. SM\_1Hz is used to reduce the frequency of sending information.
- <u>No:</u> Number 1..99 to identify the data. This number must be the same that the configured in the gateway.
- <u>Reg\_0 & Reg\_1</u>: Input for registers.

If the configuration is right, the PLC controller receives the value from the registers.

Parámetros PNIO	Buscar			Filtro	Mostrar	todo			-
PNIO Module Asignación E/S	Variable	Asigna	Canal	(	Direcci	Тіро	Valor a	Unidad	Descrip
Fisto Fiodale Asignation 2/3	💷 🦄		Additional Data Area 00		%ID	UDINT	0		
Lista de mapeado E/S	🗐 - 🍫		Additional Data Area 01		%ID	UDINT	11		
			Additional Data Area 02		%ID	UDINT	0		
Información	🖽 ᡟ		Additional Data Area 03		%ID	UDINT	0		
	۰۰ 🍫		Additional Data Area 04		%ID	UDINT	0		
	🕀 - ᡟ		Additional Data Area 05		%ID	UDINT	0		
	🔲 🗄 🖓		Additional Data Area 06		%ID	UDINT	0		
	😟 🍫		Additional Data Area 07		%ID	UDINT	0		

Figure 26.- Checking communication additional data

#### Writing information

In case it is needed to send information from the controller to the Pluto, the procedure needed is as follows.

Configuration of the gateway Gate PN in Pluto Manager:

A gateway can totally transfer 64-bit variables and 8 registers from other field buses to the Pluto

bus. The area "Data to Pluto" is divided into four packets each with 16-bit variables and two

registers and is organized according to the table below.

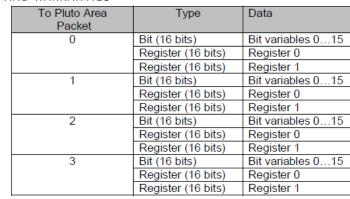


Figure 27.- "Data to Pluto" data allocation

To configure the gateway, press "External Communication" in the Pluto menu, within the Pluto Manager.

📱 Pluto Manager - [ASi_GatePN - Plu	ito 1]
File Search Tools Window	Help
Open Save Print Comp. Down Online	Start Bus St AS-I St Bus
Preferences Project as Project as AS-Options Variables Project AS-CateRN AS-Options Variables Project AS-CoteRN AS-Options Variables Project AS-CoteRN Project AS-CoteRN AS-Options Project AS-CoteRN Project A	ASI_GatePN - Pluto 1 Family = AS-i Model = AS-i v2 Instruction set 3 DFIX Number (12 hex digits) Coccosor real real IDFIX number from Pluto Pluto Description This program is used to test the communications between a Pluto AS-i and an AC500.
	B Advanced Settings External Communication Remanent Variables

Figure 28.- Clicking external communication

In the new window displayed is needed to select the gateway from which the Pluto will receive data (1) and the packet available (29.2).

External Communication (Receive data)	×
External Comm Block 0 [Reg 0-1, Signal 0-15] 1 Gateway 0  2 Packet 0	Timeout
External Comm Block 1 [Reg 2-3, Signal 16-31] Gateway 0   Packet 1	Timeout
External Comm Block 2 [Reg 4-5, Signal 32-47] Gateway 0   Packet 2	Timeout
External Comm Block 3 [Reg 6-7, Signal 48-63] Gateway 0   Packet 3	Timeout
✓ Ok	X Cancel

Figure 29.- Configuration Gateway receiving data

The configuration of the gateway is done.

To send information to the gateway, the only thing needed is set the value of the configured registers (packet 1-4).

For this example, set names for the registers that are going to be written.

Parámetros PNIO	ッマ × Eliminar mapeados	T			
	Nombre del objeto	Variable	Canal	Dirección	Tipo
PNIO Module Asignación E/S	Data_to_Pluto_Area_0		Area 0 Bits	%QW2.0	UINT
Lista de mapeado E/S	Data_to_Pluto_Area_0	bit0	Area 0 Bits - Bit0	%QX2.0.0	BOOL
	Data_to_Pluto_Area_0	bit1	Area 0 Bits - Bit1	%QX2.0.1	BOOL
Información	Data_to_Pluto_Area_0	bit2	Area 0 Bits - Bit2	%QX2.0.2	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit3	%QX2.0.3	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit4	%QX2.0.4	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit5	%QX2.0.5	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit6	%QX2.0.6	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit7	%QX2.0.7	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit8	%QX2.1.0	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit9	%QX2.1.1	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit10	%QX2.1.2	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit11	%QX2.1.3	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit12	%QX2.1.4	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit13	%QX2.1.5	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit14	%QX2.1.6	BOOL
	Data_to_Pluto_Area_0		Area 0 Bits - Bit15	%QX2.1.7	BOOL
	Data_to_Pluto_Area_0	Registro0	Area 0 Register 0	%QW2.1	UINT
	Data to plate tree 0		A	N 012 3 0	2001

Figure 30.- Setting variables names

Using the "MOVE" command is enough to set the desired value to the selected bit/register.

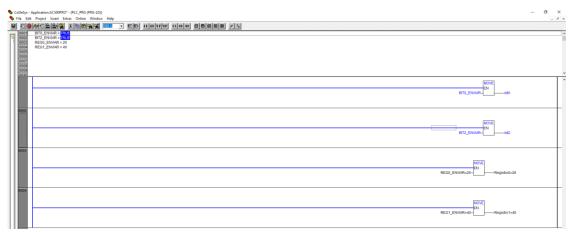


Figure 31.- Setting value to bits and registers (1)

0001	BIT0_ENVIAR = TRUE
0002	BIT2_ENVIAR = TRUE
0003	REG0_ENVIAR = 26
0004	REG1_ENVIAR = 40
0005	

Figure 32.- Values set to the gateway

#### PLC code – Pluto Manager

The block used for getting information from the gateway is the block "ExtVarBlock". The only input a configure is the "BlockNo". Use a constant block to introduce the block number needed to be read, in this case the 0. In the outputs the values send from the PLC controller will be displayed. In the bit outputs "output coils" can be used and for the registers outputs "Register results"

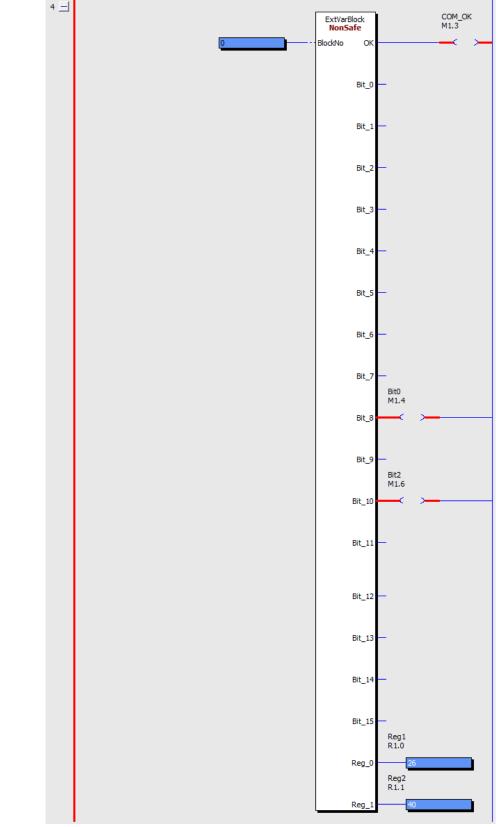


Figure 33.- Information received from AC500

## **FAQs**

Does the information transmitted or received through the gateways can be used in safety functions?

No, the information transmitted by this way can only be used for NON-SAFETY functions, it is only informative.

## Are the function blocks explained in this document the only ones able to communicate a Pluto with another PLC/Controller?

No, there are more function blocks depending on the type of information to transmit/receive (number of bits or registers).

#### How does the communication between devices take place? Directly between PLC?

The communication is always between a PLC/controller-gateway and between Pluto-gateway. The gateway stores all the information and the other devices send information to it or receive information from it.

First Pluto project: https://www.youtube.com/playlist?list=PLf6X6x2ECXPWNvrZ0k-2ePSH6BhWXQCR4

Training videos:

https://www.youtube.com/playlist?list=PLge96zSySnICY9Qgj8RxBWskZaOORrQXc

Pluto programming manual: https://library.e.abb.com/public/336c06f3bb5545fcb8dbbf0452feac90/2TLC172002M0218\_A\_Pluto\_Programming\_Manual.pdf

Pluto Hardware manual: https://library.e.abb.com/public/80fe80e7dbd1436c85042fe1223958a6/2TLC172001M0212\_A\_Pluto\_Hardware\_Manual.pdf

Gate PN webpage: https://new.abb.com/products/2TLA020071R9300/gate-pn-pluto-gatewayethernet-profinet

ABB Jokab Safety Main Catalog: http://search.abb.com/library/Download.aspx?Documen-tID=2TLC010001C0202&LanguageCode=en&DocumentPartId=&Action=Launch