Product Description

The PO5064 and PO5065 modules are Ponto® Series modular PROFIBUS-DPV1 slave heads for PROFIBUS fieldbus that can use all I/O modules from this Series. They can be connected to HMIs (keyboards and displays), creating a powerful human-machine interface on remote PROFIBUS.

The picture shows the product mounted over a PO6500 base, with power supply terminals and PROFIBUS-DP fieldbus terminals.



The module main features are:

- PROFIBUS-DP slave protocol for I/O data communication compatible with any PROFIBUS-DP master device, according to EN50170 standard
- Allows to use I/O modules which utilize HART protocol
- I/O modules access through PONTO Series data bus
- · Connects up to 20 I/O modules
- PO5064 has reading capacity up to 200 input bytes and writing capacity up to 200 output bytes
- PO5065 has reading capacity up to 198 input bytes and writing capacity up to 198 output bytes
- Allows local use of HMIs, used as an interface between HMIs and PROFIBUS-DP fieldbus
- · Hot swap of I/O modules
- Automatic configuration and parameterization of all I/O modules through PROFIBUS-DP master or PROFIBUS-DPV1 Class 1
- Diagnosis and local operation states through panel LEDs
- Sending of diagnosis to PROFIBUS-DP master or PROFIBUS-DPV1 master
- Network address on the base, avoiding addressing errors when changing the head
- 12 Mbits of maximum baud rate
- Automatic baud rate detection
- Label available in front panel to identify equipment
- Module exchange without disassembling the base and electrical wiring
- Standard serial RS-232 supervision interface, for forcing and supervising I/O points and local diagnosis

Redundant PO5065 head features:

- · Possibility of configuration of a redundant PROFIBUS-DP slave remote fieldbus with two PO5065 heads
- It provides redundancy of the PROFIBUS-DP channel, modules power supply and of modules bus access
- · Hot swap of fieldbus head with external power supply on
- Hot-expansibility: expansion of nodes and/or modules without disabling the filedbus

Revision: B

Ordering Information

Included Items

The product packaging contains the following items:

- PO5064 or PO5065 module
- Installation guide

Product Code

The following code must be used when ordering the product:

Part Number	Description
PO5064	PROFIBUS-DPV1 head
PO5065	Redundant PROFIBUS-DPV1 head

Related Products

The following products must be purchased separately when necessary:

Part Number	Description
PO6500	PROFIBUS head base
AL-2601	PROFIBUS connector
AL-2602	PROFIBUS terminator connector
AL-2605	Terminator with power supply diagnostic
AL-2303	PROFIBUS cable, diameter 7.1 mm
AL-1715	RJ45-CFDB9 cable
AL-1719	RS-232C RJ45-CMDB9 cable
AL-1720	RS-485 / RS-232C RJ45-CMDB9 cable
AL-3865	ProfiTool
MT6000	MasterTool ProPonto
PO8510	10 sheets with 14 labels of 14 tags for printer

Notes

PO6500: this base has terminals for PROFIBUS cable, dispensing DB9 connectors like AL-2601 and AL-2602.

AL-2601: PROFIBUS connector used for connection between the module and the PROFIBUS fieldbus, if multi-drop connection (i.e. module in the middle of field bus segment) is necessary.

AL-2602: terminator connector used for connection between the module and PROFIBUS fieldbus, if termination (i.e. module in the end of the field bus segment) is necessary.

AL-2605: this device is mounted in a PROFIBUS fieldbus end. It allows fieldbus normal operation when master and slave devices placed on fieldbus end positions are turned off. It has an internal terminator element and redundant power supply units. It has normal operation diagnostic through relay dry contact.

AL-1715: this cable has a RJ45 connector at one end and a standard female IBM/PC DB9 (RS-232C) connector at the other end. It can be used for:

- Interface to HMIs with standard IBM/PC connector, for local process supervision
- Interface to standard IBM/PC microcomputer with supervision software
- Interface to standard IBM/PC microcomputer for local variable monitoring and forcing, through MasterTool software, if desired

Revision: B

AL-1719: this cable has a RJ45 connector at one and a DB9 (RS-232C) male with Altus standard pin-out. It can be used for connection to a CIMREX Series HMI.

PO8510: this product consists of A4 sheets with labels where the tags may be printed, in the case the user wishes so, using MasterTool ProPonto Software - MT6000.

AL-3865: ProfiTool software is a fieldbus universal configurator. It allows configurations of Altus master and slave devices from fieldbus that use PROFIBUS DP protocol.

MT6000: MasterTool ProPonto software is used to configure Ponto Series modules. The software is not needed to configure the PROFIBUS head, but it has some functions that assist system design:

- Data bus design and view in graphics environment
- Configuration, validation verification, checking issues as power consumption, compatible bases and project limits
- System I/O points tag settings. Label generation to identify modules
- Bill of materials generation



Product Features

General Features

	PO5064
Module type	PROFIBUS-DPV1 head
Communication protocol	PROFIBUS-DPV1, EN50170 standard
Maximum number of digital I/O	320, with 16 points modules
points	640, with 32 points modules
Maximum number of modules	20
Maximum number of segments	4
Input data capacity	200 bytes
Output data capacity	200 bytes
Baudrate	Automatic baudrate detection 9.6 to 12000 Kbit/s
Terminal configuration with	1 terminal of 3 inputs for power supply (+ 24 Vdc, 0 Vdc and G)
PO6500 base	1 terminal of 3 inputs for PROFIBUS fieldbus input (B, A and
	G)
	G)
	1 RJ45 connector for RS-232C local supervision
Diagnosis indication	Yes, one multifunctional LED (DG)
State indication	OL, LC, ER and WD LEDs
Hot swap	Yes, for I/O modules
Protections	Power supply fuse available on base
External power voltage	19 to 30 Vdc ripple included
	max. consumption 620 mA @ 24 Vdc with 12 I/O modules
Isolation	1500 Vac up to 1 minute (external power supply to logic)
Power dissipation	4.5 W @ 24 Vdc with 12 I/O modules
Maximum operation temperature	00 °C
Dimensions	100 x 52 x 84 mm
Supervision interface	RS-232C
Supervision interface communication protocol	ALNET I V 2.0
Standards compliant	EN 50170 European PROFIBUS Standard
Compatible bases	PO6500: PROFIBUS fieldbus head base
GSD Files	ALT_0BAF.GSD

Revision: B

Revision: B

PO5064, PO5065

	PO5065
Module type	Redundant PROFIBUS-DPV1 head
Communication protocol	PROFIBUS-DPV1, EN50170 standard
Maximum number of digital I/O	320, with 16 points modules
points	640, with 32 points modules
Maximum number of modules	20
Maximum number of segments	4
Input data capacity	200 bytes: 198 data bytes + 2 redundant status bytes
Output data capacity	200 bytes: 198 data bytes + 2 redundant status bytes
Baudrate	Automatic baudrate detection 9.6 to 12000 Kbit/s
Terminal configuration with PO6500 base	1 terminal of 3 inputs for power supply (+ 24 Vdc, 0 Vdc and G)
	1 terminal of 3 inputs for PROFIBUS fieldbus input (B, A and G)
	1 terminal of 3 inputs for PROFIBUS fieldbus output (B, A and G)
	1 RJ45 connector for local supervision
Diagnosis indication	Yes, one multifunctional LED (DG)
State indication	OL, LC, DG, ER and WD LEDs
Hot swap	Yes, for I/O modules
	Yes, for PO5065 module with external power turned on
Protections	Power supply fuse available on base
External power voltage	19 to 30 Vdc ripple included
	max. consumption 620 mA @ 24 Vdc with 12 I/O modules
Isolation	1500 Vac up to 1 minute (external power supply to logic)
Power dissipation	4.5 W @ 24 Vdc with 12 I/O modules
Maximum operation temperature	60 °C
Dimensions	100 x 52 x 84 mm
Supervision interface	RS-232C
Supervision interface communication protocol	ALNET I V 2.0
Standards compliant	EN 50170 European PROFIBUS Standard
	PROFIBUS GUIDE-LINE ORDER no. 2.212-PROFIBUS ESPECIFICATION SLAVE REDUNDANCE version 1.0
Compatible bases	PO6500: PROFIBUS head base
GSD Files	ALT_0BB0.GSD

Notes

Power supply interruptions: power supply interruptions, during at least 10 ms may be supported, since the module is operating in its nominal voltage of 24 Vdc or greater. Longer interruptions or in voltages lower than its nominal one may cause module reset.

Compatibility With Other Products

The following table describes the main Altus products compatible with the PO5064/PO5065 heads.

	Compatible version
ProPonto MT6000	1.59 or upper
MasterTool MT8000	5.42 or upper
ALT_0BAF.GSD (PROFIBUS)	1.00 or upper
ALT_0BB0.GSD (PROFIBUS)	1.00 or upper

I/O Capacity

- A remote PROFIBUS, implemented with module PO5064/PO5065, has its capacity bounded by following values:
- total maximum number of modules: 20.
- maximum number of bus segments: 4.
- maximum total of bytes to be transmitted over network: 200 input bytes and 200 output bytes.

The maximum number of points depends on the point types used. The boundary for only digital points is 640 points (20 modules). The boundary for only analog points is 96 points (12 modules). The maximum number of a mixed configuration for PO5064 is bounded by number of bytes received or transmitted (200). For PO5065, the maximum number of a mixed configuration is bounded by number of bytes received or transmitted (198 for I/O byte + 2 bytes for redundancy control). Each module requires the following number of bytes:

- 16 points digital modules: 2 bytes.
- 32 points digital modules: 4 bytes.
- 4 points analog modules: 8 bytes.
- 8 points analog modules: 16 bytes.

For further information, we suggest consulting PROFIBUS Remote Configuration Manual (MU209010) and PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual (MU219511).

Power Supply Capacity

The PO5064/PO5065 heads have a power supply with capacity of supplying up to 12 I/O modules. For supplying more than 12 modules, it is necessary to use PO8085 power supply in the beginning of next bus segment. For PO5065, the redundancy of power supply does not increase modules capacity on bus.

Revision: B

Local Supervision Interface

Like a unique feature, this head also has a serial interface which can be used to interconnect a local HMI for local supervision and diagnosis via MasterTool software.

Interconnection to HMIs

It creates a powerful local interface in remote PROFIBUS.

HMI can read or write from/to virtual modules, allowing interaction with master control variables. Virtual modules are a set of bytes which does not have correspondence with local hardware, but they may be written or read by HMIs.

HMIs must hold communication protocol ALNET I V2.0, and it may be simple HMIs or even microcomputers with supervision software.

Supervision softwares: Any supervision software compatible with ALNET I V2.0 protocol.

Local Supervision and Diagnosis via MasterTool Software

- · It enables monitoring and forcing of points
- It enables local complete head diagnosis





PO5064, PO5065

Revision: B

Redundancy Capacity

PO5065 head has the capacity of being connected to another PO5065, sharing the same I/O modules, organizing a redundant system which provides greater reliability to field bus. The implemented redundant system is Altus Redundancy System, based on European PROFIBUS Redundancy Standard.

Implementation of Altus Redundancy System

The Redundancy System basically consists of two PO5065 field bus heads connected between them in same Ponto Series® I/O modules bus. Each head is connected to a PROFIBUS master interface. One of these heads, so called Primary, is

responsible for reading and writing Input and Output modules. The other one, called Standby, has monitoring function. When Primary head presents some problem, the Standby head assumes Ponto Series® bus command, with no damage to the application that is running.

The Redundancy System has the following features (according to PROFIBUS Redundancy Standard):

- PO5065 modules cannot be connected individually on Ponto Series bus.
- The Redundancy System may be implemented with masters that do not have redundancy features. For this it is necessary that the application in CPU implements the redundancy algorithm described on PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual.
- The Redundancy System may be implemented with a Master that fits itself to the implementation form PO5065 module (PROFIBUS PX3406 Master, for instance).
- Information about redundancy are controlled by a virtual module which is accessed by the master as a common I/O module.
- Standby head is identified by LED LC lit.
- A nodes/modules expansion may be done without disabling the PROFIBUS fieldbus (hot-expansibility) through Redundancy System.
- It is possible to define a safe state that supports the outputs for a parameterized time, in the case the redundancy system does not have communication with master.
- It allows any PO5065 head hot swap without affecting the application. This operation is possible since the two heads are at Primary or Standby state.
- It is possible to request state transition Primary/Standby (Switch Over) to the redundant system through master commands.



Revision: B

Redundant System Configurations

The redundant system may serve various field bus configuration types.

Configuration A

It allows maintaining system operation even if a fault occurs in a slave redundant head, interruption of data transmission line or a fault in one of Master interfaces. This configuration type is composed by a CPU connected to two PROFIBUS (PX3406) Master interfaces. These interfaces compound networks A and B, each one with its PO5065 heads. In the presented example, the PLC is formed by one PX2004 CPU and two PROFIBUS PX3406 Master Interfaces.



Configuration B

It allows maintaining system operation even if a fault occurs in a slave redundant head, interruption of data transmission line, in one of Master interfaces or in one of Masters. This configuration type is composed by two CPU Masters, each one connected to two PROFIBUS Master interfaces. In the presented example, each CPU is formed by one PX2004 and two PROFIBUS PX3406 Master Interface.



PROFIBUS-DPV1 Head

Doc. Code: CE109511

```
PO5064, PO5065
```

Revision: B

Installation



ATTENTION:

ESD (Electro Static Discharge) sensitive device. Always touch a grounded metal object before handling the device.

Electrical Installation

The diagram shows 24 Vdc power supply wiring and PROFIBUS cable with PO5064/PO5065 module installed on PO6500 base. PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual must be consulted for further details.



Diagram Notes:

1 – PROFIBUS fieldbus cables are directly connected to the terminal base identified by A and B and ground shielding.

2 – If the head is the last element in a PROFIBUS fieldbus, SW1 key must be commuted to ON. Thus the terminal resistors demanded by field bus are added.

3 - Two hexadecimal keys program the PO5064/65 PROFIBUS address. SW2 is the most significant digit.

- 4 PO6500 base has terminals for direct link of PROFIBUS cable and incorporates the impedance compensation circuit. Thus is not necessary to use special connectors like AL-2601 and AL-2602.
- 5 The power source of 24 Vdc is connected to terminals "+24 Vdc", "0 Vdc" and grounding "G".
- 6 The common point of the power source of modules (0 Vdc) must be turned on ground from electrical panel. This joining is not mandatory, but is recommended to minimize electric noise in an automation system.
- 7- RJ45-RS232C standard interface for connection of a local HMI.

ATTENTION:

Atmospheric discharges (lightnings) may cause damages to the modules although their protections.

Additional protections should be used if module's power comes from a power supply located outside the cabinet where the module is installed, because this makes it vulnerable to this kind of discharges.

If the field wiring of input points is susceptible to this kind of discharge, surge suppressors should be used.

Mechanical Assembly

The mechanical assembly is described in the Ponto Series Utilization Manual (MU209000). There are no special requirements in mechanical assembly of this module.

Please, adjust the module base mechanical code to 64 (6 on switch A and 4 on switch B) when assemblying PO5064 module, and to 65 (6 on switch A and 5 on switch B) when assemblying PO5065 module.

Parameterization

Head parameterization and modules parameterization attached to it is done remotely with PROFIBUS-DP or PROFIBUS-DPV1 software for master configuration.

In the case of masters made by Altus, this software is denominated ProfiTool. Head parameters are transmitted through PROFIBUS-DP net, without the necessity of additional configuration.

Head parameters are described in its Utilization Manual and are related to operation modes aspects as:

- · Modules hot swap
- · Points forcing
- Safe state

Modules parameterization is described in their Technical Characteristics. For further information about modules parameterization consult PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual.

GSD File

All parameterization options of head and modules are defined in the PROFIBUS standard file called GSD. This file, for PO5064 PROFIBUS DPV1 head, is called ALT_0BAF.GSD and, for PO5065 PROFIBUS DPV1 redundant head, is called ALT_0BB0.GSD. Using these heads with other manufacturers' masters, the GSD file can be obtained and is also available on www.altus.com.br website or by contacting Altus technical support.

Revision: B

Diagnostics

The heads and attached modules diagnostics are available remotely through master PROFIBUS-DP or master PROFIBUS-DPV1 configuration program connected to fieldbus master.

In the case where Altus manufactured the masters, this software is called ProfiTool.

Diagnostic LEDs

The state and diagnostic LEDs of this module are described in its Utilization Manual.

Physical Dimensions

Dimensions in mm.

Ponto Series installation manual must be consulted for panel dimensioning.



Maintenance

The PO5064 PROFIBUS head can substitute the PO5063V1 in case of maintenance and replacement. But it is necessary to make changes on the project. Specially, in the software used for configuration and programming, in order to adjust the operation according to PO5064 PROFIBUS head.

The Redundant PO5065 PROFIBUS head can substitute the PO5063V5 in case of maintenance and replacement. But it is necessary to make changes on the project. Specially, in the software used for configuration and programming, in order to adjust the operation according to PO5065 PROFIBUS head.

In case of heads replacement, both PO5064 and PO5065, it is necessary to use the correspondent GSD file in order to avoid configuration problems, because each type of head has its own identification.

Revision: B

Manuals

For using the products, PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual (MU219511) must be consulted.

For further technical details about Ponto Series configuration, installation and programming, the following documents must be consulted:

Document number	Description
CT109000	Ponto Series General Characteristics
MU219511	PO5064 PROFIBUS Head and PO5065 Redundant PROFIBUS Head Utilization Manual
MU299026	PROFIBUS Fieldbus Utilization Manual
MU209010	Remote PROFIBUS Configuration Manual
MU209000	Ponto Series Utilization Manual
MU203026	ProfiTool Utilization Manual - AL-3865
MU229040	MT6000 Utilization Manual - MasterTool ProPonto
MU209020	HART Network Utilization Manual Over PROFIBUS