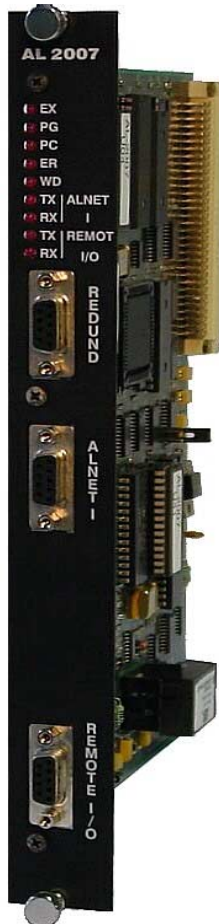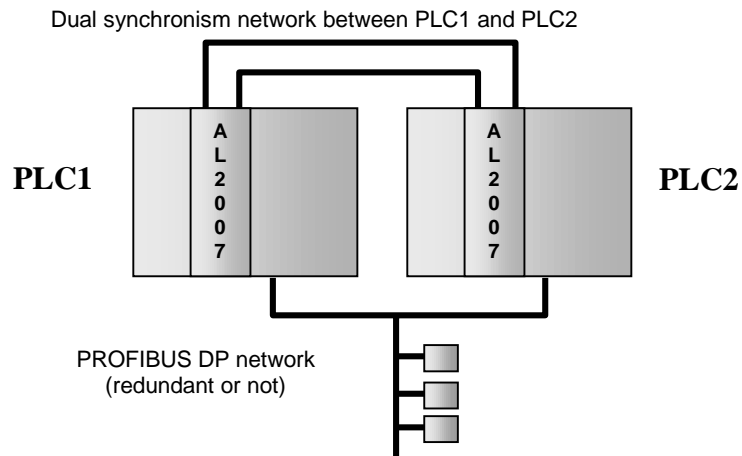# Redundancy Coprocessor   AL-2007

Product Description

The AL-2007 coprocessor is used in redundant configurations of the AL-2004 PLC, with redundant or non-redundant PROFIBUS DP remote I/O system.

The hot-standby redundancy is used in applications that require high degree of availability, where two complete AL-2004 PLCs are connected to the same remote I/O system.

The AL-2007 module synchronizes the two PLCs.

Dual synchronism network between PLC1 and PLC2

PROFIBUS DP network
(redundant or not)

The AL-2007 module has the following features:

- may synchronize up to 2016 bytes of redundant memory on each scan cycle, for operands types M, I, D, F, TM, TI, TD, TF, and other 192 operands of A
- can synchronize additionally up to 50 multiplexed blocks of operands (one block per scan cycle)
- fast automatic switchover in case of failure of the active PLC
- connects to a redundant or non-redundant PROFIBUS DP remote I/O system
- detailed diagnostics for AL-2007 communication channels and remote I/O system
- event log makes it easy to analyze failures and switchover occurrences

For additional details about the AL-2007 function, see sections Software Characteristics and Functional Characteristics.

Ordering Data

Included Items

The product package contains the following items:

- the AL-2007 module
- CD with:
    - AL-2007 User Manual
    - EVCAPT and EVLOG programs for capture and exhibition of the event log

Product Code

The following code must be used for purchasing the product:

Code	Description
AL-2007	Redundancy Coprocessor

Related Products for Obligatory Acquisition

The following products should be purchased.

Code	Description
AL-1366	Cable CMDB9-CMDB9
AL-3116	Module with 16 ED 24 Vdc
AL-3201	Module with 16 SD 24 Vdc / 2 A
AL-2300	Cable UCP to AL-2600
AL-2301	RS-485 Cable for ALNET II network
AL-2600	Network terminator

Remarks

AL-1366: This cable connects the REDUND connector of the two AL-2007.

Related Products

The following products should be purchased separately when necessary.

Code	Description
AL-3630	Rack for Power Supply, UCP and 4 modules
AL-3632	Rack for Power Supply, UCP and 8 modules
AL-3634	Rack for Power Supply, UCP and 16 modules
AL-3635	Rack for Power Supply, UCP and 8 intelligent modules
AL-3640	Rack for Redundant Power Supply, UCP and 6 modules
AL-3511	Power Supply 80 W Input 24-48 Vdc
AL-3512	Power Supply 80 W Input AC/DC
AL-2004	UCP for 2.048 digital I/O points – 1 Mbyte Flash
AL-3406	PROFIBUS Master Interface
AL-3416	PROFIBUS Slave Interface
QK1404	PROFIBUS Slave Interface
PONTO	Ponto Series (remote I/O)

Remarks

PONTO: Ponto Series, among other functions, allow the configuration of PROFIBUS DP remote I/O sub-systems. See the Ponto Series User Manual for more information.

Characteristics

The AL-2007 coprocessor has the following characteristics:

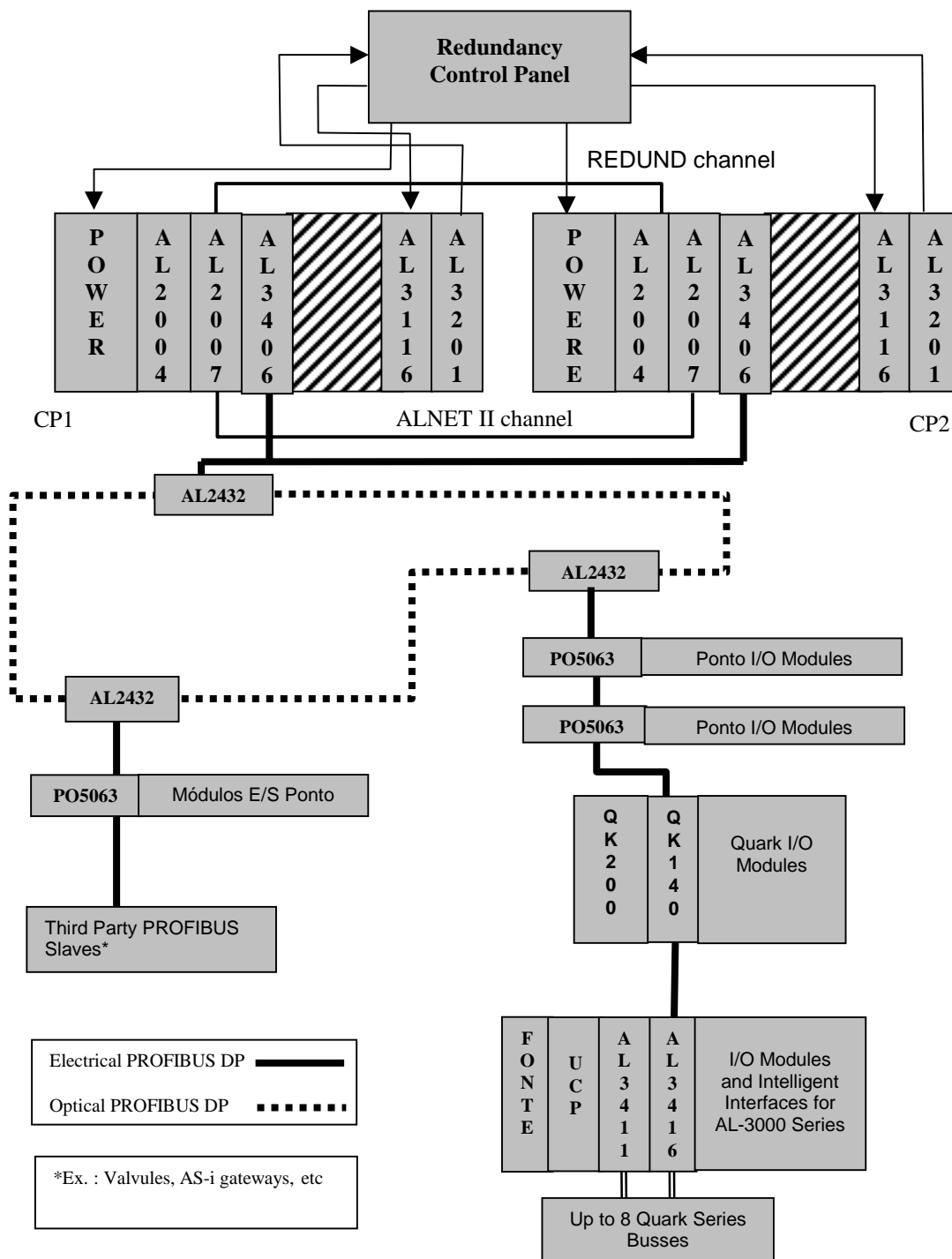|	AL-2007
Module Type	Redundancy Coprocessor
Power consumption	300 mA @ +5 Vdc 250 mA @ +15 Vdc 30 mA @ -15 Vdc 70 mA @ +5 Vbb 30 µA @ +5 Vbb when powered off
Heat dissipation	11 W
Frontal Connectors	• REDUND: DB9 female (communicates with the other AL-2007 for diagnostics) • ALNET I: DB9 female (local diagnostics via MasterTool programmer) • REMOTE I/O: DB9 female (communicates whit the other AL-2007 for memory synchronism and diagnostics)
LEDs	• EX: execution state • PG: not used • PC: communication with AL-2004 CPU through local bus • ER: error condition • WD: watchdog • TX ALNET I: data transmission on ALNET I network • RX ALNET I: data reception on ALNET I network • TX REMOT I/O: data transmission on ALNET II network • RX REMOT I/O: data reception on ALNET II network
Operation Temperature	0 to 60 ^{o}C
Storage Temperature	-25 to 75 ^{o}C
Humidity	5 to 95% without condensing
Weight	without package 420 g with package 570 g
Protection Degree	IP 30
Protection Against Shock Hazard	according standard IEC 536 (1976), class I
ESD Immunity	according standard IEC 1131 level 3
Immunity to Electromagnetic Radiated Field	10 V/m @ 140 MHz, according standard IEC 1131
Supervision Circuit	watchdog
Configuration	Redundancy Wizard available on the MasterTool programmer (see AL-2007 User Manual)

Compatibility with Other Products

In the following products, the software revision must be equal or newer than the following:
- AL-2004: v1.22
- AL-3406: v1.14
- MasterTool MT4100: V3.80

Software Characteristics

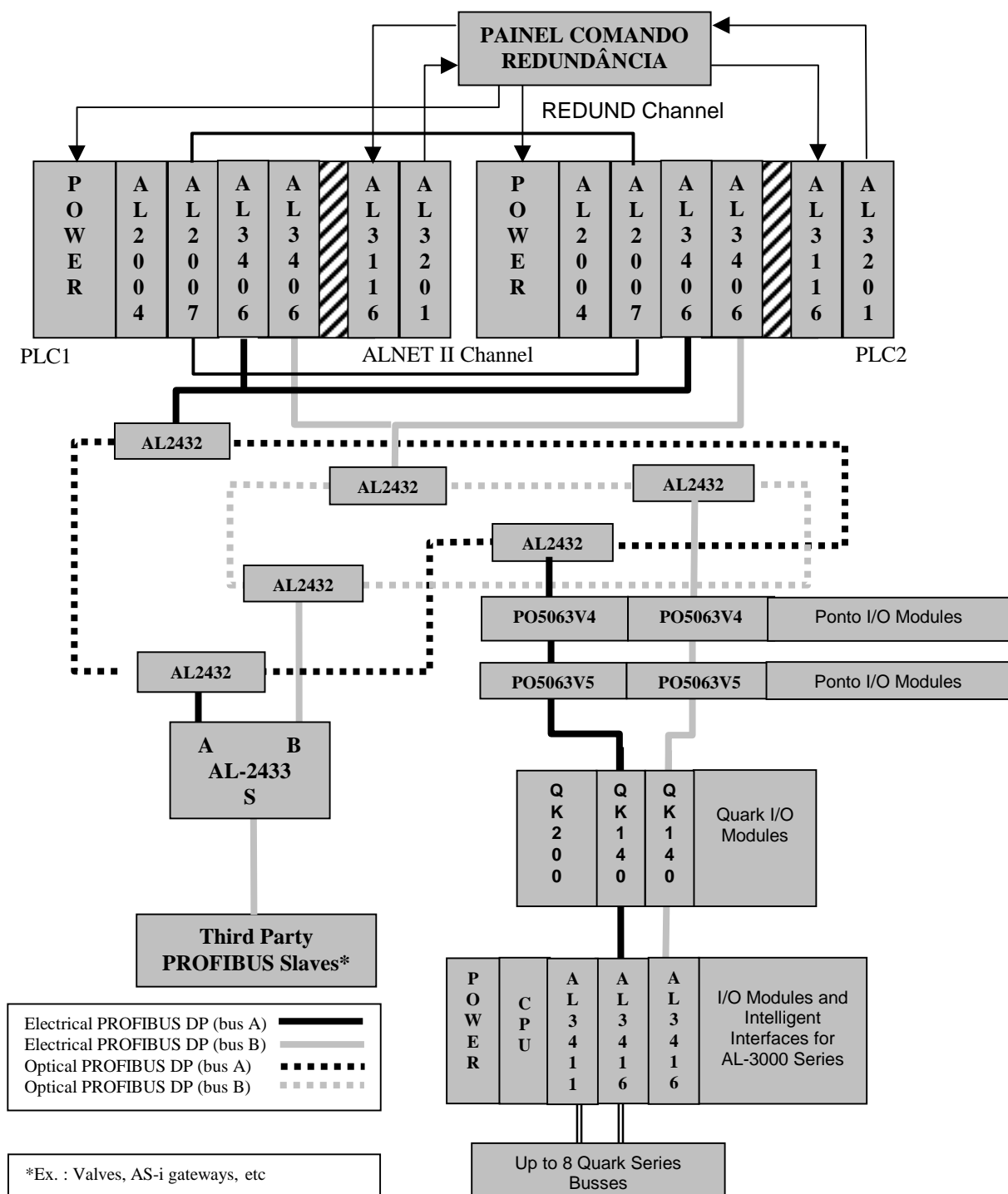|	
Main Redundant Memory	up to 2016 bytes for operands M, I, D, F, TM, TI, TD, TF
Multiplexed Redundant Memory	up to 50 blocks. A channel should be allocated inside the 2016 bytes of main redundant memory.
Redundant Memory for A type Operands	up to 192 bytes
Type of Redundant Operands	A, M, I, D, F, TM, TI, TD, TF
Main Diagnostics	• redundant state for local and remote PLC • configuration failures • bus failures • ALNET II network failures and statistics • REDUND network failures
Event log for redundancy	• last 36 events are logged retentively • capture and exhibition through programs EVCAPT and EVLOG

Architecture with Non-Redundant PROFIBUS-DP

In the previous figure, the AL-2007 of PLC1 and PLC2 are connected through ALNET II and REDUND networks. Each PLC (PLC1 and PLC2) has only one PROFIBUS master interface (AL-3406), because PROFIBUS network is not redundant in this architecture.

In this example the PROFIBUS network is configured as a redundant optical ring deriving RS-485 segments, using AL-2432 repeaters. This is an interesting way to achieve better optical media reliability.

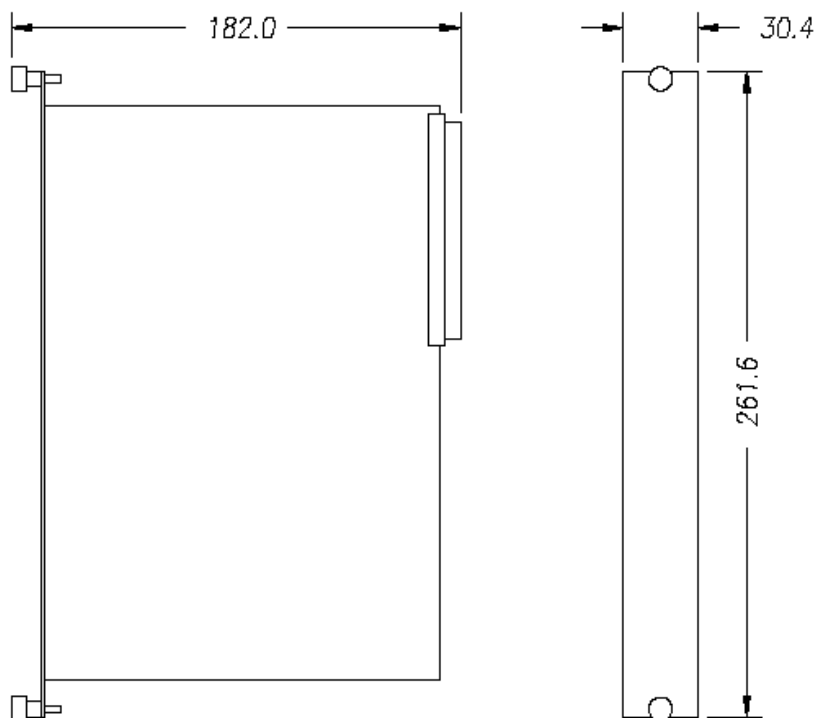## *Architecture with Redundant PROFIBUS-DP*

The previous figure shows a redundant variation of the configuration with PROFIBUS I/O, to improve the fault tolerance. Each PLC has two PROFIBUS DP master interfaces (AL-3406). Additionally, each PROFIBUS remote I/O system has two slave interfaces.

Each PROFIBUS optical network is configured as an optical ring using AL-2432 repeaters, to achieve better reliability for the optical physical media.

The figure also shows the AL-2433 module (PROFISwitch), that allows connecting non-redundant PROFIBUS slaves to the PROFIBUS redundant network.

Physical Dimensions

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* Dimensions in mm (millimeters).

Manuals

Document Code	Description
MU200007	AL-2007 User Manual