USC 3003
REMOTE TERMINAL UNIT

The Remote Terminal Units (RTU's) for the remote control of electrical networks

GENERALITIES

The USC-3003's are Remote Terminal Units (RTU's) especially dedicated to the remote control of industrial processes in harsh environments, as for example encountered in the management of electrical networks.

The USC-3003's are designed around a powerful main CPU card controlling intelligent Input/Output cards in a multi-processor architecture. Terminal blocks are used for connecting the I/O cards to the equipment of the process under control.

The system is modular. It is offered in 19'' chassis with a height of 5 DIN Units.

In the basic 19" rack configuration, the maximum number of points handled is 448 (DI's only). The average capacity depends on the relative quantities of I/O types required. For example, a single rack can handle an average mix of 256 simple DI's, 128 simple DO's and 48 AI's, a total of 432 points.

The one rack configuration can be extended by chaining a number of identical racks. A maximum number of 4 racks is standard in this product range. With the same mix of I/O's as above, the number of points controlled is then 1792.

For even more demanding requirements, the configuration can be extended in specially tailored arrangements.

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The Main CPU Card

The main CPU card has a high processing power, with its IXP425 processor, 32 Mbytes of Flash, 64 Mbytes of SDRAM, 4 RS-232 lines (2 with RS-485 capacity).

Another level of connectivity is offered through two independent 10Base-T, 100Base-T network links, and one USB device port.

The main CPU card is responsible, amongst others, for the management of the system bus, for data processing (automates, archiving, periodic tests,..).

It is also in charge of the communication with the Control Center and external devices via serial buses, or LAN connections.

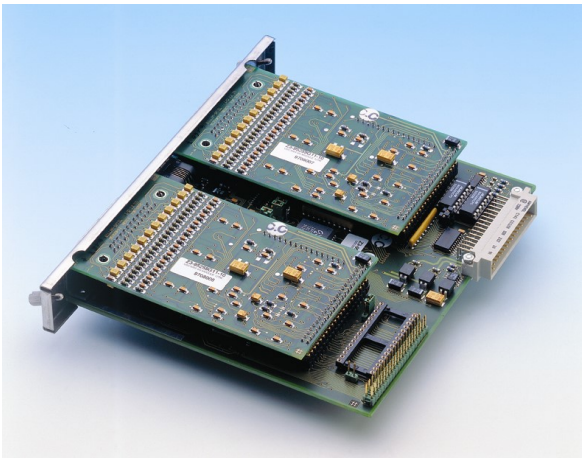
Time synchronization may be achieved through NTP.

Various software protocols are available, such as :

- From RTU to control center server
  - ♦ Serial Port Server
  - ♦ Telegam (GILLAM protocol)
  - ♦ CEI 870 / USC 3000 (GILLAM protocol)
  - ♦ RP570
  - ♦ CEI870-5-101 (RS-232)/104(TCP-IP)
- Engineering operations
  - ♦ Telnet : remote configurations
  - ♦ TFTP
- From RTU to substation local equipment
  - ♦ JBUS/MODBUS
  - ♦ CEI870/USC-3000
  - ♦ CEI870-5-103

Basic Input/Output Card (I/O Card)

I/O cards operate the pre-processing of the input/output data. Each card contains a microprocessor and the required resources, the whole dedicated to the immediate processing of the special functions (fine chronology, filtering, management of avalanches,..).



Communication between the main CPU card and I/O cards is serial, through the backplane and/or cables to the extension shelves if any.

Every raw I/O card can host a maximum of two I/O modules freely selected amongst DI, DO, AI according to the required configuration. A particular module interfaces directly to a companion Terminal Block through a simple shielded 25 wires cable.

Two serial lines are present per card, one interfacing the main CPU card, the other routed to the front of the card for supervision purposes.

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Digital Inputs Terminal Block (DI)

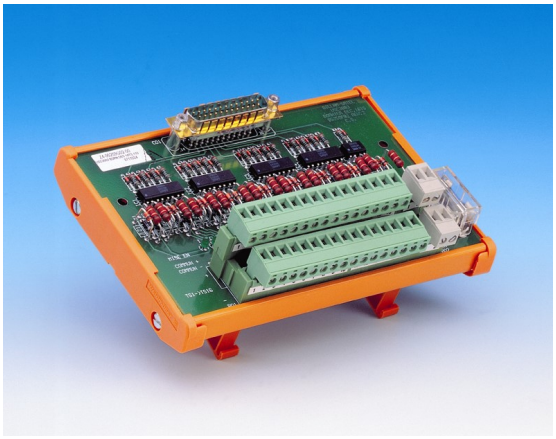
DI terminal blocks are used in conjunction with their companion module on one I/O card for the acquisition of digital input signals necessary to the management of the process under control by the Control Center.

The DI terminal blocks may be indifferently used for reading simple signalizations, double (complementary) signalizations, binary coded analog values and the acquisition of counting (totaling) pulses.

All DI's are isolated from each other, from ground and from any RTU voltage through opto-isolators.

Each terminal block offers 16 simple DI's, making one I/O card able to handle 32 simple DI's.

Input voltages are 24Vdc, 48Vdc or 110Vdc. Nominal current is 6 mA.



Digital Outputs Terminal Block (DO)

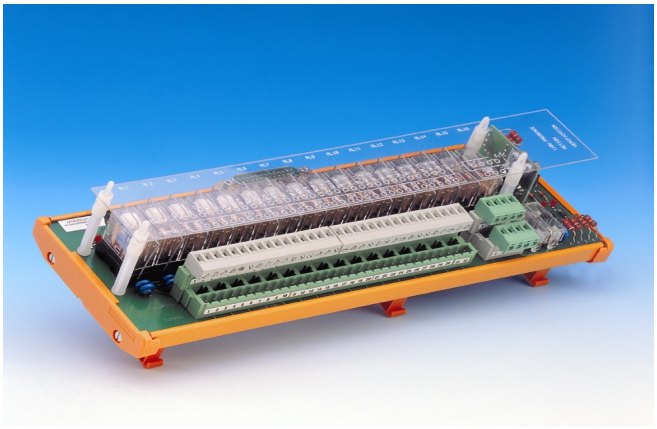
DO terminal blocks are used in conjunction with their companion module on one I/O card for the transfer of commands from the Control Center to the process under control.

Commands are executed on the addressed site under the form of simple outputs (momentary), simple outputs (permanent) or open/close (double) outputs.

These latter are always momentary (pulse), and use a double level relaying (object relays + action relay), together with a highly secured process set to work by the microprocessor of the I/O base card and dedicated logic on the I/O module and terminal block.

Each terminal block offers 16 simple outputs (32 maximum per I/O card). Simple outputs have Common/NO/NC contacts, free of any potential, and varistor protected.

Open/close outputs are available 8 per terminal block (16 maximum per I/O card). They apply the positive rail voltage to the open/close input of the controlled equipment.



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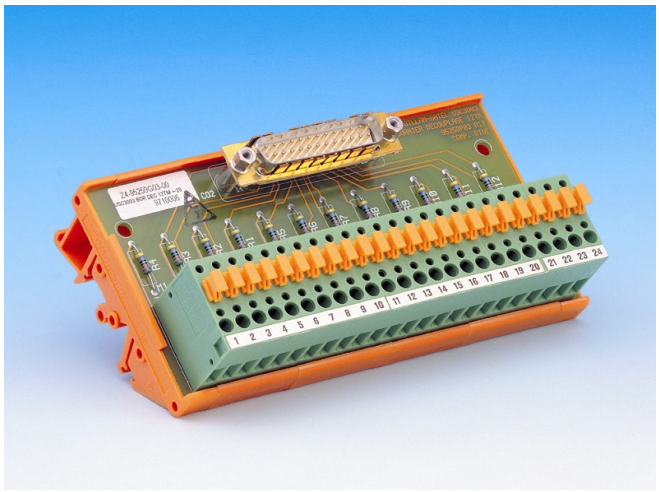
Analog Inputs Terminal Block (AI)

AI terminal blocks are used in conjunction with their companion module on one I/O card for the reading of analog values from the process under control.

The conversion of the value of the voltage or current measured is done on 12 bits.



Each terminal block offers 12 AI's, non isolated (24 AI's maximum per I/O card).

The various ranges handled are:

0 to 2,5V/5V/10V

0 to 10 mA/20mA/100mA.

(4 to 20 mA supported in 0 to 20 mA range)

-2,5 to +2,5V / -5 to +5V / -10 to +10V

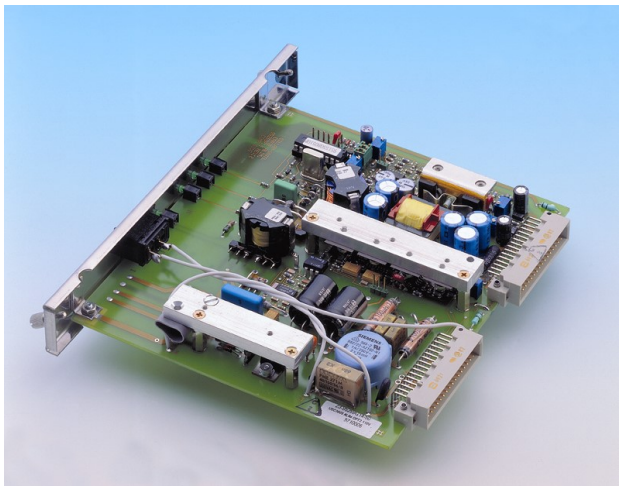
-10 to +10mA / -20 to +20mA / -100 to +100mA

Other ranges on request.

Power Supply Card

Input voltages supported :

- 40 to 60 Vdc
- 90 to 140 Vdc
- 190 to 250 Vac



Power : 20 W

Redundancy (option) : Two units may be used for increased availability. Load sharing mode.

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19'' shelf

Dimensions (l x h x d) in mm	486 x 200 x 220
Material	Stainless steel
Number of slots per shelf	16

Power supply card

Input voltage range for 48Vdc type	40 to 60 Vdc
Input voltage range for 110Vdc type	90 to 140 Vdc
Input voltage range for 230Vac range	190 to 250 Vac
Power consumption	< 20 Watts
Internal voltages	+5Vdc ; +12Vdc ; -12Vdc

CPU card

Processor	Intel IXP425
Frequency	266 MHz
SRAM Memory	64 MB
FLASH Memory	32 MB
Integrated logic	Real-Time clock/calendar, watchdog, reset, alarm
Ethernet ports	2 independent 10/100 Base-T ports
Serial Line #1	RS-232 (or integrated modem)
Serial Line #2	RS-232
Serial Line #3	RS-232 or RS-485 non isolated fieldbus
Serial Line #4	RS-232 or RS-485 non isolated fieldbus or Time Of Day
USB port	1 for configuration PC
Optional integrated modem	PSTN or Leased Line: V22bis, V23bis, V34, V92

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IO card

Processor	Zilog Z84C15
Frequency	6.144 MHz
SRAM Memory	32KB
EPROM Memory	< 256 KB
FLASH Memory	< 512 KB
Sockets for IO Module	2

DI Terminal Block

Quantity (per IO module)	16
Voltage type	24Vdc, 48Vdc, 110Vdc
Current consumption	6mA
Dielectric isolation	Opto-coupler isolation (5kVrms)
Time discrimination	2msec
Debounce time	Programmable from 0 to 1 sec
Fleeting limit Counting frequency	≤ 10 changes / sec F ≤ 100 Hz
Connector type	Screw Terminal Block

DO Terminal Block (simple outputs)

Quantity (per IO module)	16
Voltage Types	24Vdc, 48Vdc, 110Vdc
Dielectric strength	Electromechanical relay (5kVrms between coil and contact)
Rated current	8A
Maximum load breaking capacity (simple outputs)	8A @ 30Vdc 2A @ 50Vdc 0.4A @ 110Vdc 0.25A @ 300Vdc 8A @ 240Vac
Contacts	NO / NC / Common
Connector type	Screw Terminal Block
Relay Type	Monostable or Bistable

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DO Terminal Block (double outputs)

Quantity (per IO module)	8
Voltage Types	24Vdc, 48Vdc, 110Vdc
Dielectric strength	2500 Vac
Rated current (Object Relay)	1.5 A
Maximum load breaking capacity	1.5A @150Vdc (Solid-state relay)
Power switching relay	Solid-state type
Pulse length	Programmable from 300 msec to 5 sec
Contacts	Contacts polarized to Vaux.
Connector type	Screw Terminal Block

AI Terminal Block

Quantity (per IO Module)	12
Input ranges (unipolar mode)	0 to 2.5 / 5 / 10Vdc 0 to 10 / 20 / 100 mA
Input ranges (bipolar mode)	-2.5 / -5 / -10Vdc to 2.5 / 5 / 10Vdc -10 / -20 / -100 mA to 10 / 20 / 100 mA
Dielectric insulation	No. Please consult us for isolated version
Filtering	50Hz rejection (digital filter)
ADC Converter	12 bits
Conversion time	20 msec
Precision	0.5% Superior precision on request
Connector type	Screw Terminal Block

Environmental conditions

Temperature range	0 to +45 °C
Humidity	Class F (DIN 40040)

Applicable standards

EN60950	Safety of information technology equipment
EN55011 Class A	Conducted emission
EN55011 Class A	Radiated emission
IEC 61000-4-2	ESD Immunity
IEC 61000-4-3	Radiated immunity
IEC 61000-4-4	Fast transients immunity
IEC 61000-4-5	Surge immunity
IEC 61000-4-6	Conducted immunity

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