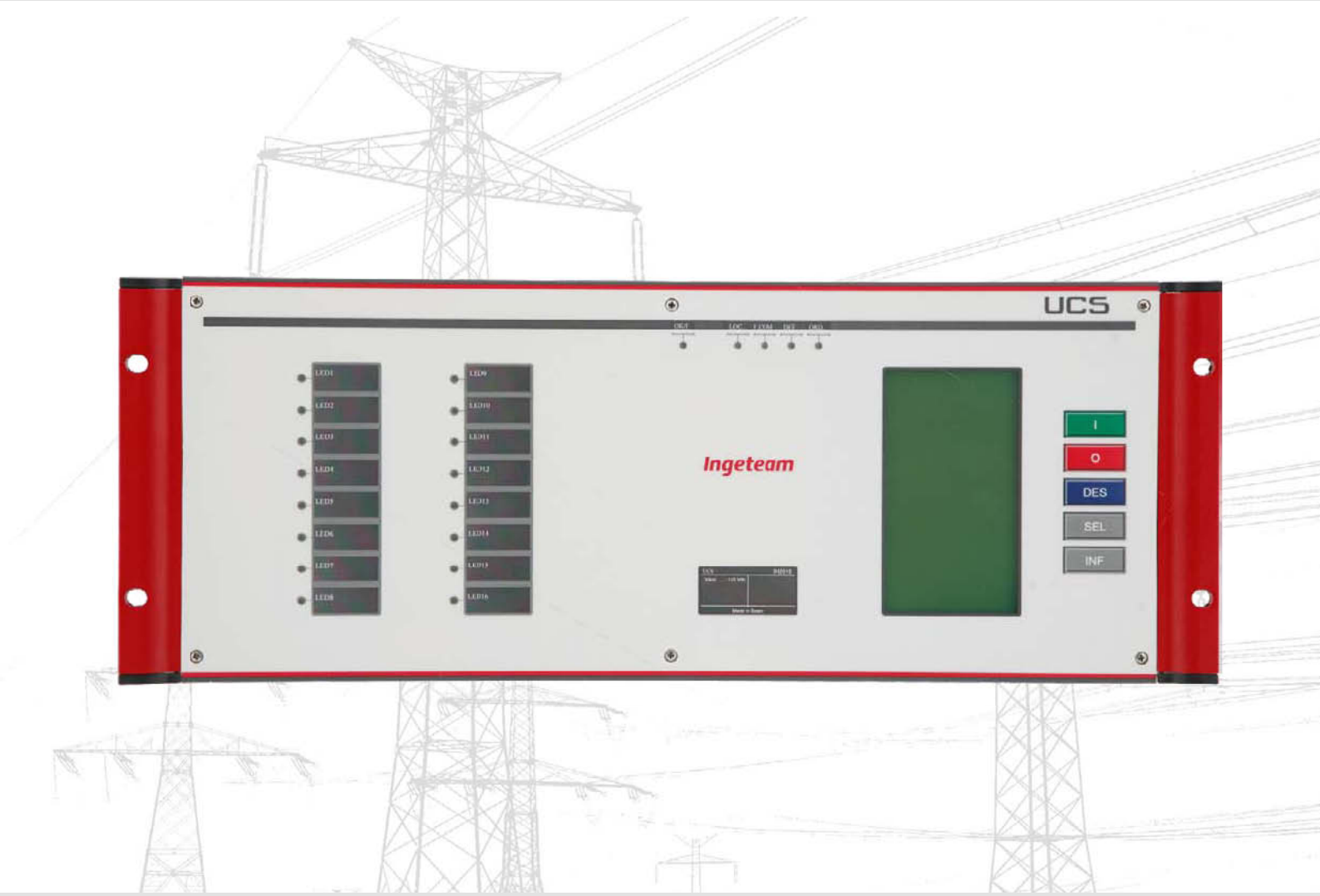
UCS

Central system unit

Data sheet



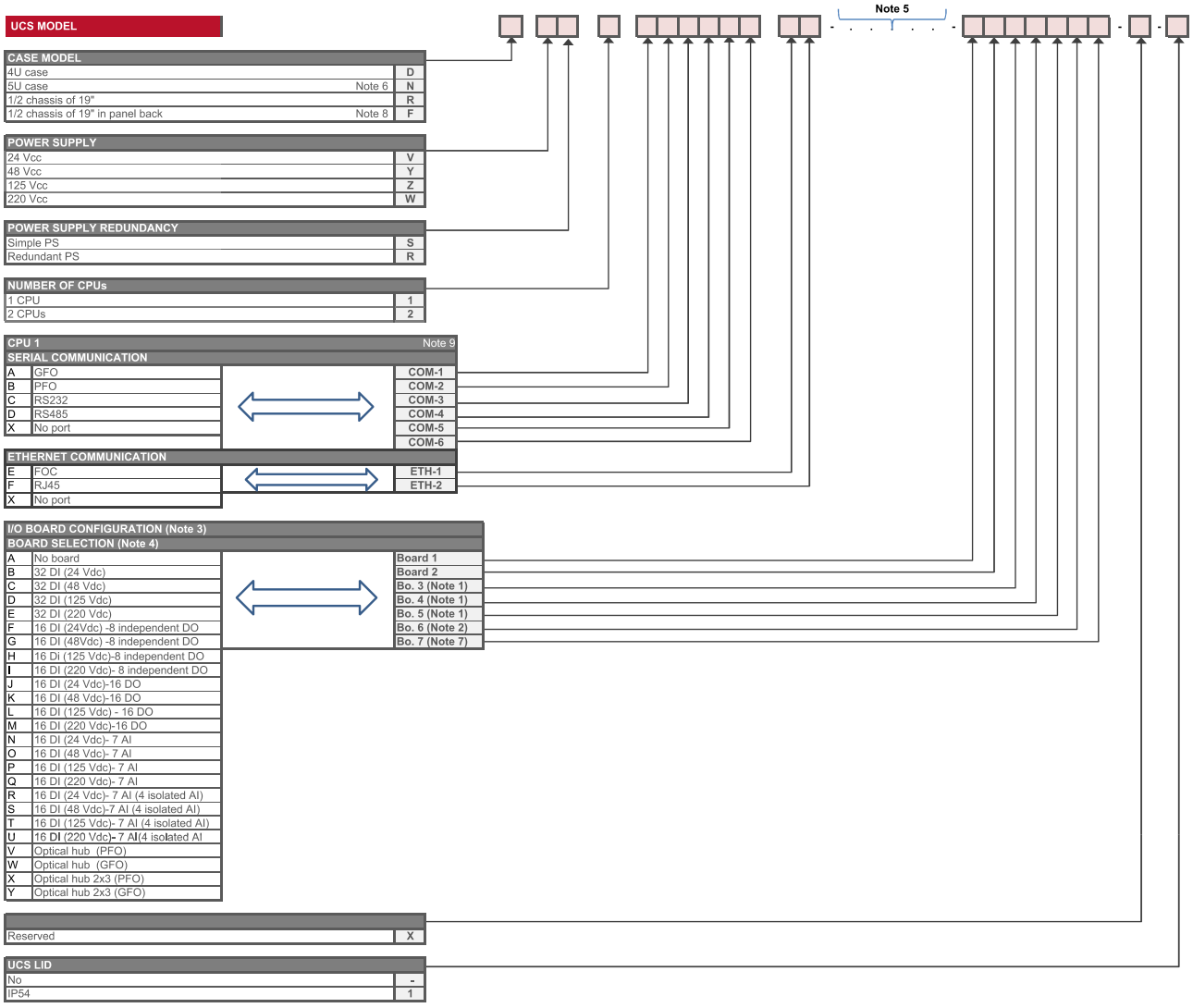
Ingeteam

DSC_UCS_AH

One of the main aims of Ingeteam T&D lies in the continuous improvement of the company's equipment and, therefore, the information contained in this catalogue may be modified without prior notification.

For further information, consult the corresponding manual or contact us directly.

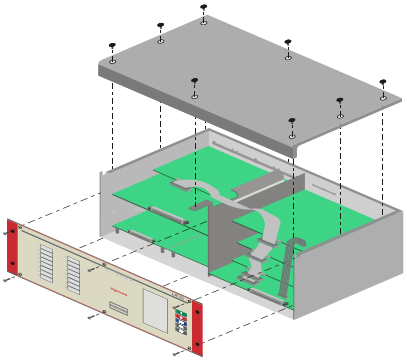
MODEL CODE SELECTION



Note 1: Option available when the number of CPUs = 1 or 2.
Note 2: Option available when the number of CPUs = 1.
Note 3: The number of boards depends on the type of rack.
Note 4: If you want to know the order of the boards in the rack, consult the number of the terminals on the rear views of each chassis .
Note 5: Depending on the number of wanted CPUs, fill in the corresponding gaps (related to up to 2 CPUs) following the same criteria as CPU1.
Note 6: Maximum number of CPUs= 2.
Note 7: Option available only for 5U case.
Note 8: This model is without display.
Note 9: Only one CPU is available for 1/2 chassis of 19" models.

CONFIGURATION OF CENTRAL SYSTEM UNIT (UCS)

The Central System Unit (UCS) is equipped with a 19" housing and 4U with highly-reliable modular hardware composed of various boards.



It is equipped with:

- 1 or 2 CPU IH modules (in this case, one master and one slave) dedicated to control and communications functions. These modules include:
  - Up to 6 optional serial communications ports, which may be selected from: RS232, RS485, GFO and PFO.
  - Up to 2 Ethernet communications ports, selectable between: GFO and RJ45.
  - 1 demodulated IRIG-B input.
  - 1 hardware status digital output.
- Independent power supply module with redundancy option.
- Input/output boards.
  - 32 digital inputs, divided into sets of 8 inputs with a common point.
  - 16 digital inputs, divided into sets of 8 inputs with a common point + 16 digital outputs, divided into sets of 8 outputs with common point.
  - 16 digital inputs, divided into sets of 8 inputs with a common point + 8 independent digital outputs.
  - 16 digital inputs, divided into sets of 8 inputs with a common point +7 analogue outputs, with one common output.
  - 16 digital inputs, divided into sets of 8 inputs with a common point +4 independent analogue inputs + 3 analogue inputs, with one common output.
- Optical hub communications boards (O.H.)
  - 1 to 5 optical hub (G.F.O. or P.F.O.)
  - 2x3 optical hub (G.F.O. or P.F.O.)
- IP40 frontal protection.
- IP54 frontal protection (optional).

FUNCTIONS

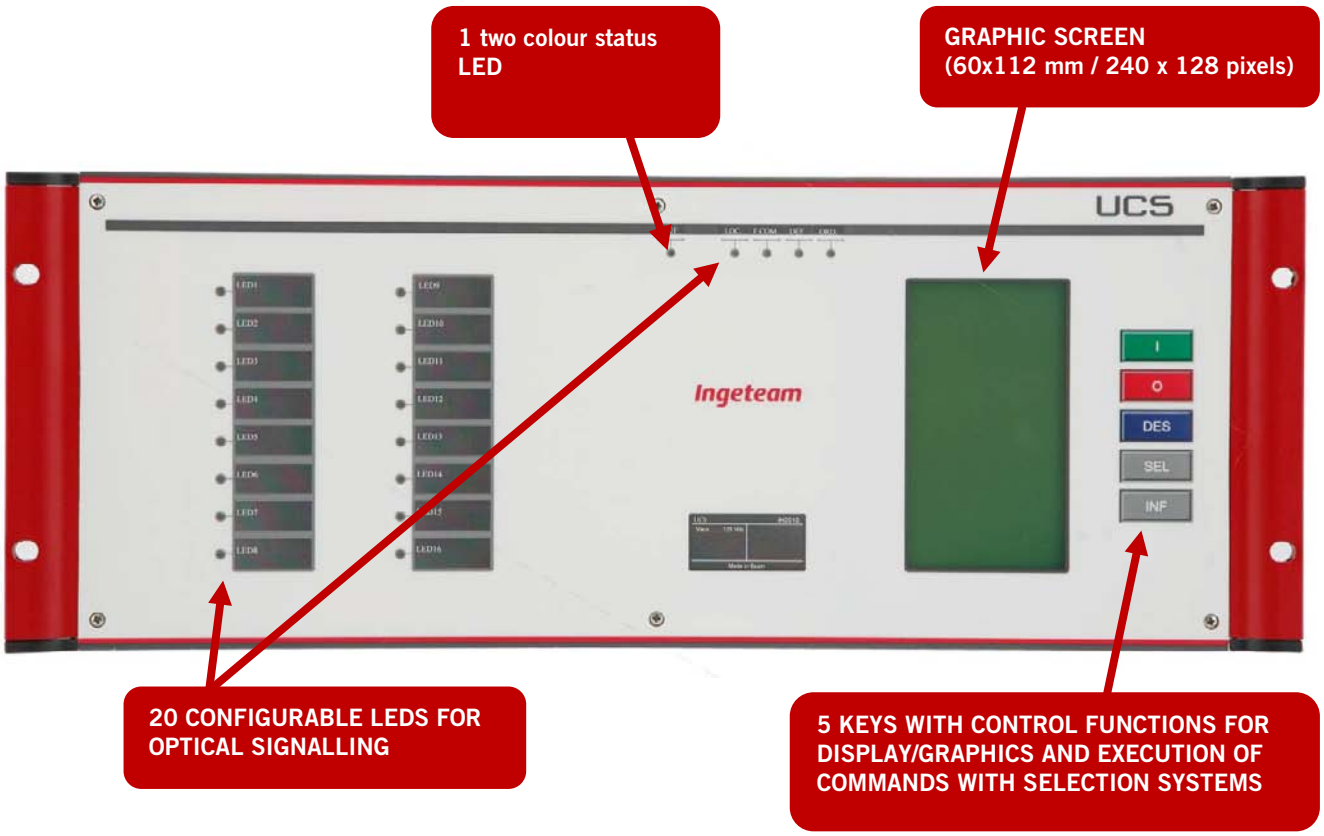
The Central System Unit's (UCS) main functions are:

- Collection of all the information produced by the bay units, including digital and analogue inputs, measurements and alarms.
- Dispatch of the collected information to the local and remote consoles, technical Incident Analysis offices, Maintenance Centres, Telecontrol Centres, SCADA, etc.
- Transfer of the commands received from the Telecontrol Centres and the local and remote operation consoles to each of the bay units.
- Local filing of events and alarms, together with the corresponding activation dates and times.
- Capacity to communicate simultaneously with:
  - Up to 5 channels for communication with multiple IEDs with different protocols.
  - Up to 3 channels for communication with Telecontrol Centres and SCADA.
  - Up to 5 channels for communications with operational consoles (local or remote) via RTC modem.
- Substation automatisms (load shedding, H, automatic service resetting, etc,).
- Synchronization of IEDs with a 1 ms resolution. by means of GPS signals,demodulated IRIG-B input or Telecontrol communication messages.

COMMUNICATIONS

- Communication with the Bay Control Units:
  - Maximum number IEDs per Central System Unit (UCS): 253
  - Up to 5 independent channels
  - Number of IEDs per channel: Configurable
  - Maximum speed per serial channel: 115200 bauds
  - Available protocols:
    - DNP 3.0
    - IEC 870-5-103
    - MODBUS RTU
    - PROCOME SERIAL TCP/IP
- Communication with Operational Consoles:
  - Up to 5 communication channels, which may be configured in each of the ports.
  - Serial channels:
    - RS232
    - F.O.
  - Ethernet channel
  - Available protocols:
    - PROCOME via serial channel
    - Enclosed PROCOME over TCP/IP via Ethernet.2 channel
- Communication with the Incident Analysis and Maintenance Centres:
  - All of the 5 operational consoles accepted by the Central System Unit (UCS) may be connected remotely via a Switched Telephonic Network.
- Communication with Telecontrol Centres:
  - Up to 3 ports for connection with different Telecontrol Centres. Each port may employ a different protocol and, in certain cases, redundant connections may be configured:
  - Available protocols:
    - IEC60870-101 (various profiles)
    - IEC60870-104 (various profiles)
    - IEC 870-5-103
    - DNP3.0 (level 3)
    - DNP3.0 TCP/IP
    - MODBUS RTU
    - PROCOME 3.0
- Time synchronization:
  - Via demodulated IRIG-B input.
  - Via GPS clock (via serial)
  - Via one of the Telecontrol protocols
  - Via a local or a remote operational console
  - Via SNTP

HUMAN-MACHINE INTERFACE (HMI)



The HMI is equipped with the following light indicators:

- 1 two-colour status LED:
  - LED green: Correct operation
  - LED red: Incorrect operation
  - Slow flicker: Equipment has not been configured
  - Fast flicker: Equipment has been configured
- 18 programmable red LEDs with identification label for optical signalling.
- 2 programmable green LEDs with identification label for optical signalling.

The HMI is equipped with 5 keys, which correspond to the following functions:

I	Close / Running / Automatism / Remote control
O	Open / Out of order / Manual / Local
DES	Discharge
SEL	Selection
INF	Information

STANDARDS AND TESTS

Electromagnetic			
Measurement of conducted radioelectric emissions in DC power port	IEC60255-25/EN55022	Class A	
Measurement of radiated radioelectric emissions	IEC 60255-5/EN55022 /EN5511	Class A	
Insulation resistance test	IEC60255-5		500Vcc,>100MΩ
Dielectric test	IEC60255-5		2kVac
Impulse voltage test	IEC60255-5	Class 3	±5kV/±1kV
Electrostatic discharges immunity test	IEC61000-4-2	Level 4	±8kV/±15kV
Radiated radiofrequency fields immunity test	ENV 50204/IEC 61000-4-3	Level 3	10V/m
Electrical fast transients immunity test	IEC61000-4-4	Level 4	±4kV, 2,5kHz PS ±2kV, 5kHz the rest
Surge immunity test	IEC61000-4-5	Level 4	±4kV CM ±2kV DM
Conducted disturbances induced by radio-frequency fields	IEC61000-4-6	Level 3	10Vrms
1 MHz damped waves immunity test	IEC60255-22-1		±2,5kV CM ±1kV DM
DC power supply variations and interruptions immunity test	IEC61000-4-29/IEC60255-11		100% 100ms 60% 1000 ms 30% 1000ms
50 Hz magnetic fields immunity test	IEC61000-4-8	Level 5	100 A/m 1000A/m
Pulse magnetic fields immunity test	IEC61000-4-9	Level 5	1000A/m
Damped oscillatory magnetic fields immunity test	IEC61000-4-10	Level 5	100A/m
Climatic			
Cold test	IEC 60068-2-1		-40ºC 16h
Dry heat test	IEC 60068-2-2		+85ºC 16h
Damp heat test, steady state	IEC 60068-2-78		+40ºC,93% Relative humidity 16h
Damp heat test, cyclic	IEC 60068-2-30		+55ºC,93% Relative humidity, 6 cycles
Change of temperature (thermal shock)	IEC 60068-2-14		-20º/+70ºC
Mechanical			
Vibration test	IEC60255-21-1	Class I	
Shock and bump test	IEC 60255-21-2	Class I	

TECHNICAL SPECIFICATIONS

CPU Module

- 1 or 2 32-bit microprocessor, 66 MHz clock
- 16 Mbytes SDRAM memory for variables and the running of firmware and applications
- 1 Mbyte SDRAM memory for storing settings, variables, etc.
- 8 Mbytes FLASH memory for firmware, settings, applications and backup
- Demodulated IRIG-B input
- 1 switched digital output for signalling hardware status
- Up to 6 selectionable serial communication ports:
  - RS232
  - RS485
  - GFO
  - PFO
- Serial communication characteristics:
  - Communication mode: Half-duplex or Full-duplex
  - Baud rate: 600 to 115200 bps (maximum for PFO, 56000bps)
- Up to 2 selectable Ethernet communication ports:
  - F.O. (100 Base-Fx)
    - Operating speed: 10/100 Mb
    - Multimode G.F.O.: 62.5/ 125µm
    - Connector: ST (SC optional)
    - Min. optical power at transmitter output: -20dbm
    - Max. receptive optical power: -31dbm
    - Distance: 1.5 Km
  - RJ45 (10/100 Base-Tx)
    - Operating speed: 10/100Mb
    - Insulation: 500 Vac
    - Communication capacity: 10 /100Mbps in Half-duplex (Ethernet)
- Communication capacity: 10/100 Mbps in Half-.duplex
- Battery-powered clock for data: 10-year maximum
- SRAM memory battery: 10-year maximum

Power Supply Module

- 1 or 2 P.S. in a single slot within the Central System Unit (UCS)
- They generate 2 internal voltages: +5 Vdc for supplying the CPU and the DIs and +5 Vdc to supply the DOs.
- 24-Vdc P.S. module
  - Input voltage range: 19-34 Vdc
  - Output power: 40 W
- 48 Vdc P.S. module
  - Input voltage range: 34-60 Vdc
  - Output power: 40 W
- 125 Vdc P.S. module
  - Input voltage range: 86-165 Vdc
  - Output power: 40 W
- 220 Vdc P.S. module
  - Input voltage range: 165-280 Vdc
  - Output power: 40 W
- Protection against the inversion of the input voltage polarization
- Protection against short-circuits in the output

Optical hub module 1x5

- This module, which is designed to be installed in the Central System Unit (UCS), is powered by the unit's internal power supply.
- Consumption: 875mW
- Nº secondary channels 5
- Nº primary channels 1
- Various modules may be connected in cascade format in order to increase the number of communication channels. To do so, the modules in question must be connected via external cabling - one of the module's secondary channels is to be connected to the following module's primary channel.
- Each optical channel is equipped with 1-Tx + 1-Rx
  - Glass multimode (I=820nm) ST
  - Plastic or Silicate multimode (I=650nm) HP-VLF
- Front elements
  - Green LEDs RX secondary channel 5
  - Red LEDs TX primary channel 1
- Maximum distances without connections -10ºC to + 55ºC
  - Glass multimode OF 62.5 /125 µm 1.5 Km at 115200 bps
  - Low loss 1mm multimode POF 115 m at 56000 bps
  - Silicate multimode OF 200 µm (HCS) 1.9 Km
- The module is equipped with a security system which locks any channel which receives a permanent signal or fixed frequency in order to avoid the rest of the channels being affected.

2x3 Optical hub module.

- This module, which is designed to be installed in a UCS, is powered by the unit's internal power supply.
- Burden: 500 mW – without communication
  2 W maximum
- Nº secondary channels (slaves) Configurable (maximum of 5 per module)
- Nº primary channels (master) Configurable (maximum of 4 per module)
- Several modules may be connected in cascade format in order to increase the number of communication channels. To do so, the modules in question must be connected via external wiring - one of the module's secondary channels is to be connected to the following module's primary channel.
- Each optical channel is equipped with 1-Tx + 1-Rx
  - Glass multimode (λ =820nm) ST
  - Plastic or Silicate multimode (λ=650nm) HP-VLF
- Front elements
  - Green LEDs RX secondary channel 6
  - Green LEDs TX primary channel 6
  - Red LEDs Fault 2 (shared with Tx3)
- Maximum distances without connections from -40ºC to + 85ºC
  - Glass multimode OF 62.5 /125 µm 1.2 Km at 115200 bps
  - Low loss 1mm multimode POF 100 m at 56,000bps
  - Silicate multimide OF 200 µm (HCS) 1.9 Km
- The module is equipped with a security system which locks any channel which receives a permanent signal or fixed frequency in order to avoid the rest of the channels being affected.

Digital input, digital output and analogue converter input module

Options:

- 32 DIs, with an independent common DI for each 8 DIs
- 16 DIs, with one common input for each 8 inputs, + 16 DOs, with one common output for each 8 outputs.
- 16 DIs, with a common DI for each 8 DIs + 8 independent DOs
- 16 DIs, with one common input for each 8 inputs, +7 AIs, with one common input.
- 16 DIs, with one common input for each 8 inputs, +3 AIs, with one common input + 4 independently-insulated AIs.

Digital input characteristics

- Galvanic separation by means of optoisolators
- Supervision circuit with the following checking functions:
  - Module power supply voltage
  - Module access monitoring

- Digital input voltage:
  - 24 Vdc DIs 18-34 Vdc
  - 48 Vdc DIs 36-60 Vdc
  - 110-125 Vdc DIs 86-160 Vdc
  - 220 Vdc DIs 165-264 Vdc
- Surges (10 sec.) 44%
- Input type Externally powered contact
- Nominal consumption per input 3 mA
- Digital anti-bounce filter 1 ms.

Digital output characteristics

- The outputs are supplied with potential-free contacts
- Supervision circuits with the following checking functions:
  - Module power supply voltage
  - Module access monitoring, with output deactivation if access is not gained within 100 ms
  - Independent hardware selection, checking and execution system for each output
- Breaking capacity (L/R=40 ms)
  - 48 Vdc 0.5 A
  - 125 Vdc 0.3 A
  - 220 Vdc 0.2 A
- Closure capacity (0.5 s) 30 A
- Continuous current 8 A
- Current (1 s) 50 A

Analogue input characteristics

- Adaptation and filtering of 7 analogue inputs
- Insulation via optoisolators between the input and the internal logic
- Insulated part powered via +5Vdc/-5Vdc converter with galvanic separation
- 12-bit A/D conversion for successive approaches
- Supervision circuits with the following checking functions:
  - Module power supply voltage
  - Conversion failure
  - Incorrect conversions
  - Optoisolator failure

- Measurement range: ±2,5 mA, ±5 mA, ±20 mA
- Resolution: 11 bits + sign
- Accuracy: 0.2 % at 25ºC
- Connection type: 2 wires per measurement
- Insulation:
  - With internal logic: 2,500 Vac
  - Between inputs
    - Standard: No
    - Insulated: 1,000 Vac

Consumption

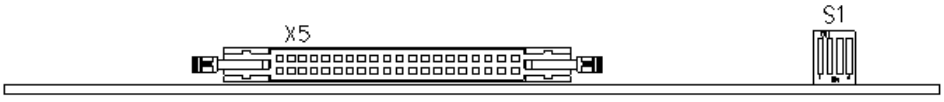
Modules	Module consumption
32 DIs, with an independent common DI for each 8 DIs	125mW
16 DIs, with one common input for each 8 inputs, + 16 DOs, with one common output for each 8 outputs.	350mW
16 DIs, with a common DI for each 8 DIs + 8 independent DOs	350mW
16 DIs, with one common input for each 8 inputs, +7 AIs, with one common input.	1.5W
16 DIs, with one common input for each 8 inputs, +3 AIs, with one common input + 4 independently-insulated AIs.	3W

- Additional consumption per active DI: 2,5mW
- Additional consumption per active DO: 450mW

Directing of modules

- All modules are equipped with 4 micro-breakers. The micro-breakers enable the identification, by means of a unique code, of each module within unit.

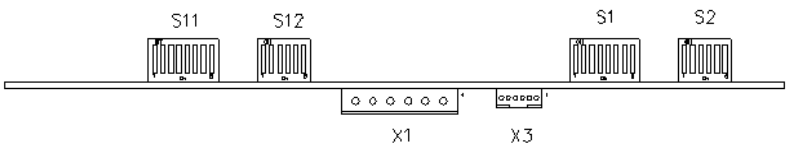
  The “OFF” value = “1”, whilst the “ON” value =”0”



Internal front view of the direction switches

Configuration of communication modules

- The 2x3 optical hub modules are equipped with the following switches for configuration.

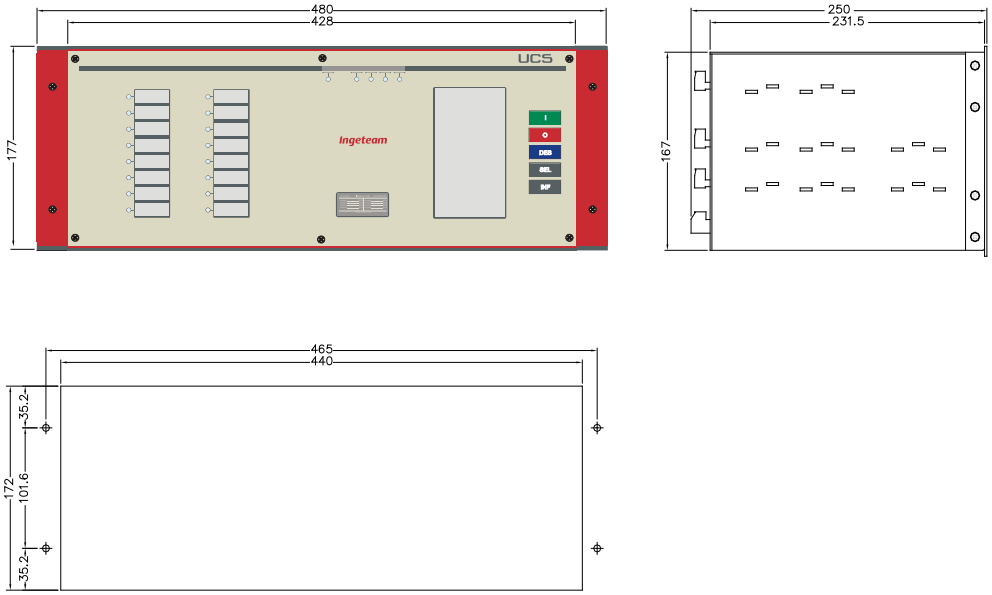


Internal front view of the configuration switches

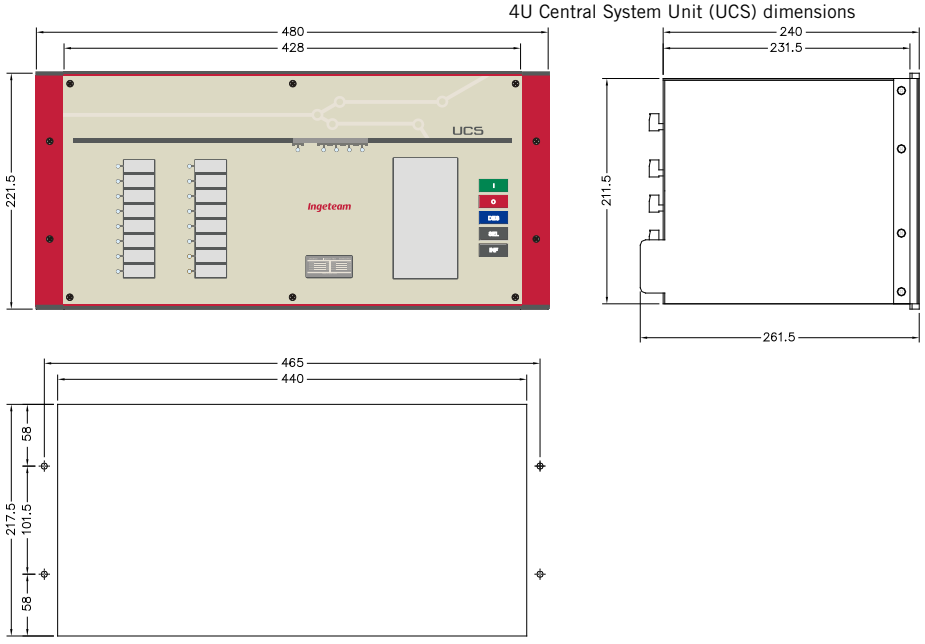
ENVIRONMENTAL CONDITIONS

Operating temperature	-20ºC to +75ºC
Storage temperature	-40ºC to +85ºC

CONSTRUCTIVE CHARACTERISTICS



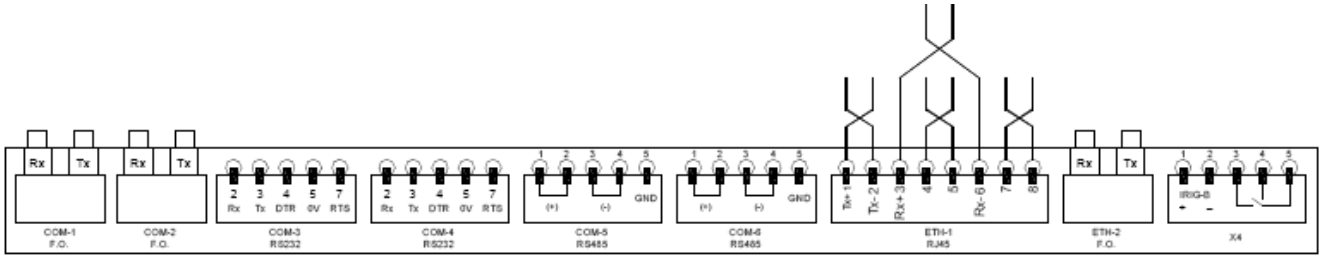
4U Central System Unit (UCS) dimensions



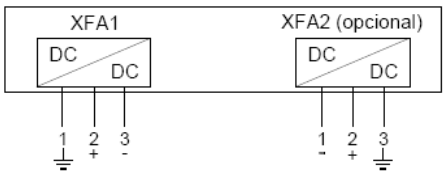
5U Central System Unit (UCS) dimensions

CONNECTIONS

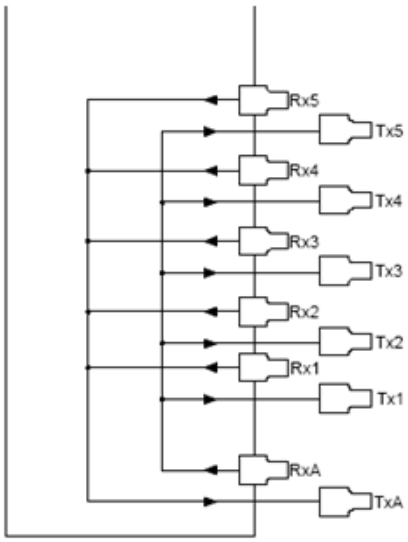
CPU Module



Power Supply Module



1x5 Optical hub Module



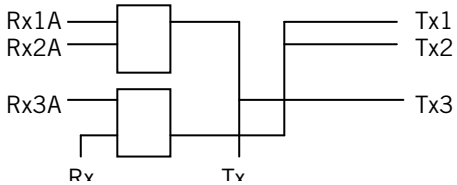
Connections and rear view

2x3 optical hub

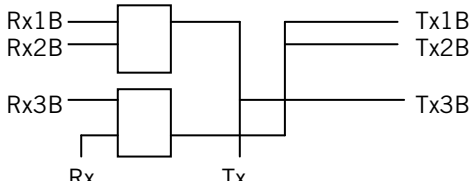
Printed information on module plate

RX1	RX2	RX3	Switch ON		Switch OFF	
M	M	E	**S1/11**: 1-2-3-4-5-6-7	**S2/12**:	**S1/11**: 8	**S2/12**: 1-2-3-4-5-6
M	E	E	**S1/11**: 2-3-4-5-7-8	**S2/12**: 1	**S1/11**: 1-6	**S2/12**: 2-3-4-5-6
E	E	E	**S1/11**: 1-6-7	**S2/12**: 2-3-4-5	**S1/11**: 2-3-4-5-8	**S2/12**:1-6

Note: in independent groups, the shaded switches are OFF.

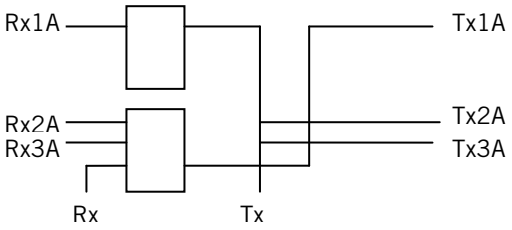


MMS

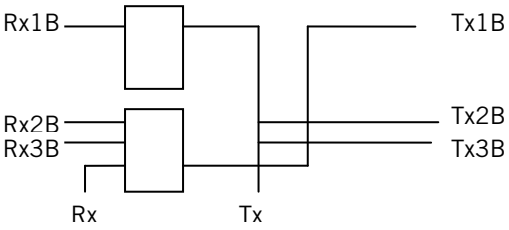


MMS

2x3 optical hub, master connectors 1 and 2 and slave connector 3

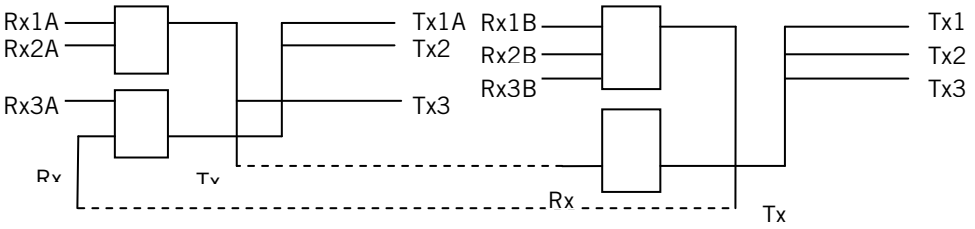


MSS



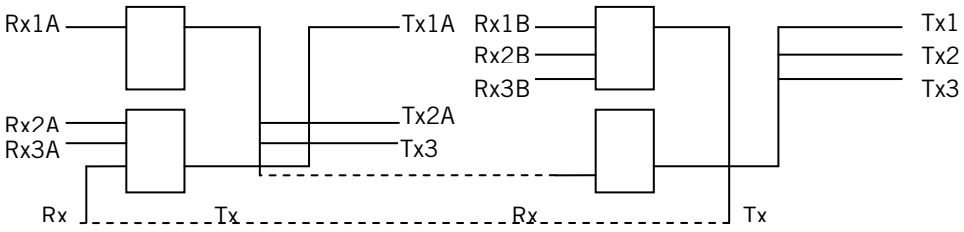
MSS

2x3 optical hub, master connector 1 and slave connectors 2 and 3



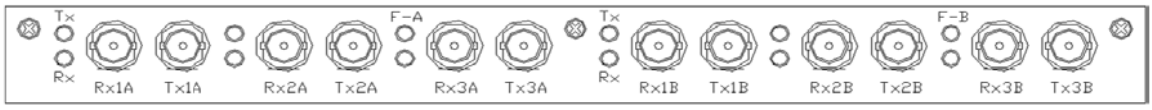
MMS and SSS

2x3 optical hub, master connector 1A and 2A and slaves 3A, 1B, 2B and 3B



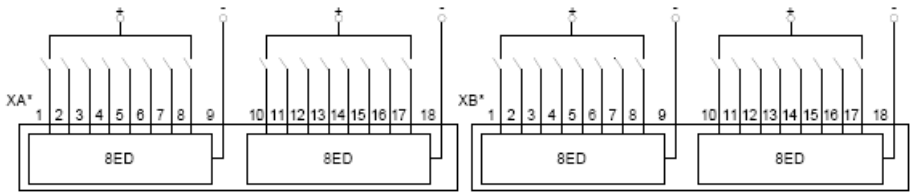
MSS and SSS

2x3 optical hub, master connector 1A and slaves 2A, 3A, 1B, 2B and 3B

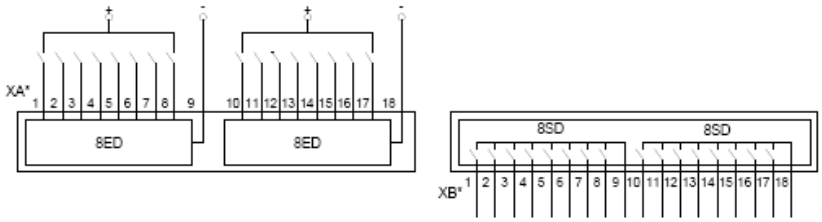


Connections and rear view of 2x3 optical hub module

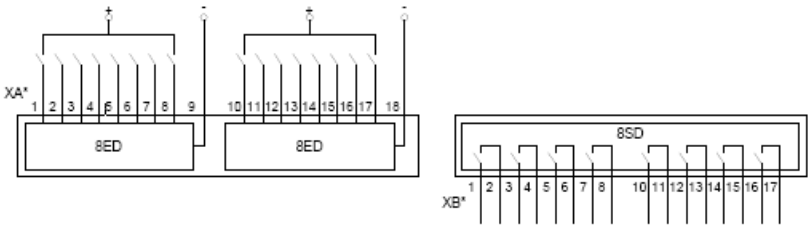
Module with 32 Digital Input



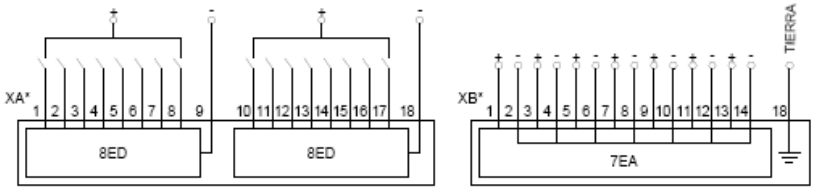
Module with 16 digital inputs and 16 digital outputs



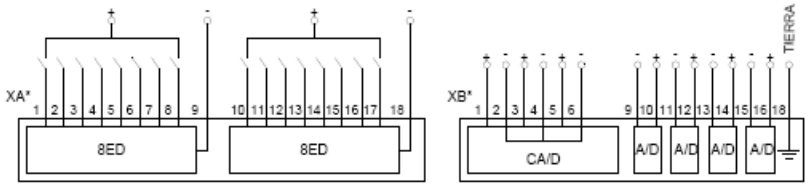
Module with 16 independent digital inputs and 8 independent digital outputs



Module with 16 digital inputs and 7 analogue inputs



Module with 16 digital inputs and 7 analogue outputs (4 Isolated analogue inputs)



*Depends on the position of the card within the chassis

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