



INGESYS™ CMS

PRODUCT OVERVIEW.

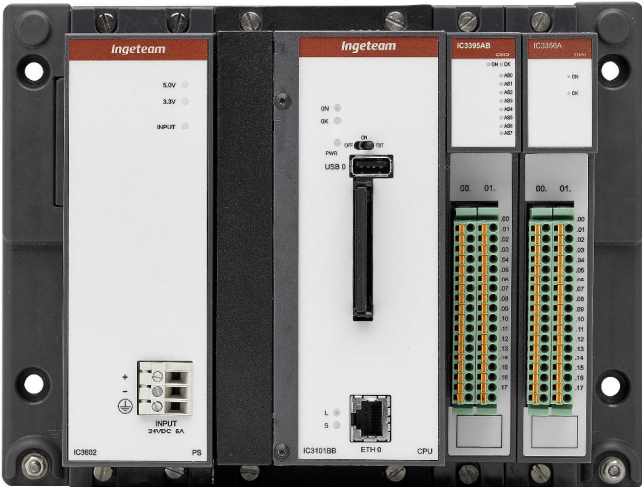


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1 Introduction

INGESYS™ CMS is a rotary machine condition monitoring system. By analysing vibrational measurements taken at specific points on the rotary machine, the system makes it possible to determine its condition, anticipating the appearance of functional anomalies.

The complete **INGESYS™ CMS** solution consists of a hardware system which acquires and handles signals from field sensors (accelerometers, pulse generators, temperature sensors, etc.) and a suite of software tools which helps to configure and parameterise the acquisition, as well as to analyze received data.

INGESYS™ CMS hardware system is scalable, flexible and a high-performance condition monitoring platform. Based on the concept of Programmable Automation Controllers (PACs), it fulfils the requirements of the maintenance experts with a complete solution for demanding CMS applications.

A wide range of programming techniques (IEC61131 programming tool based on CODESYS , C++, MATLAB®/SIMULINK®) makes it possible to increase the performance and profitability of the control engineer throughout the different phases of plant automation (programming, commissioning and maintenance).

A modular design fulfilling industry requirements (extreme ambient and vibrational conditions, extended life time, EMC, etc.) guarantees the achievement of low failure rates and high availability.

A complete range of network and fieldbus communication protocols based on standards facilitate the integration of **INGESYS™ CMS** with upper system levels and with low-level field devices.

An internal distributed architecture based on a real-time optical fibre bus makes it possible to optimally adapt the control system to the process's requirements.

INGESYS™ CMS PAC Controller Highlights:

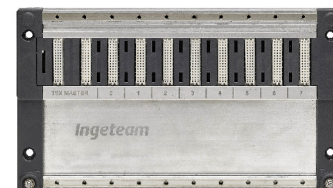
- Control processors and I/O modules designed to fulfill the demands of different application sectors with competitive solutions
- Realtime control
- Advanced programming (IEC 61131-3, C++, MATLAB®/SIMULINK®)
- Integrated PC functional features (Web server, FTP, Flash-based file system, etc.)
- Integrated industry standard de facto Ethernet protocols
- Complete range of industrial fieldbuses (CANopen)
- Vibrations / Shock resistance conforming to EN60068-2-6/EN60068-2-27
- EMC Immunity /emission conforming to EN61000-6-2/EN61000-6-4

Applications:

- Renewable energies (Wind, Hydroelectric, Solar)
- Industry automation
- Transport
- Power grid automation

2 System racks

The set of **CMS** racks provides mechanical support and electrical interconnection to the **INGESYS™ CMS** controller modules.



Two types of racks are available:

- a) Racks including reserved slots for power supply modules.
Designed for processor or bus terminal modules powered at 3,3V or 5,0V that requires an external power supply module.

References	
IC3503	Power supply + Processor + 4 I/O one-slot modules
IC3504	Power supply + Processor + 8 I/O one-slot modules
IC3505	Power supply + Processor + 2 I/O one-slot modules

- b) Racks not including reserved slots for power supply modules.
Designed for processor or bus terminal modules powered at 24V that does not require an external power supply module.

References	
IC3512	Processor /header + 4 I/O one-slot modules
IC3513	Processor /header + 2 I/O one-slot modules

3 Power supply modules

IC360x power supply modules feed power to the whole system via the backplane. Different input voltages (24Vdc, 125Vdc or 220Vac) are available, depending on the installation requirements.

These modules have been designed for use in the harshest of environments, where low dissipation and high temperature support are needed. For this purpose, new semiconductor and transformer design techniques have been used.

IC360x power supply modules are also prepared for redundancy operation. Two power supplies can be connected in parallel. In case one fails, the second one immediately takes control without any voltage drop. The LEDs of the malfunctioning power supply module will switch off, so that the user can identify and replace it.

Redundancy operation is the well-known N+1 mode. That means that there is neither current sharing nor power sharing. When two power supply modules are connected in parallel the maximum output current is still 5A per output.

General Characteristics:

- 24Vdc, 125Vdc, 220Vac
- Status indication LEDs
- Status monitoring from processor module
- High temperature operation
- N + 1 redundancy support
- Long-life design under extreme operation conditions

References	Specific Characteristics
IC3602	Power supply 24Vdc input
IC3603	Power supply 88-300Vdc / 85-250Vac input



	IC3602	IC3603
Electrical		
Input Voltage	14,4Vdc to 31,2Vdc	88Vdc to 300Vdc 85Vac to 285Vac
Max. Input Current	3,2A	0,75A 0,70A
Output Voltage	3,3V / 5,0V	
Max. Output current		
3,3 V	5A	
5,0 V	5A	
Max. Dissipated Power	12W	10W
Isolation		
Input-Output	2000Vac @ 60s	
Input-Earth	2000Vdc @ 60s	
Additional Features		
Reverse input voltage protection		
Input, 3,3V and 5,0V status indication LEDs		
Input and output voltage supervision		
Power fail indication to processor module		
N + 1 redundancy support		
Hot swap		
Mechanical		
Dimensions (WxHxD)	52,25mm x 175mm x 150,5mm	
Weight	540g	
Climatic		
Operating Temperature	-40°C to + 70°C	
Storage Temperature	-40°C to + 85°C	
Relative Humidity	5% to 95% w/o condensing	

4 Processor modules

INGESYS™ CMS processor modules ensure the right solution in terms of performance and robustness at competitive prices for each application field.

A compact design makes it possible to integrate the most demanding control functionalities (LAN, fieldbus, memory storage, USB, etc.) and ensures the fulfillment of the most demanding industrial requirements.

The different **INGESYS™ CMS** processor modules are application software compatible enabling the optimisation of software development resources.

The CODESYS-based programming tool with the five IEC61131 programming languages (IL, ST, SFC, LD, FBD), the advanced programming tools (MATLAB®/SIMULINK®, C++) and a powerful range of application-specific software libraries provide the control engineer with the right tool for each requirement.

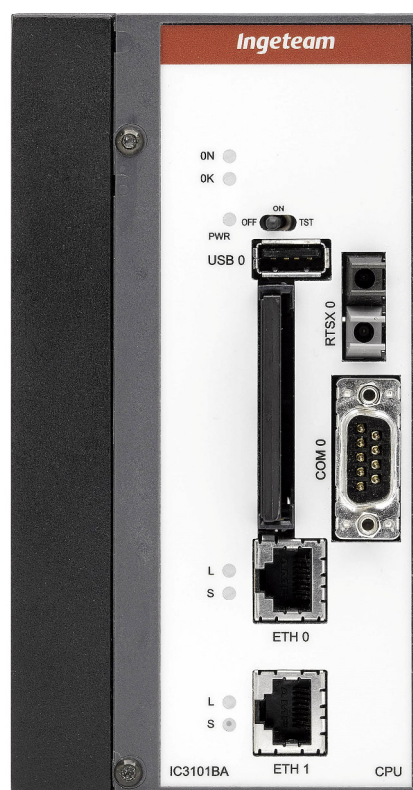
References	
IC3101	Pentium-based high-performance processor module
IC3121	ARM-based medium-performance processor module, extended temperature range

4.1 IC3101 Processor module

The IC3101 processor modules enable maximum **INGESYS™ CMS** functionality and performance, offering a state-of-the-art solution for CMS applications. These processor modules optimally integrate the real-time control characteristics and robustness of industrial PLCs, with advanced control functional features based on PC technology standards (data management, embedded web servers, communications protocols, etc). Their compact, robust design makes it possible to work in an extensive temperature range thanks to the passive cooling elements. Different communication interfaces allow **INGESYS™ CMS** to be integrated with redundant Ethernet networks, remote I/O extensions and RS232/RS485 communication links.

General Characteristics:

- x86 500Mhz processor
 - 2/4 Ethernet interfaces (10/100)
 - 1 USB host interface
 - 1 RS232C serial interface
 - 4MB RAM for user application
 - 10MB internal Flash for user application
 - 62KB NVRAM
 - CF slot for user data
 - TEST/ON/OFF switch and status LEDs
- **Optional**
 - RTSX interface
 - CAN port
 - 2/ 4/ 8 TSX channels (local IO)



References	Specific Characteristics
IC3101BA	2 Ethernet, 8 TSX channels (Local IO), RS-232C, 1 RTSX port (Remote IO)
IC3101BB	1 Ethernet, 8 TSX channels (Local IO)
IC3101BC	1 Ethernet, 8 TSX channels, 1 RTSX port
IC3101BD	2 Ethernet, 8 TSX channels (Local IO), RS-232C, 1 CAN port

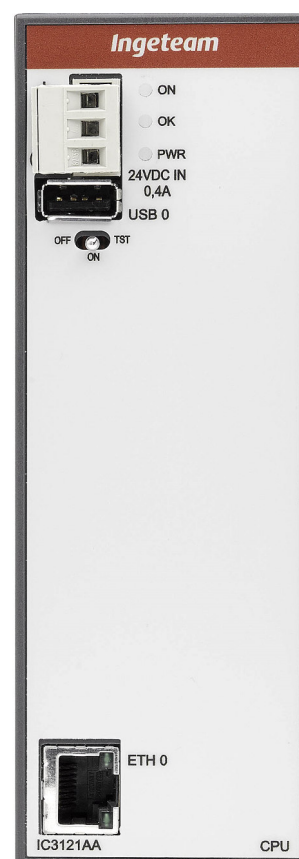
	IC3101BA	IC3101BB	IC3101BC	IC3101BD
Functional				
CPU	500Mhz Pentium Compatible			
RAM Memory	4Mbytes			
NVRAM Memory	62Kbytes			
Internal Flash Memory	10MB for user application			
CF Slot	CF without size restriction			
Ethernet	2 x 10/100 BaseTX	1 x 10/100 BaseTX		2 x 10/100 BaseTX
Serial	1 x RS232C	NO		1 x RS232C
USB	1 x USB 2.0 Host			
CAN		NO		1
TSX	8 channels			
RTSX	1 x RTSX port	NO	1 x RTSX port	NO
IRIG-B	NO			
Electrical				
Power Supply	+3,3V / 5,0V from backplane			
Current Consumption 3,3 V	1A (max.) / 0,75A (typ.)			
Current Consumption 5,0 V	1,5A (max.) / 1,125A (typ.)			
Max.Dissipated Power	11W			
Additional descriptions				
Watchdog				
Real-time clock with lithium battery				
3 position working mode switch (TST/ON/OFF)				
3 status indication LEDs				
Internal temperature supervision				
Self-diagnosis				
Hot swap				
Mechanical				
Dimensions (WxHxD)	78,5mm x 175mm x 150,5mm			
Weight	1023g			
Climatic				
Operating Temperature	0°C to + 60°C (Fan less)			
Storage Temperature	-40°C to + 85°C			
Relative Humidity	5% to 95% w/o condensing			
Accessories (not included)				
IC3805: COMPACT FLASH 64MB				
IC3582: COMPACT FLASH 1GB				
IC3583: COMPACT FLASH 2GB				

4.2 IC3121 Processor module

The IC3121 processor modules are designed for medium-performance condition monitoring applications with communications requirements in demanding environmental situations. The software is compatible with the IC3101xx processor and can also work with **INGESYS™ CMS's** modules. (I/Os, counter modules, communications modules, etc) offering the same monitoring architecture. Based on ARM processors, these modules make it possible to work in extreme temperature conditions given their very low power dissipation. IC3121 modules have a built-in power supply, capable of feeding power to the backplane, eradicating the need for a power supply module. This family is also capable of communicating via TSX with local IO modules, as well as communicating with remote modules via RTSX. These processor modules also have a built-in Ethernet switch, which can reduce network infrastructure costs in the installation.

General Characteristics:

- ARM 400Mhz processor
 - RTSX interface
 - 1 Ethernet interfaces (10/100)
 - 1 USB host interface
 - 1,4MB RAM
 - 2MB for user Application
 - 32KB NVRAM
 - TEST/ON/OFF switch and status LEDs
- **Optional**
 - RS232C/485



References	Specific Characteristics
IC3121AA	2 TSX channels, Power Supply

IC3121AA	
Functional	
CPU	400Mhz ARM
Program memory	2MB for user application
RAM memory	1,4MB
NVRAM memory	32KB for user application
Ethernet	1 x 10/100 BaseTX
USB	1 x USB 2.0 Host
TSX	2 channels
Electrical	
Input Voltage	11Vdc to 34Vdc
Input Current	0,9A (max.) (depends on output power to backplane)
Output Voltage	3,3V / 5,0V (to backplane)
Max. Total Output Power	4W (Shared between 3,3V and 5,0V)
Max. Output current	Max. total output power must be taken into account
	3,3 V 1,1A
	5,0 V 0,7A
Max. Dissipated Power	4W
Isolation	1000V
Additional descriptions	
Watchdog	
Real-time clock with Lithium battery	
3 position working mode switch (TST/ON/OFF)	
3 status indication LEDs	
Internal temperature supervision	
Self-diagnosis	
Hot swap	
Mechanical	
Dimensions (WxHxD)	52,25mm x 175mm x 150,5mm
Weight	540gr
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
IC3565: DC Power Input Plug	

5 Analog input / output modules

A set of analog input/output modules intended for a TSX bus, fully equips **INGESYS™ CMS PAC** for using analog process signals.

The requirements of different application sectors have been considered, enabling a scalable and optimized solution.

These modules are designed to fulfill demanding industrial environmental conditions, following international standards.

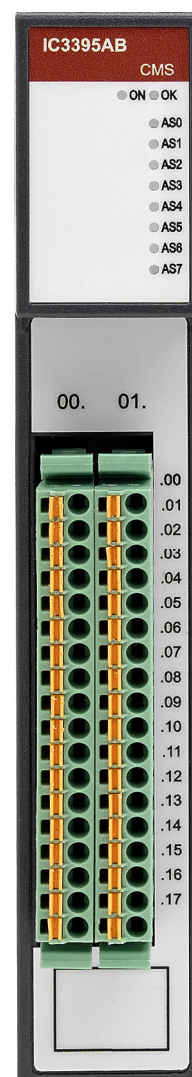
References	Specific Characteristics
IC3356AB	16 analog inputs with +/- 10V and +/- 20mA max input ranges
IC3357AB	16 PT100 inputs 2 wires TSX
IC3362AA	8 analogue input channels V//PT100/IEPE 8 analogue output channels V/I
IC3362AB	2 PT100 , 2 IEPE 2 analogue output channels V/I
IC3362AC	8 analogue input channels V/I
IC3362AD	6 analogue input channels V//Pt100/IEPE. Chansels 0..5 2 analogue input channels thermocouple. Chansels 6..7 8 analogue output channels V/I
IC3394AB	8 IEPE standard inputs, 8 digital input/outputs 4 analog inputs, 2 encoder inputs and 1 SSI channel
IC3395AB	8 IEPE standard inputs

5.1 Analog input modules

General Characteristics:

- Fulfill the most demanded analog measurements in the industry
- High resolution
- Self-diagnosis
- High density modules

References	Specific Characteristics
IC3356AB	16 analog inputs with +/- 10V, +/- 20mA ranges
IC3357AB	16 PT100 inputs. 2 wires
IC3394AB	8 IEPE standard inputs, 8 digital input/outputs 4 analog inputs, 2 encoder inputs and 1 SSI channel
IC3395AB	8 IEPE standard inputs



	IC3356AB	IC3357AB
Functional		
Input signal	Voltage / Current	PT100 sensor
Number of inputs	16	16
Connection mode	Common GND reference	2 wires
Measurement ranges	-20mA to +20mA, 0 to 20mA, +4mA to 20mA -10V to +10V, -5V to +5V, -1V to +1V, 0 + 5V, 0 + 10V	-50°C to 200°C
Refresh time	5,2ms (max.)	48ms (max.)
A/D converter	16 bits	
Self-diagnosis	TSX and ADC	
Hot swap	Yes	
Electrical		
Break down current in current mode	+/- 40mA	-
Break down voltage	+/- 18V	-
Open circuit voltage	-	3,4V (max.)
PT100 current	-	1,6mA (max.)
Isolation input to system	1500Vac, 60s	
Isolation between inputs	No	
Input impedance, voltage mode	>33KΩ	-
Input impedance, current mode	440Ω (min.), 460Ω (max.)	-
Current Consumption 3,3V	550mA (max.) / 430mA (typ.)	600mA (max.) / 400mA (typ.)
Mechanical		
Dimensions (WxHxD)	26mm x 175mm x 130,41mm	
Weight	210g	250g
Slot width	1 slot TSX	
Climatic		
Operating Temperature	-40°C to + 70°C	
Storage Temperature	-40°C to + 85°C	
Relative Humidity	5% to 95% w/o condensing	
Accessories (not included)		
Field connection options	Spring terminal plug, 1,5mm ² (2 IC3571 per module) or 50 pin flat cable adapter (1 IC3573 per module)	

IC3394AB	
Functional	
Accelerometer inputs	
Input signal	IEPE standard (ICP) Accelerometer
Input channels	8
Connection signals	ASx, AGx, ⊥ (signal, ref. screen)
Sampling frequency	47,971492Khz
Connection mode	Single ended
Configurable gains G, (dB)	0, 3, 6, 9, 12, 20, 23, 26, 29, 32
Resolution	24bits
Sensitivity	10V p-p a G=0db at full scale
Dynamic range	106,5dB (typ.)
Useful band	0,1Hz to 21Khz
Sensor diagnosis	Yes
Current injected to sensor	4mA (typ.)
Self-diagnosis	TSX internal bus, inputs and outputs and ADC
Hot swap	Yes
Analog inputs	
Input channels	4
Input signal types	Voltage / Current
Measurement ranges	-20mA to +20mA, 0 to 20mA, +4mA to 20mA -10V to +10V, -5V to +5V, -1V to +1V, 0 to + 5V, 0 to + 10V
Refresh time	1,6ms (max.)
Resolution	16 bits
Break down current in current mode	+/- 40mA
Break down voltage	+/- 18V
Isolation input to system	1500Vac, 60s
Isolation between inputs	No
Input impedance, voltage mode	>33KΩ
Input impedance, current mode	440Ω (min.), 460Ω (max.)
Digital inputs/outputs	
Input/output channels	8
Input connection mode	One common return for all the signals
Input low level	0V to 11V
Input high level	18V to 30V
Input current	5,5mA
Output technology	Solid state relay opto isolated
Max current per output	250mA
Fast counter inputs	
Counter channels	Two channels, each with three signals: A0, B0, G0 / A1, B1, G1
SSI Interface	
Interface	SSI standard

IC3394AB	
Electrical	
24V power supply voltage for IEPE inputs (PSA power supply)	24Vdc, +/- 10%
PSA power supply consumption	250mA (max.) / 125mA (typ.)
Mechanical	
Dimensions (WxHxD)	52mm x 175mm x 130,41mm
Weight	225g
Slot width	2 slot TSX
Climatic	
Operating Temperature	-40° to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug.1,5mm ² (4 IC3571 per module)

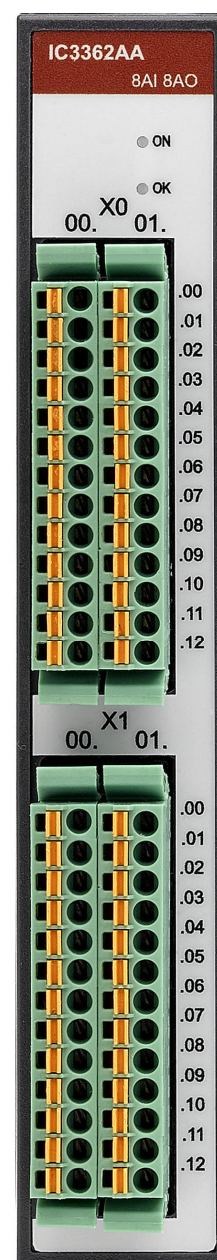
IC3395AB	
Functional	
Input signal	IEPE standard (ICP) Accelerometer
Input channels	8
Connection signals	ASx, AGx, ⊥ (signal, ref. screen)
Sampling frequency	47,971492Khz
Connection mode	Single ended
Configurable gains G, (dB)	0, 3, 6, 9, 12, 20, 23, 26, 29, 32
Resolution	24bits
Sensitivity	10V p-p a G=0db at full scale
Dynamic range	106,5dB (typ.)
Useful band	0,1Hz to 21Khz
Sensor diagnosis	Yes
Current injected to sensor	4mA (typ.)
Self-diagnosis	TSX internal bus, inputs and outputs and ADC
Hot swap	Yes
Electrical	
24V power supply voltage for IEPE inputs (PSA power supply)	24Vdc, +/- 10%
PSA power supply consumption	250mA (max.) / 125mA (typ.)
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	210 g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40° to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug.1,5mm ² (2 IC3571 per module)

5.2 Analog input / output modules

General Characteristics:

- Fast acquisition rate up to 100Ks/sec
- iTSX compliant. Intended for fast control application
- High resolution ADC and DAC, up to 16 bits
- Differential inputs
- Analogue Input mode (V/I/Pt100/IEPE) software configurable
- Analogue Output mode (V/I) software configurable

References	Specific Characteristics
IC3362AA	8 analogue input channels V/I/Pt100/IEPE 8 analogue output channels V/I
IC3362AB	2 PT100 , 2 IEPE 2 analogue output channels V/I
IC3362AC	8 analogue input channels V/I
IC3362AD	6 analogue input channels V/I/Pt100/IEPE. Chanel 0..5 2 analogue input channels thermocouple. Chanel 6..7 8 analogue output channels V/I



	IC3362AA	IC3362AB	IC3362AC	IC3362AD
Functional				
Number of inputs	8	2 + 2	8	6+2
Input type and ranges				
Voltage	+/-10V , +/-5V , +/-1V, 0 to 10V , 0 to 50V	-	+/-10V , +/-5V , +/-1V , 0 to 10V, 0 to 50V	
Current	+/-20mA , 0 to 20mA, 4 to 20mA	-	+/-20mA , 0 to 20mA , 4 to 20mA	
Pt100 sensor	-50C to 200C		-	-50C to 200C
IEPE sensor	+/-5V , +/-1V		-	+/-5V , +/-1V
Input connection	Differential for voltage ranges Single ended for current, Pt100 and IEPE	Single ended for Pt100 and IEPE	Differential for voltage ranges Single ended for current	Differential for voltage ranges Single ended for current, Pt100, thermocouple and IEPE
Sampling rate	Up to 100Ks/sec			
Input resolution	Up to 16bits			
Number of outputs	8	2	-	8
Output type and range				
Voltage	+/-10V , +/-5V , +/-1V , 0 to 10V, 0 to 50V		-	+/-10V , +/-5V , +/-1V, 0 to 10V , 0 to 50V
Current	+/-20mA , 0 to 20mA , 4 to 20mA		-	+/-20mA , 0 to 20mA , 4 to 20mA
Electrical				
Isolation				
Front connector to system connector	1500Vdc 1min			
Front connector to earth	1500Vdc 1min			
Max. Input voltage	+/- 15V from any Ain(+/-) input to M point	-	+/- 15V from any Ain(+/-) input to M point	
Input Impedance				
Voltage mode	>500KΩ	-	>500KΩ	
Current mode	440Ω typ	-	440Ω typ	
Output max load				
Voltage mode	1KΩ (min.)	-	1KΩ (min.)	
Current mode	500Ω (max.)	-	500Ω (max.)	
Aux. supply voltage	24Vdc +/- 10%			
Aux. supply current	450mA (max.) / 310mA (typ.) @ 24Vdc			
Current Consumption 3,3V	400mA (max.) / 250mA (typ.)			
Mechanical				
Dimensions (WxHxD)	26mm x 175mm x 130,41mm			
Weight	275g			
Slot width	1 slot TSX			
Climatic				
Operating Temperature	-40°C to + 70°C (extended range)			
Storage Temperature	-40°C to + 85°C			
Relative Humidity	5% to 95% w/o condensing			
Accessories (not included)				
Field connection options	Spring terminal plug.1,5mm ² (4 IC3593 per module)			

6 Digital input / output modules

INGESYS™ CMS PAC incorporates a complete set of digital input/output modules to access process signals.

The requirements of different application sectors have been considered, enabling a scalable and optimized solution.

These modules are designed to fulfill demanding industrial environmental conditions, following international standards.

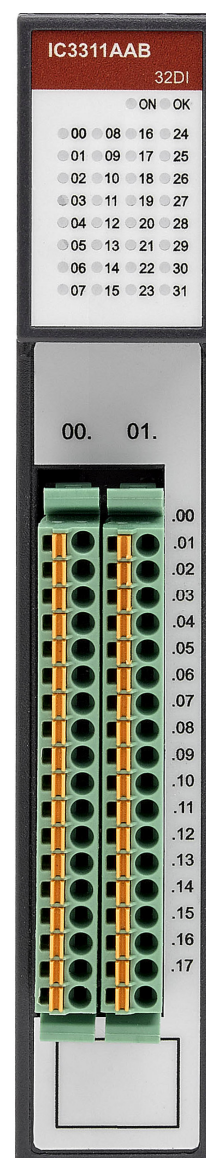
References	
IC3311AAB	32 inputs 24Vdc with diagnosis
IC3331AAB	32 outputs solid state relay (HSD) with diagnosis
IC3393AAB	16 inputs, 16 outputs solid state relays (HSD) 24Vdc with diagnosis

6.1 Digital input modules

General Characteristics:

- High density modules. Up to 32 inputs in one-slot width
- Self-diagnosis
- Digital configurable input filters
- **Optional**
 - 24Vdc rated voltages
 - 110/125Vdc rated voltages
 - Sequence-of-event recording (SoE)

References	Specific Characteristics
IC3311AAB	32 inputs, 24Vdc with diagnosis



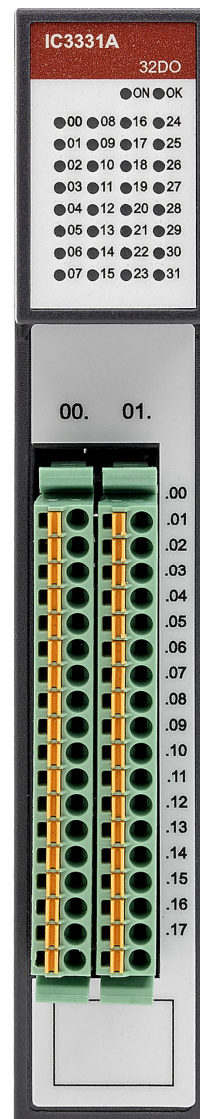
IC3311AAB	
Functional	
Number of inputs	32
Connection mode	One common return for all the signals
Input polarity	positive
SoE recording	No
Input filter	RC
Input to TSX time	2ms (max.)
Self-diagnosis	TSX Internal bus and inputs
Hot swap	Yes
Electrical	
Isolation input to system	2500Vac, 60s
Isolation between inputs	No
Rate voltage	24Vdc
Low level	0V to 11V
High level	18V to 30V
Input current	5,5mA (typ.) @ 24V
Current Consumption 3,3V	160mA (max.) / 110mA (typ.)
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	210g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug, 1,5mm ² (2 IC3571 per module) or 50 pin flat cable adapter (1 IC3573 per module)

6.2 Digital output modules

General Characteristics:

- High density modules
- Self-diagnosis. Failure detection on each output
- Short-circuit protection
- Overheating protection
- **Optional**
 - 32 solid state 24Vdc outputs
 - 16 electromechanical relay outputs

References	Specific Characteristics
IC3331AAB	32 solid state outputs



IC3331AAB	
Functional	
Number of outputs	32
Connection mode	Two groups of 16 outputs with separate supply (Common high side drive)
TSX to output time	2ms (max.)
Operating rate	1Khz (max.)
Self-diagnosis	TSX internal bus and outputs
Hot swap	Yes
Electrical	
Output technology	Solid state relay (SSR) opto isolated
Isolation output to system	2500Vac, 60s
Isolation between outputs	No
Aux. supply voltage	24Vdc (rated) 19Vdc (min.), 30Vdc (max.)
Aux. supply current	Sum of all output currents plus 15mA per active output Limited by a 5A internal fuse per block
Max. current per output	250mA
Max. short circuit current per output	1A, limited by SSR protection
Max. total current per module	5A, limited by internal fuse
Current Consumption 3,3 V	Outputs ON: 400mA (max.) / 350mA (typ.) Outputs OFF: 60mA (typ.)
Current Consumption 5,0 V	-
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	220g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C(extended range)
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug, 1,5mm ² (2 IC3571 per module) or 50 pin flat cable adapter (1 IC3573 per module)

6.3 Digital input / output modules

General Characteristics:

- High density modules
 - Self-diagnosis capability
 - Short-circuit protection
 - Over-temperature protection
- **Optional**
 - 16DI + 16DO 24Vdc optocoupler
 - 8DI 24Vdc + 4DO relay
 - 8DI 48Vdc + 4DO relay
 - 8DI 125Vdc + 4DO relay
 - 8DI 250Vdc + 4DO relay
 - Sequence-of-event recording (SoE)

References	Specific Characteristics
IC3393AAB	16 inputs + 16 outputs. 24Vdc with diagnosis



IC3393AAB	
Functional	
Number of inputs	16
Connection mode	One common return
Input polarity	Positive
Input filter	RC
SoE recording	No
Input to TSX time	2ms (max.)
Number of outputs	16
Outputs connection mode	Common high side drive
Internal bus to output time	2ms (max.)
Output switching rate	1Khz (max.)
Self-diagnosis	TSX internal bus, inputs and outputs
Hot swap	Yes
Electrical	
Inputs	
Isolation input to system	2500Vac, 60s
Isolation between inputs	No
Input Rated voltage	24Vdc
Input Low level	0V to 11V
Input High level	18V to 30V
Input current	5,5mA (typ.) @ 24V
Current Consumption 3,3 V	160mA (max.) / 110mA (typ.)
Outputs	
Output technology	Solid state relay (SSR) opto isolated
Isolation output to system	2500Vac, 60s
Isolation between outputs	No
Aux. supply voltage	24Vdc (rated) 19Vdc (min.), 30Vdc (max.)
Aux. supply current	Sum of all the output currents plus 15mA per active output Limited by 5A internal fuse

IC3393AAB	
Electrical	
Outputs	
Max current per output	250mA
Max short circuit per output	1A, limited by SSR protection
Max total per module	5A, limited by internal fuse
Current Consumption 3,3 V	Outputs ON: 400mA (max.) / 350mA (typ.) Outputs OFF: 60mA (typ.)
Current Consumption 5,0 V	-
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	220g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug, 1,5mm ² (2 IC3571 per module) or 50 pin flat cable adapter (1 IC3573 per module)

7 Counter modules

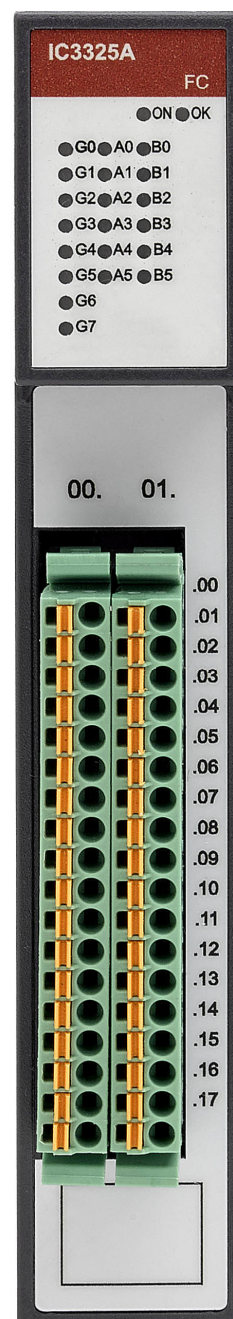
The counter function modules are designed to manage binary signals with high frequency rates.

Different counter modules are available integrating different functional features and additional I/Os.

General Characteristics:

- Three types of incremental encoders
- Up to 1 Million counts per second
- Fully configurable counters: set-points, presets, etc.
- High resolution position and speed measurements

References	Specific Characteristics
IC3325AB	6 general-purpose configurable counters Position and speed measurement by pulse encoders



IC3325AB	
Functional	
Number of counters	6
Encoders supported	A, B signals phase shifted 90° A for up and B for down A for count and B for up/down
Number of signals	6 A/B pairs + 8 (general purpose)
Count speed	10 ⁶ counts/sec
Hot swap	Yes
Electrical	
Counter Signals standard	24V HTL
SSI signals	-
Isolation input to system	2500Vac, 60s
Isolation between inputs	No
Current Consumption 3,3V	250mA (max.)
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	220g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing
Accessories (not included)	
Field connection options	Spring terminal plug, 1,5mm ² (2 IC3571 per module) or 50 pin flat cable adapter (1 IC3573 per module)

8 Fieldbus communication modules

INGESYS™ CMS PAC offers a wide range of fieldbus-compatible modules, covering a wide number of monitoring applications.

References	Specific Characteristics
IC3251AB	3 serial RS232/RS485 ports, D-Sub9 connector Extended Temperature Range
IC3261AB	CANopen Master. 2 Ports, D-Sub9 male connector Extended temperature range

8.1 Serial communications modules

INGESYS™ CMS offers different possibilities to interface external devices via serial links. RS232 or RS485 (half or full duplex) with the most standard serial protocols are offered to satisfy the demands of industrial applications.

General Characteristics:

- Three software-configurable serial ports
RS-232/RS-485 (half/full duplex)
- TX/RX LEDs per channel
- Intelligent modules
- FIFO buffer UART

References	Specific Characteristics
IC3251AB	3 serial RS232/RS485 ports, D-Sub9 connector Extended Temperature Range



IC3251AB	
Functional	
Communication	Serial RS232/RS485 (Half and Full duplex)
Number of ports	3
Connection type	Female DB9
Physical medium	Copper
Maximum transmission speed	RS-232 Up to 64 Kbit/s RS485: Up to 500Kbit/s
Signals/Diagnosis	Yes
Transmission LEDs	Yes
Diagnosis LEDs	Yes
Electrical	
Power supply consumption	
3,3V	420mA (max.) / 400mA (typ.)
5,0V	-
Dissipated power	1,4W (max.)
Galvanic isolation	500Vdc between field signals and internal logic
Isolation technology	Using transformer
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	220g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing

8.2 CANopen master modules

IC3261 module incorporates the CANopen master functional feature in **INGESYS™ CMS**, following the profiles given in the CiA 301 specification released by CAN in Automation.

The use of CANopen eases technical details, simplifying the control engineer’s task of developing the application and improving reliability.

General Characteristics:

- CANopen master module
- Copper
- Max. transmission speed 1Mbit/s
- Hot swap
- Extended temperature

References	Specific Characteristics
IC3261AB	CANopen Master. 2 Ports, D-Sub9 male connector Extended temperature range



IC3261AB	
Functional	
Communication Protocol	CANopen
Number of channels	2
Connection type	D-Sub9 male
Physical medium	Copper
Max. transmission speed	Up to 1Mbit/s (Cable length dependent)
Diagnosis LEDs	Yes
Self-diagnosis	Yes
Hot swap	Yes
Electrical	
Data link and physical layer	CAN
Current Consumption 3,3V	250mA (max.) / 230mA (typ.)
Current Consumption 5,0V	50mA (max.) / 30mA (typ.)
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	205g
Slot width	1 slot TSX
Climatic	
Operating Temperature	-40°C to + 70°C
Storage Temperature	-40°C to + 85°C
Relative Humidity	5% to 95% w/o condensing

9 ACCESSORIES

References	
IC3598A	32 PONTS INTERFACE + PS DISTRIBUTION NO SWITCHABLE W/O FUSES PLASTIC ENCLOSURE
IC3565	DC POWER INPUT PLUG FOR IC3121XX
IC3571	18 PIN TERMINAL PLUG (max. CABLE SECTION 1,5mm ²)
IC3573	TERMINAL SOCKET/ FLAT CABLE ADAPTER (32 POINTS)
IC3574	10 PIN TERMINAL PLUG (max. CABLE SECTION 1,5 mm ²)
IC3575	TSX SLOT COVER
IC3805	COMPACT FLASH 64MB
IC3582	COMPACT FLASH 1GB
IC3583	COMPACT FLASH 2GB
IC3593	13 PIN SCREW TERMINAL PLUG (max. CABLE SECTION 2,5mm ²)
IC3595	18 PIN SCREW TERMINAL PLUG (max. CABLE SECTION 2,5mm ²)

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