Ingeteam

INGESYS™ IC3

PRODUCT OVERVIEW

IC6452IKH02 Rev K02

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1 INTRODUCTION

INGESYS™ IC3 is a scalable, flexible, high-performance automation platform. Based on the concept of Programmable Automation Controllers (PACs), it fulfils the requirements of the process industry with a complete solution for demanding automation applications. A comprehensive suite of processors with increasing performance and I/Os modules increases the performance, quality and profitability of your industrial process.

The *INGESYS*™ IC3 controller optimises the integration of real-time multitasking control and the reliability of embedded platforms with the openness and tools offered by the new PC based solutions for the data intensive management. 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*™ IC3 with upper automation 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*™ IC3 PAC Controller Highlights:**

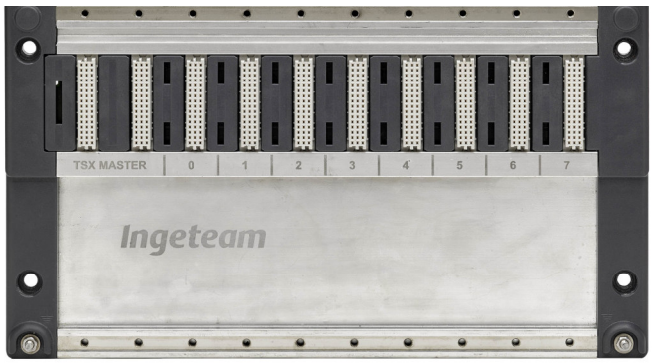
- Control processors and I/O modules designed to fulfill the demands of different application sectors with competitive solutions
- Realtime control
- Advanced programming (IEC 61131-3, C++, MATLAB®/SIMULINK®)
- Integrated PC functional features (Web server, FTP, Flash-based file system, etc.)
- Integrated industry standard de facto Ethernet protocols
- Complete range of industrial fieldbuses (CANopen, Profibus DP, Interbus-S, Ethercat, etc.)
- RTU functionality based on a complete range of standard protocols (IEC 60870-5-101, IEC 60870-5-104, DNP3, IEC61850, etc.)
- 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 RACKS

The set of IC3 racks provides mechanical support and electrical interconnection to the *INGESYS*™ IC3 controller modules.



Two types of racks are available:

a) Racks including a reserved slot for power supply modules. Designed for CPU or bus terminal modules powered at 3,3V or 5,0V that require an external power supply module.

References	
IC3501	Power supply + CPU + 16 I/O one-slot modules
IC3503	Power supply + CPU + 4 I/O one-slot modules
IC3504	Power supply + CPU + 8 I/O one-slot modules
IC3505	Power supply + CPU + 2 I/O one-slot modules
IC3507	Power supply + CPU + 4VC + 8 I/O one-slot modules
IC3509	2 Power supply + CPU + 2 I/O one-slot modules
IC3510	2 Power supply + 2 CPU/header + 12 I/O one-slot modules
IC3516	2 Power supply + CPU + 8 I/O one-slot modules

b) Racks not including a reserved slot for power supply modules. Designed for CPU or bus terminal modules powered at 24V that do not require an external power supply module.

References	
IC3511	CPU/header + 8 I/O one-slot modules
IC3512	CPU/header + 4 I/O one-slot modules
IC3513	CPU/header + 2 I/O one-slot modules
IC3515	CPU/header + 6 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.

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	
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	3,2Adc	0,75Adc 0,70Aac
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		
Mechanical		
Dimensions (WxHxD)	52,25mm x 175mm x 150,5mm	
Weight	540g	
Climatic		
Operating Temperature	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	

4 PROCESSOR MODULES

INGESYS™ IC3 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*™ IC3 processor modules are application software compatible enabling the optimization 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™* IC3 functionality and performance, offering a state-of-the-art solution for industrial automation.

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 is possible to work in an extensive temperature range thanks the passive cooling elements.

Different communication interfaces allow *INGESYS™* IC3 to be integrated with redundant Ethernet networks, remote I/O extensions and RS232/RS485 communication links.

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
- IRIG-B interface
- 8/16 TSX channels (local IO)

References	
IC3101AA	2 Ethernet, RS-232C
IC3101BA	2 Ethernet, RS-232C, 1 RTSX port (Remote IO),8 TSX channels (Local IO)
IC3101BB	1 Ethernet, 8 TSX channels (Local IO)
IC3101BD	2 Ethernet, RS-232C, 8 TSX channels (Local IO), 1 CAN port
IC3101CA	2 Ethernet, RS-232C, 1 RTSX port (Remote IO),16 TSX channels (Local IO)
IC3101CC	4 Ethernet, RS-232C, 1 RTSX port (Remote IO),16 TSX channels (Local IO), IRIG-B

	IC3101AA	IC3101BA	IC3101BB	IC3101BD	IC3101CA	IC3101CC
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		4 x 10/100 BaseTX
Serial	1 x RS232C		NO	1 x RS232C		
USB	1 x USB 2.0 Host					
CAN	NO			1	NO	
TSX	NO	8 channels			16 channels	
RTSX	NO	1 x RTSX port	NO		1 x RTSX port	
IRIG-B	NO					1 x IRIG-B
Electrical						
Power Supply	+3,3V / 5,0V from backplane					
Power Consumption 3,3 V	1A (max.) / 0,75A (typ.)					
Power Consumption 5,0 V	1,5A (max.) / 1,125A (typ.)					
Max.Dissipated Power	11W					
Additional Descriptions						
Watchdog/ Self Diagnostics						
Real-time clock with lithium battery						
3 position working mode switch (TST/ON/OFF)						
3 status indication LEDs						
Internal temperature supervision						
Autodiagnostics						
Hot Swap						
Mechanical						
Dimensions (WxHxD)	78,5mm x 175mm x 150,5mm					
Weight	1023g					
Climatic						
Operating Temperature	0ºC to + 60ºC (Fan less)					
Storage Temperature	-40ºC to + 85ºC					
Relative Humidity	5% to 95% w/o condensing					
Accessories (Not included)						
IC3581: COMPACT FLASH 512MB IC3582: COMPACT FLASH 1GB IC3583: COMPACT FLASH 2GB						

4.2 IC3121 PROCESSOR MODULE

The IC3121 processor modules are designed for medium-performance control applications with communications requirements in demanding environmental situations.

The software is compatible with the IC3101xx processor and can also work with *INGESYS*™ IC3's modules. (I/Os, counter modules, communications modules, etc) offering the same control 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.

CHARACTERISTICS

- ARM 400Mhz processor
- RTSX interface
- 2 Ethernet interfaces (10/100)
- 1 USB host interface
- CAN interface
- 1,4MB RAM
- 2MB for user Application
- 62KB NVRAM
- TEST/ON/OFF switch and status LEDs

Optional

- RS232C/485

References	
IC3121CA	4 TSX channels (Local IO), 1 RTSX port (Remote IO), CAN port Versatile Link, Power Supply
IC3121CB	4 TSX channels (Local IO), 1 RTSX port (Remote IO), CAN port Versatile Link, 2 Serial ports (RS232/485) , Power Supply
IC3121EA	4 TSX channels (Local IO), 2 CAN ports , Power Supply
IC3121FA	8 TSX channels (Local IO), 2 CAN ports , NO Power Supply

	IC3121CA	IC3121CB	IC3121EA	IC3121FA
Functional				
CPU	400Mhz ARM			
Program memory	2MB for user application			
RAM memory	1,4MB			
NVRAM memory	62KB for user application			
Ethernet	2 x 10/100 BaseTX (internally switched)			
Serial	-	2 x RS232C/RS485	-	-
CAN	1 x Optical Versatile Link		2 x D-SUB 9	
USB	1 x USB 2.0 Host			
TSX	4 channels			8 channels
RTSX	1 x RTSX port		-	-
Electrical				
Input Voltage	11Vdc to 34Vdc			+3,3V / +5,0V (from backplane)
Input Current	0,9A (depends on output power to backplane)			+3,3V: 0,7A (max.) / 0,575A (typ.) +5,0V: 0,1A (max.) / 0,050A (typ.)
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			2,5W
Isolation	1000V			-
Additional Features				
Watchdog				
Real-time clock with Lithium battery				
3 position working mode switch (TST/ON/OFF)				
3 Status indication leds				
Internal temperature supervision				
Mechanical				
Dimensions (WxHxD)	52,25mm x 175mm x 150,5mm			
Weight	540gr			
Climatic				
Operating Temperature	-40ºC to + 70ºC			
Storage Temperature	-40ºC to + 85ºC			
Relative Humidity	5% to 95% w/o condensing			
Accessories (Not included)				
IC3565: DC Power Input Plug				-

5 DIGITAL INPUT / OUTPUT MODULES

INGESYS™ IC3 PAC incorporates a complete set of digital input/output modules to access process signals.

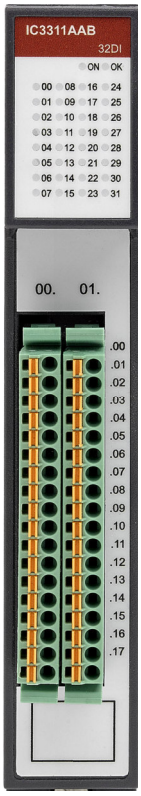
The requirements of different application sectors have been considered, enabling a scalable and optimised solution.

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

References	
IC3311AAB	32 inputs 24Vdc with diagnosis
IC3312AAB	32 inputs 24Vdc with diagnosis. SoE recording
IC3313AAC	32 inputs. 110/125Vdc, SoE recording
IC3331AAB	32 outputs solid state relay (HSD) with diagnosis
IC3333AAB	32 x 24Vdc Dos HSD 250mA (20 DOs in 5 groups with a common in each group + 12SDs independent common)
IC3335	16 outputs relay (NO) without diagnosis
IC3335BB	16 outputs relay (8NO + 8NC) without diagnosis
IC3393AAB	16 inputs, 16 outputs solid state relays (HSD) 24Vdc with diagnosis
IC3396AA	8 inputs 24Vdc, 4 outputs relay (NO) with diagnosis
IC3396BA	8 inputs 48Vdc, 4 outputs relay (NO) with diagnosis
IC3396CA	8 inputs 125Vdc, 4 outputs relay (NO) with diagnosis
IC3396DA	8 inputs 250Vdc, 4 outputs relay (NO) with diagnosis

5.1 DIGITAL INPUT MODULES

CHARACTERISTICS



- High density modules. Up to 32 inputs in one-slot width
- Self diagnosis
- Digital configurable input filters

Optional

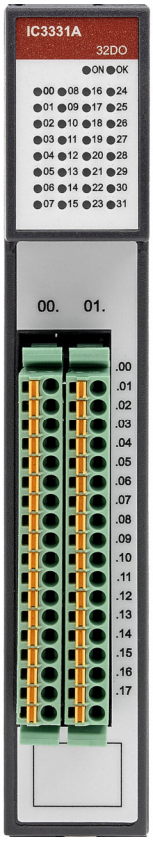
- 24Vdc rated voltages
- 110/125Vdc rated voltages
- Sequence-of-event recording (SoE)

References	
IC3311AAB	32 inputs, 24Vdc with diagnosis
IC3312AAB	32 inputs, 24Vdc, with diagnosis, SoE recording
IC3313AAC	32 inputs, 110/125Vdc, SoE recording

	IC3311AAB	IC3312AAB	IC3313AAC
Functional			
Number of inputs	32		
Connection mode	One common return for all the signals		One common return for each of the 16 inputs block
Input polarity	positive		positive / negative
SoE recording	No	Yes	
Input filter	RC	Digital configurable. 1ms to 200ms	
Self diagnosis	TSX Internal bus and inputs		Only on internal bus TSX
Hot Swap	Yes		
Input to TSX time	2ms (max.)	Filter Time	
Electrical			
Isolation input to system	2500Vac, 60s		
Isolation between inputs	No		2500Vac 60s between the two 16 input blocks
Rate voltage	24Vdc		110 / 125Vdc
Low level	0V to 11V		0 to + 67V
High level	18V to 30V		+ 77V to + 162V
Input current	5,5mA (typ.) @ 24V		1,6mA @125V
TSX bus 3,3V supply	160mA (max.) / 110mA (typ.)		230mA (max.) /160mA (typ.)
Mechanical			
Dimensions (WxHxD)	26mm x 175mm x 130,4mm		52mm x 175mm x 130,4mm
Weight	210g		250g
Slot width	1 slot. IC3 / TSX		2 slot. IC3 / TSX
Climatic			
Operating Temperature	-40ºC to + 70ºC		
Storage Temperature	-40ºC to + 85ºC		
Relative Humidity	5% to 95% w/o condensing		
Accessories (Not included)			
Field connection options	Spring terminal plug, 1,5mm^2 (2 IC3571 per module) 50 pin flat cable adapter (1 IC3573 per module)		Screw terminal plug, 2,5 mm^2 (2 IC3595 per module)

5.2 DIGITAL OUTPUT MODULES

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

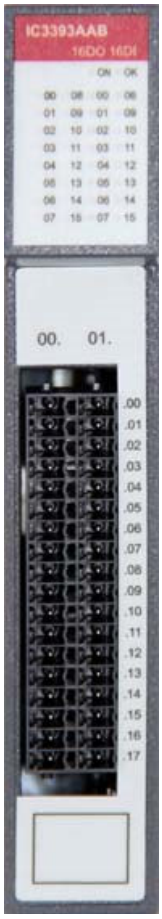
References	
IC3331AAB	32 solid state outputs
IC3333AAB	32 x 24Vdc DOs HSD 250mA (20 DOs in 5 groups with a common in each group + 12SDs independent common)
IC3335	16 outputs relay (NO) without diagnosis
IC3335BB	16 outputs relay (8NO + 8NC) without diagnosis

	IC3331AAB	IC3333AAB	IC3335	IC3335BB
Functional				
Number of outputs	32		16	8NO + 8NC
Connection mode	Two groups of 16 outputs with separate supply Common high side drive	5 different groups of 4 digital output with a common in each group + 12SDs independent	16 Normally open (NO), potential free contacts	8 Normally open (NO), 8 Normally close, potential free contacts
Self diagnosis	TSX internal bus and outputs		TSX internal bus and relay coils	
Hot Swap	Yes			
TSX to output time	2ms (max.)		75ms (max.)	
Operating rate	1Khz (max.)		5Hz (Full load)	
Electrical				
Output technology	Solid state relay (SSR) opto isolated		Electromechanical relay	
Isolation output to system	2500Vac, 60s		2500Vac, 60s	
Isolation between outputs	No		2500Vac, 60s	
Breakdown voltage between open contacts	-		1000Vrms	
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		-	
Switching capacity 24Vdc resistive load	-		8A	
Switching capacity 250Vac resistive load	-		8A	
Max. short circuit current per output	1A, limited by SSR protection		-	
Max. total current per module	5A, limited by internal fuse		-	
Current from 3,3V	Outputs ON: 400mA (max.) / 350mA (typ.) Outputs OFF: 60mA (typ.)		205mA	
Current from 5,0V	-		1,5A (max.)	

	IC3331AAB	IC3333AAB	IC3335	IC3335BB
Mechanical				
Dimensions (WxHxD)	26mm x 175mm x 130,41mm	52,25mm x 175mm x 150,5mm	52mm x 175mm x 130,41mm	
Weight	220g		536g	
Slot width	1 slot. IC3 / TSX		2 slot. IC3 / TSX	
Climatic				
Operating Temperature	-40ºC to + 70ºC(extended range)			
Storage Temperature	-40ºC to + 85ºC			
Relative Humidity	5% to 95% w/o condensing			
Accessories (Not included)				
Field connection options	Spring terminal plug, 1,5mm^2 (2 IC3571 per module) 50 pin flat cable adapter (1 IC3573 per module)	13 pin spring terminal socket (4 IC3593 per module)	Screw terminal plug, 2,5 mm^2 (2 IC3595 per module)	

5.3 DIGITAL INPUT / OUTPUT MODULES

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	
IC3393AAB	16 inputs + 16 outputs. 24Vdc with diagnosis
IC3396AA	8 inputs 24Vdc + 4 relay outputs with diagnosis
IC3396BA	8 inputs 48Vdc + 4 relay outputs with diagnosis
IC3396CA	8 inputs 125Vdc + 4 relay outputs with diagnosis
IC3396DA	8 inputs 250Vdc + 4 relay outputs with diagnosis

	IC3393AAB	IC3396AA	IC3396BA	IC3396CA	IC3396DA
Functional					
Number of inputs	16	8			
Connection mode	One common return	One common return			
Input polarity	Positive	All input with same polarity Positive or Negative			
Input filter	RC	Digital configurable. 1ms to 200ms			
SoE recording	No	Yes			
Self diagnosis	TSX internal bus, inputs and outputs				
Hot Swap	Yes				
Input to TSX time	2ms (max.)	2ms (max.)			
Number of outputs	16	4			
Outputs connection mode	Common high side drive	Normally open (NO) relay outputs			
Internal bus to output time	2ms (max.)	10ms (max.)			
Output switching rate	1Khz (max.)	5Hz (Full load)			
Electrical					
Inputs					
Isolation input to system	2500Vac, 60s	2500Vac, 60s			
Isolation between inputs	No	No			
Input Rated voltage	24Vdc	24Vdc	48Vdc	125Vdc	250Vdc
Input Low level	0V to 11V	0V to 9V	0V to 32V	0V to 82V	0V to 165V
Input High level	18V to 30V	12V to 30V	37V to 60V	87V to 156V	172V to 312V
Input current	5,5mA (typ.) @ 24V	3mA (typ.) @ 24V	2,5mA (typ.) @ 48V	2mA (typ.) @ 125V	2mA (typ.) @ 250V
Power from 3,3V	160mA (max.) / 110mA (typ.)	185mA (max.) / 169mA (typ.)			
Outputs					
Output technology	Solid state relay (SSR) opto isolated	Electro mechanical relay			
Isolation output to system	2500Vac, 60s	2500Vac, 60s			
Isolation between outputs	No	2500Vac, 60s			
Breakdown voltage between open contacts	-	1000Vrms			
Switching capacity 24Vdc resistive load	-	8A			
Switching capacity 250Vac resistive load	-	8A			
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	-			
Max current per output	250mA	-			
Max short circuit per output	1A, limited by SSR protection	-			
Max total per module	5A, limited by internal fuse	-			

	IC3393AAB	IC3396AA	IC3396BA	IC3396CA	IC3396DA
Electrical					
Outputs					
Power from 3,3V	Outputs ON : 400mA (max.) / 350mA (typ.) Outputs OFF: 60mA (typ.)	180mA (max.) / 160mA (typ.)			
Current from 5,0V	-	300mA (max.) / 263mA (typ.)			
Mechanical					
Dimensions (WxHxD)	26mm x 175mm x 130,41mm				
Weight	220g	298g			
Slot width	1 slot. IC3 / TSX				
Climatic					
Operating Temperature	-40ºC to + 70ºC				
Storage Temperature	-40ºC to + 85ºC				
Relative Humidity	5% to 95% w/o condensing				
Accessories (Not included)					
Field connection options	Spring terminal plug.1,5mm^2 (2 IC3571 per module) Socket to flat cable adapter (1 IC3573 per module)	Screw terminal plug, 2,5 mm^2 (1 IC3560 and 1 IC3570 per module)			

6 ANALOGUE INPUT / OUTPUT MODULES

A set of analogue input/output modules intended for a TSX bus, fully equips IC3 PAC for using analogue process signals.

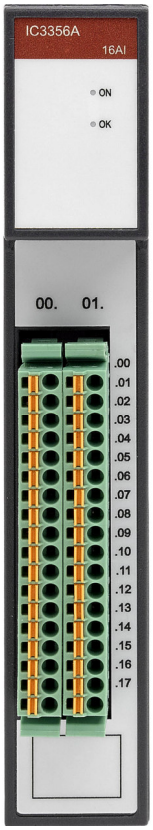
The requirements of different application sectors have been considered, enabling a scalable and optimized solution.

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

References	
IC3356AB	16 analogue inputs with +/- 10V and +/- 20mA max input ranges
IC3357AB	16 PT100 inputs 2 wires TSX
IC3358AB	16 PT100 inputs 3 wires TSX
IC3364AA	8 V/I/Pt100/IEPE high speed analogue inputs channels 8 V/I high speed analogue outputs channels
IC3364AC	2 PT100 CH + 2 IEPE high speed analogue inputs channels 2 V/I analogue output channels
IC3364AD	6 V/I/Pt100/IEPE high speed analogue input channels 2 Thermocouple analogue input channels 8 V/I high speed analogue output channels
IC3364AF	8 V/I/Pt100/IEPE high speed analogue input channels
IC3373AB	16 outputs with +/- 10V and +/- 20mA max output ranges
IC3374AB	8 outputs with +/- 10V and +/- 20mA max output ranges
IC3394AB	8 channels for accelerometer signal analysis, 8 digital inputs and output, 4 analogue input, 2 fast counter channels and 1 SSI channel

6.1 ANALOGUE INPUT MODULES

CHARACTERISTICS



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

References	
IC3356AB	16 analogue inputs with +/- 10V, +/- 20mA ranges
IC3357AB	16 PT100 inputs. 2 wires
IC3358AB	16 PT100 inputs. 3 wires
IC3364AF	8 V/I/Pt100/IEPE high speed analogue input channels
IC3394AB	8 accelerometer channels, 8 digital inputs/outputs, 4 analogue input channels, 2 fast counter channels and 1 SSI channel

	IC3356AB	IC3357AB	IC3358AB
Functional			
Input signal	Voltage / Current	PT100 sensor	
Number of inputs	16	16	
Connection mode	Common GND reference	2 wires	2 or 3 wires
Self diagnosis	TSX and ADC		
Hot swap	Yes		
Measurement ranges	-20mA to +20mA,0 to 20mA, +4mA to 20mA -10V to +10V, -5V to +5V, -1V to +1V 0 + 5V, 0 + 10V	-50ºC to 200ºC	
Refresh time	5,2ms (max.)	48ms (max.)	
A/D converter	16 bits		
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.)	-	
TSX bus current from 3,3V	550mA (max.) / 430mA (typ.)	600mA (max.) / 400mA (typ.)	
Current from 5,0V	-		
Mechanical			
Dimensions (WxHxD)	26mm x 175mm x 130,41mm		
Weight	210g		250g
Slot width	1 slot. IC3 / TSX		
Climatic			
Operating Temperature	-40ºC to + 70ºC		
Storage Temperature	-40ºC to + 85ºC		
Relative Humidity	5% to 95% w/o condensing		
Accessories (Not included)			
Field connection options	Spring terminal plug, 1,5mm^2 (2 IC3571 per module) Socket to flat cable adapter (1 IC3573 per module)	Spring terminal plug, 1,5mm^2 (4 IC3593 per module)	

	IC3364AF
Functional	
Number of Inputs	8
Input type and ranges	
Voltage	+/-10V , +/-5V , +/-1V , 0 to 10V , 0 to 5V
Current	+/-20mA , 0 to 20mA , 4 to 20mA
Pt100 sensor	-50C to 200C
IEPE sensor	+/-5V , +/-1V
Input connection	Differential for voltage ranges, Single ended for current, Pt100 and IEPE
Refresh time (CoDeSys)	1.5ms
Max. Sampling rate (Simulink®)	100Ksamples/s
Input resolution	Up to16bits
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
Input Impedance	
Voltage mode	>500KΩ
Current mode	440Ω typ
Aux. supply voltage	24Vdc +/- 10%
Aux. supply current	250mA (max.) / 150mA (typ.) @ 24Vdc
Current from TSX	
3,3V	400mA (max.) / 250mA (typ.)
5,0V	-
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	275g
Slot width	1 slot. IC3 / TSX
Climatic	
Operating Temperature	-40ºC to + 70ºC (extended range)
Storage Temperature	-40ºC to + 85ºC
Relative Humidity	5% to 95% w/o condensing
Accessories (Not included)	
Field connection options	Spring terminal plug, 1,5mm^2 (4 IC3593 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 diagnostics	Yes
Current injected to sensor	4mA (typ.)
Self diagnosis	-
Hot Swap	-
Analogue inputs	
Input channels	4
Input signal types	Voltage / Current
Measurement ranges	-20mA to +20mAa, 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	1 slot. IC3 / TSX
Climatic	
Operating Temperature	-40º to + 70ºC
Storage Temperature	-40ºC to + 85ºC
Relative Humidity	5% to 95% w/o condensing
Accesories (Not Included)	
Field connection options	Spring terminal plug.1,5mm^2 (4 IC3571 per module)

6.2 ANALOGUE OUTPUT MODULES

CHARACTERISTICS

- Voltage or current outputs. Software configurable
- Output status diagnosis
- Short-circuit protection
- Overheating protection

References	
IC3373AB	16 outputs with +/- 10V and +/- 20mA
IC3374AB	8 outputs with +/- 10V and +/- 20mA

	IC3373AB	IC3374AB
Functional		
Number of outputs	16	8
Connection mode	Common GND reference	
Self diagnosis	TSX and ADC	
Hot Swap	Yes	
Output signal	Voltage / Current	
Output ranges	-10V to +10V,0 to +10V, 0 to +5V -20mA to +20mA, 0 to 20mA, +4mA to 20mA	
Refresh time	2,5ms (max.)	
A/D converter bits	16	
Electrical		
Aux. supply voltage	24V +/- 10%	
Aux. supply current	370mA (max.) , with all outputs at 20mA	
Isolation output to system	1500Vac, 60s	
Isolation between outputs	No	
Resistive load in voltage mode	1KΩ (min.)	
Resistive load in current mode	500Ω (max.)	
Current from 3,3V	160mA (max.) / 115mA (typ.)	
Mechanical		
Dimensions (WxHxD)	26mm x 175mm x 130,41mm	
Weight	230g	
Slot width	1 slot. IC3 / TSX	
Climatic		
Operating Temperature	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	
Accessories (Not included)		
Field connection options	Spring terminal plug.1,5mm^2 (2 IC3571 per module) Socket to flat cable adapter (1 IC3573 per module)	Spring terminal plug.1,5mm^2 (2 IC3574 per module) Socket to flat cable adapter (1 IC3578 per module)

6.3 ANALOGUE INPUT / OUTPUT MODULES

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	
IC3364AA	8 V/I/Pt100/IEPE high speed analogue inputs channels 8 V/I high speed analogue outputs channels
IC3364AC	2 PT100 CH + 2 IEPE high speed analogue inputs channels 2 V/I analogue output channels
IC3364AD	6 V/I/Pt100/IEPE high speed analogue input channels 2 Thermocouple analogue input channels 8 V/I high speed analogue output channels

	IC3364AA	IC3364AC	IC3364AD
Functional			
Number of Inputs	8		6+2
Input type and ranges			
Voltage	+/-10V , +/-5V , +/-1V , 0 to 10V , 0 to 5V		
Current	+/-20mA , 0 to 20mA , 4 to 20mA		
Pt100 sensor	-50C to 200C	-	-50C to 200C
IEPE sensor	+/-5V , +/-1V	-	+/-5V , +/-1V
Thermocouple sensor	-		J: -40ºC to 180ºC K: -200ºC to 230ºC T: -200ºC to 200ºC
Input connection	Differential for voltage ranges Single ended for current, 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 to16bits		
Number of outputs	8	-	8
Output type and range			
Voltage	+/-10V , +/-5V , +/-1V , 0 to 10V , 0 to 5V		
Current	+/-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		
Input Impedance			
Voltage mode	>500KΩ		
Current mode	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 from TSX			
3,3V	400mA (max.) / 250mA (typ.)		
5,0V	-		
Mechanical			
Dimensions (WxHxD)	26mm x 175mm x 130,41mm		
Weight	275g		
Slot width	1 slot. IC3 / TSX		
Climatic			
Operating Temperature	-40ºC to + 70ºC (extended range)		
Storage Temperature	-40ºC to + 85ºC		
Relative Humidity	5% to 95% w/o condensing		
Accessories (Not included)			
Field connection options	Spring terminal plug, 1,5mm^2 (4 IC3593 per module)		

7 FIELDBUS COMMUNICATION MODULES

Distributed automation solutions based on open field buses are the current standard for many sectors in the manufacturing industry and more recently, for process engineering. Field buses permit full utilization of the functional advantages of digital communication, such as improved resolution in measured values.

INGESYS™ IC3 PAC offers a wide range of fieldbus-compatible modules, covering the entire scope of process and manufacturing automation.

References	
IC3261AB	CANopen Master. 2 Ports 9-pin male D-Sub. Extended temperature range
IC3262A	CANopen Master. 2 Optical fibre ports
IC3262AB	CANopen Master 1 x Optic fibre port + 1 x Copper DB9 connection
IC3262B	CANopen Master. 1 Optical fibre port
IC3262BB	CANopen Master. 1 Optic fibre port. Extended Temperature Range
IC3281	Interbus-S Master module
IC3282A	Interbus-S Slave module. Copper
IC3282B	Interbus-S Slave module. Optical fibre
IC3271	Profibus DP Master module
IC3272AA	Profibus DP Slave module
IC3291	MVB Multifunction Vehicle Bus. Train Communication Network (TCN)
IC3292A	WTB Wire Train Bus. Train Communication Network (TCN)
IC3293A	Profinet Slave 2-port (switched)

7.1 CANOPEN MASTER MODULES

IC326X modules incorporate the CANopen master functional feature in *INGESYS*™ IC3, 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.

CHARACTERISTICS

- CANopen master modules
- Copper or optical fibre
- Max. transmission speed 1Mbit/s
- Hot Swap
- Extended temperature

References	
IC3261AB	CANopen Master. 2 Ports 9-pin male D-Sub. Extended temperature range
IC3262A	CANopen Master. 2 Optical fibre ports
IC3262AB	CANopen Master. 1 Optical fibre port + 1 9-pin male D-Sub Port
IC3262B	CANopen Master. 1 Optical fibre port
IC3262BB	CANopen Master. 1 Optical fibre port. Extended Temperature Range

	IC3261AB	IC3262A	IC3262AB	IC3262B	IC3262BB
Functional					
Communication Protocol	CANopen				
Number of channels	2			1	
Connection type	DB9 male	V-pin connector	1 x V-pin connector 1 xx DB9 male	V-pin connector	
Physical medium	Copper	POF or HCS optical fibre	POF or HCS optical fibre Copper	POF or HCS optical fibre	
Max. transmission speed	Up to 1Mbit/s (Cable length dependent)	1Mbit/s	1Mbit/s Up to 1Mbit/s (Cable length dependent)	1Mbit/s	
Hot Swap	Yes				
Diagnostic LEDs	Yes				
Electrical					
Data link and physical layer	CAN				
Power supply consumption					
3,3V	250mA (max.) / 230mA (typ.)	170mA (max.) / 140mA (typ.)		160mA (max.) / 130mA (typ.)	
5,0V	50mA (max.) / 30mA (typ.)	230mA (max.) / 210mA (typ.)		110mA (max.) / 105mA (typ.)	
Self diagnosis	Yes				
Mechanical					
Dimensions (WxHxD)	26mm x 175mm x 130,41mm				
Weight	205g	192g	195g	190g	
Slot width	1 slot. IC3 /TSX				
Climatic					
Operating Temperature	-40ºC to + 70ºC				
Storage Temperature	-40ºC to + 85ºC				
Relative Humidity	5% to 95% w/o condensing				

7.2 INTERBUS-S COMMUNICATIONS

INTERBUS is an open fieldbus network, standardised in the international standard IEC 61158. It is designed as a fast sensor / actuator network for transmitting cyclic process data in industrial environments

INGESYS™ IC3 incorporates the INTERBUS-S master and slave functional feature for its optimal integration into process automation.

CHARACTERISTICS

- Interbus S master and slaves modules
- Copper, optical fibre
- Hot Swap
- Extended temperature

References	
IC3281	Interbus-S master module
IC3282A	Interbus-S slave module. Copper
IC3282B	Interbus-S slave module. Optical fibre

	IC3281	IC3282A	IC3282B
Communication Protocol	INTERBUS-S		
Functionality	Master	Slave	
Number of channels	1	1 (Input - output)	
Connection type	DB9 female	Ingoing DB9 male / Outgoing DB9 female	V-LINK Connector
Physical medium	Copper	Copper	POF or HCS optical fibre
Max. transmission speed	500Kbps		
Hot Swap	Yes		
I/O Interbus-S No. Bytes	4096 input & 4096 outputs	2 to 64	
Max. No. Slave Devices	512	-	
Electrical			
Power supply consumption			
3,3V	330mA (max.) / 280mA (typ.)	600mA (max.) / 560mA (typ.)	440mA (max.) / 400mA (typ.)
5,0V	260mA (max.) / 220mA (typ.)	130mA (max.) /100mA (typ.)	320mA (max.) / 290mA (typ.)
Dissipated power	1,4W (max.)	2,7W (max.)	3,3W (max.)
Galvanic separation	500 VAC for 1 min between IBS connectors and internal circuits		
Isolation technology	Optical couplers		
Self diagnosis	Yes		
Mechanical			
Dimensions (WxHxD)	26mm x 175mm x 130,41mm		
Weight	240g	211g	
Slot width	1 slot. IC3 / TSX		
Climatic			
Operating Temperature	-40ºC to + 70ºC		
Storage Temperature	-40ºC to + 85ºC		
Relative Humidity	5% to 95% w/o condensing		

7.3 TRAINBUS COMMUNICATIONS (TCN) MODULES

The Train Communication Network (TCN) defined in the IEC61375-1 standard is applied in trains in order to facilitate communication between devices and different wagons. This protocol standard founded by the International Electrotechnical Committee (IEC) is used to transfer information concerning train control, diagnostics and passenger information.

TCN is an embedded real-time data network proposed for use on trains [IEC99], and consists of two different networks with somewhat different protocols: The Multi- function Vehicle Bus (MVB) protocol is used for networks within a single vehicle, while the Wire Train Bus (WTB) is used across the length of an entire train.

Modules IC3291 and IC3292 incorporate these two protocols in *INGESYS*™ IC3.

CHARACTERISTICS

- Two redundant channels
- MVB. Multifunction Vehicle Bus
  - Optical fibre connection
  - Bus administrator capacity
- WTB.Wire Train Bus
  - Supporting the UIC protocol
    (“International Union of Railways), according UIC-556 Leaflet)

References	
IC3291	MVB communication module
IC3292A	WTB communication module

	IC3291	IC3292A
Functional		
Communication Protocol	TCN – MVB – OGF (optical fibre)	TCN – WTB
Line number	2	2
Connection type	2 x ST (each line)	2 x D-Sub with 9 pin (each line)
Physical medium	HCS Multimode 200µm (optical fibre pair)	Shielded twisted pair
Transmission speed	1,5 Mbit/s	1 Mbit/s
Hot Swap	Yes	
Status Diagnosis Leds	Yes	
Electrical		
Power supply consumption		
3,3V	500mA (max.) / 360mA (typ.)	210mA (max) / 170mA (typ.)
5,0V	195mA (max.) / 150mA (typ.)	195mA (max.) w/o fritting / 160mA (typ.) 740mA (max.) with fritting / 630mA (typ.)
Dissipated Power	2,7W	1,7W (max.) w/o fritting 4,4W (max.) with fritting
Mechanical		
Dimensions (WxHxD)	26mm x 175mm x 130,41mm	52mm x 175mm x 130,41mm
Weight	225g	385g
Slot width	1 slot. IC3 / TSX	2 slots. IC3 / TSX
Climatic		
Operating Temperature	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	

7.4 PROFIBUS DP MODULES

PROFIBUS is suitable for fast communication with distributed I/Os in production automation and for communications tasks in process automation.

It is based on universal international standards and oriented to the OSI (Open System Interconnection) reference model as per international standard ISO 7498.

The PROFIBUS DP fieldbus is established at the field level, where a high-speed response is required and small amounts of data are generally exchanged.

CHARACTERISTICS

- PROFIBUS DP master Class 1
- Max. Transmission rate 12Mbit/s
- Hot Swap
- Extended temperature

References	
IC3271	PROFIBUS DP Master module
IC3272AA	PROFIBUS DP/DPV1 Slave module

	IC3271	IC3272AA
Functional		
Communications	PROFIBUS DP Master	PROFIBUS DP Slave
Number of channels	1	
Connection type	DB9 male	
Physical medium	Copper	
Max. transmission speed	12Mbit/s	
Hot Swap	Yes	
Diagnosis LEDs	Yes	
Electrical		
Power supply consumption		
3,3V	180mA (max.) / 120mA (typ.)	200mA (max.) / 185mA (typ.)
5,0V	450mA (max.) / 320mA (typ.)	-
Dissipated power	2,65W (max.)	0,68W
Signals/Autodiagnosis	Yes	
Mechanical		
Dimensions (WxHxD)	26mm x 175mm x 130,4mm	
Weight	235g	197g
Slot width	1 slot. IC3 / TSX	
Climatic		
Operating Temperature	0ºC to + 70ºC	-40ºC to + 70ºC
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	

7.5 SERIAL COMMUNICATIONS MODULES

INGESYS™ IC3 offers different possibilities to interface external devices via serial links. RS232 or RS485 (half or full duplex) or serial optical fibre links with the most standard serial protocols are offered to satisfy the demands of industrial applications.

CHARACTERISTICS

- Three software-configurable serial ports RS-232/RS-485 (half/full duplex)
- Optical fibre link (POF or HCS) version for demanding EMC environments
- TX/RX LEDs per channel
- Intelligent modules
- FIFO buffer UART

References	
IC3251AB	3 serial RS232/RS485 ports, DB9. Extended Temperature Range
IC3252AB	3 serial port optical fibre link. Extended Temperature Range
IC3252BB	2 serial port optical fibre link. Extended Temperature Range
IC3252DB	2 serial port optical fibre link + 1 Dsub-9 serial port RS232/RS485. Extended Temperature Range

	IC3251AB	IC3252AB	IC3252BB	IC3252DB
Functional				
Communication	Serial RS232/RS485 (Half and Full duplex)	Serial		
Number of ports	3		2	3
Connection type	Female DB9	V-pin connector		2 x V-pin connector 1 x Female DB9
Physical medium	Copper	POF 50m (max.) HCS optical fibre 300m (max.)		POF 50m (max.) HCS optical fibre 300m (max.) Copper
Maximum transmission speed	RS-232 Up to 64 Kbit/s RS485: Up to 500Kbit/s	POF : Up to 500Kbit/s HCS : Up to 500Kbit		POF : Up to 500Kbit/s HCS : Up to 500Kbit RS-232 Up to 64Kbit/s RS485: Up to 500Kbit/s
Signals/Diagnosis	Yes			
Transmission LEDs	Yes			
Diagnostic LEDs	Yes			
Electrical				
Power supply consumption				
3,3V	420mA (max.) / 400mA (typ.)	170mA (max.) / 160mA (typ.)		220mA (max.) / 210mA (typ.)
5,0V	-	300mA (max.) / 270mA (typ.)	200mA (max.) / 180mA (typ.)	
Dissipated power	1,4W (max.)	2 W (max.)	1,6W (max.)	1,8W (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	197g	194g	210g
Slot width	1 slot. IC3 / TSX			
Climatic				
Operating Temperature	-40ºC to + 70ºC			
Storage Temperature	-40ºC to + 85ºC			
Relative Humidity	5% to 95% w/o condensing			

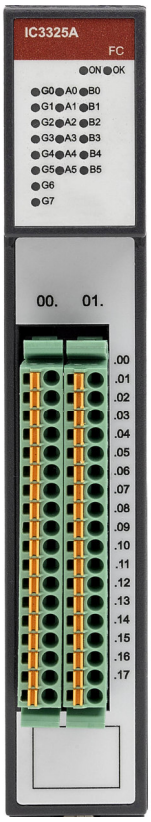
7.6 PROFINET SLAVE COMMUNICATION

The IC3293 module provides profinet slave functionality, with integrated 2-port switch and support up to 256 bytes of IO for both Input and Output data for cyclic RT communications.

References	
IC3293A	Profinet Slave 2-port (switched)

	IC3293A
Functional	
Communications	PROFINET I/O
Number of channels	2
Connection type	RJ45
Physical medium	Copper
Diagnosis LEDs	Yes
Self diagnosis	Yes
Hot Swap	Yes
Electrical	
Power supply consumption	500mA (max.) / 3,3V 335mA (typ.)
Dissipated Power	1,165W(max.)
Mechanical	
Dimensions (WxHxD)	26mm x 175mm x 130,41mm
Weight	205g
Slot width	1 slot. IC3 / TSX
Climatic	
Operating Temperature	0ºC to + 70ºC
Storage Temperature	-40ºC to + 85ºC
Relative Humidity	5% to 95% w/o condensing

8 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.

CHARACTERISTICS

- Three types of incremental encoders
- Up to 2 Million counts per second
- Fully configurable counters: set-points, presets, etc.
- High resolution position and speed measurements

References	
IC3325AB	6 general-purpose configurable counters Position and speed measurement by pulse encoders
IC3391A	6 counters for speed measurement by pulse encoders 4 analogue outputs (+/- 10V)
IC3391AB	6 counters for speed measurement by pulse encoders 4 analogue outputs (+/- 10V). Extended Temperature Range
IC3392BB	3 SSI interface for absolute position encoder 4 digital inputs 2 digital outputs (relay) 4 analogue outputs (4 to 20 mA)

	IC3325AB	IC3391A	IC3391AB	IC3392BB
Functional				
Number of counters	6			-
SSI interface	-			3
Encoders supported	A, B signals phase shifted 90º A for up and B for down A for count and B for up/down			SSI
Number of signals	6 A/B pairs + 8 (general purpose)			3 A/B pairs
Count speed	2 x 10^6 counts/sec			-
Electrical				
Counter Signals standard	24V HTL			-
SSI signals	-			RS485
Isolation input to system	2500Vac, 60s			1500Vac, 60s
Isolation between inputs	No			
Current from 3,3V	250mA (max.)			Outputs ON: 400mA (max.) / 350mA (typ.) Outputs OFF: 72mA (max.) / 60mA (typ.)
Mechanical				
Dimensions (WxHxD)	26mm x 175mm x 130,41mm			52,25mm x 175mm x 130,41mm
Weight	220g			
Slot width	1 slot. IC3 / TSX			
Climatic				
Operating Temperature	-40ºC to + 70ºC	0ºC to + 70ºC	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC			
Relative Humidity	5% to 95% w/o condensing			
Accessories (Not included)				
Adapter module for Grid Measurements module (AC0179) connection to IC3391A. Ref. IC7036 IC7036 <-> IC3391A connection cable. Ref. IC3590 Field connection options: Spring terminal plug.1,5mm^2. (2 IC3571 per module) Socket to flat cable adapter. (1 IC3573 per module)				

9 RTSX EXPANSION BUS

The RTSX is a proprietary bus on which *INGESYS*™ IC3's distributed topology is based.

A 10Mbits transmission rate and exhaustive diagnostics features ensure the system's integrity, reliability and determinism.

The bus expansion follows a nested star topology with up to two sublevels and up to 256 remote I/Os units can be connected by an optical fibre link (plastic or HCS).

Two different components integrate the bus: the router modules that enable bus expansion, and header modules that integrate I/O expansion racks in the RTSX bus. The processors modules incorporate RTSX master ports to directly access a remote expansion I/O unit incorporating an RTSX header module.

References	
IC3201AB	Header module 16 slots without built-in power supply
IC3202AB	Header module 8 slots with built-in power supply
IC3221	Router RTSX 1M-4S
IC3222B	Router RTSX 2M-4S

9.1 HEADER MODULES

The header modules are a component *INGESYS*™ IC3 PAC's distributed architecture. They make it possible to add remote I/Os units that expand the central unit when a larger number of inputs/outputs than those permitted by a local set is required, or when a distributed input/output configuration is needed.

Communication between central rack and remote racks is based on the RTSX master-slave proprietary bus, an optical fibre bus (POF for distances up to 50m or HCS fibres for distances up to 200m) that guarantees robust and real-time communication between the central processors and modules located in remote racks.

There are various header modules available, depending on the maximum slot number and the incorporation of rack power supply

References	
IC3201AB	Header module 16 slots without built-in power supply
IC3202AB	Header module 8 slots built-in without power supply

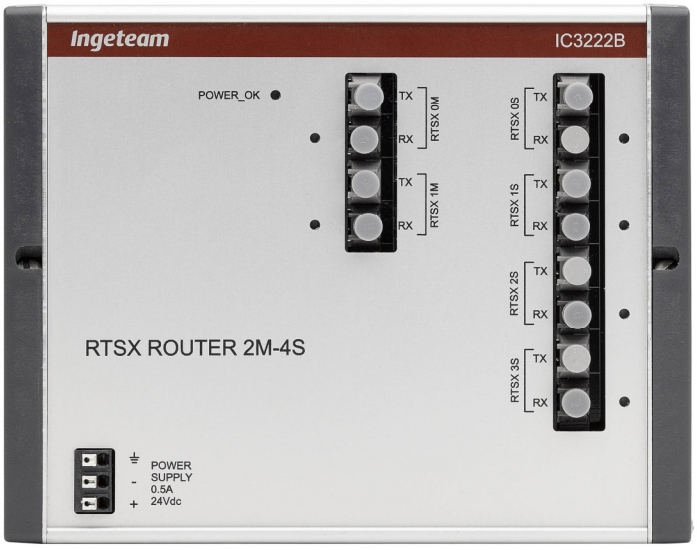
	IC3201AB	IC3202AB
Functional		
Communications	RTSX	
Number of ports	1	
Max. Transmission speed	10Mbit/s	
Max. Installation distance per section	50m for POFs, 200m for HCS	
Diagnosis LEDs	Yes	
Electrical		
Connection type	Versatile Link (V-LINK)	
Max. Number of TSX slaves	16	8
Built in rack power supply	No	Yes
Max. Output current to backplane		
3,3V	-	2,5A
5,0V	-	1,75A
Power Supply Consumption		
In 3,3 V	900mA (max.)	800mA (max.)
Mechanical		
Dimensions (WxHxD)	52mm x 175mm x 130,41mm	
Weight	450 g	
Slot width	2 slot. IC3 / TSX	
Climatic		
Operating Temperature	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	

9.2 TSX STAR COUPLER

The IC3222B “RTSX 2M-4S Star coupler” permits the connection of 2 RTSX master modules and the expansion of the RTSX Bus up to 4 slave channels.

The communication channels are via optical fibre with V_LINK type connectors. It supports up to 10Mbit/s.

Each channel incorporates a status indication LED.



References	
IC3221	Router RTSX 1M-4S
IC3222B	Router RTSX 2M-4S

	IC3221	IC3222B
Functional		
Configuration	1 INGESYS™ IC3 controller accessing 4 remote I/Os racks	Up to 2 INGESYS™ IC3 controllers accessing 4 remote I/Os racks
Max. Transmission speed	10Mbit/s	
Max. Installation distance per section	50m for POFs, 200m for HCS	
Diagnosis LEDs per channel	Yes	
Electrical		
Average power consumption	3,5Watts	
Power supply voltage (rated)	18-30VDC	
Mechanical		
Dimensions (WxHxD)	125mm x 161mm x 40mm	
Weight	189g	
Mounting	DIN rail	
Climatic		
Operating Temperature	-40ºC to + 70ºC	
Storage Temperature	-40ºC to + 85ºC	
Relative Humidity	5% to 95% w/o condensing	

10 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
IC3582	COMPACT FLASH 1GB
IC3583	COMPACT FLASH 2GB
IC3596	COMPACT FLASH 4GB
IC3590	CONNECTION CABLE: AC0179 MODULE -- IC3391-A MODULE: Options: • A : 2,5m • B: 2m • C: 1,5m • D: 1m • E: 0,5m
IC3593	13 PIN SCREW TERMINAL PLUG (max. CABLE SECTION 2,5mm^2)
IC3595	18 PIN SCREW TERMINAL PLUG (max. CABLE SECTION 2,5mm^2)
IC7036	ADAPTER TO CONNECT: AC0179 MODULE -- IC3391-A MODULE

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