imc CRONOS-XT Base Unit

The heart and soul of the imc CRONOS-XT system

The imc CRONOS-XT Base Unit provides you with the key functionalities of a modular building block system. Individual modules can be easily connected with a simple, robust "click" mechanism.

Measurements under special ambient conditions such as heat, cold, splashing water and vibrations require suitably protected measuring systems. The imc CRONOS-XT meets these requirements while maintaining maximum flexibility and modularity for the user during configuration of the system.

CRXT-2000

The corresponding imc STUDIO measurement software, which provides a configuration and operating interface for all imc devices, enables versatile functionality. It offers a complete solution, from laboratory testing and mobile data logger applications to complete industrial test benches.

- Multi-purpose data acquisition
- Real-time signal processor imc Online FAMOS
- TCP/IP Ethernet interface for PC connectivity
- Onboard flash and optional hard drive storage and/or network storage
- Stand-alone operation and power-failure control logic
- Extensive fieldbus options
- GPS (for time and/or position information) and external display connectivity

imc CRONOS-XT - Maximizes flexible modularity

An imc CRONOS-XT system is composed of a base unit, a power supply module and one or more imc CRONOS-XT modules. The imc click mechanism offers a mechanically strong connection between several imc CRONOS-XT modules. At the same time, the "click" establishes an electrical connection to the system bus and the power supply.

Key data "imc CRONOS-XT"

Parameter	CRXT	Remarks
Ethernet TCP/IP	1 GBit	
Max. sampling rate	2000 kS/s	
Flash removable storage	CFast-Card Slot	
PTP synchronization	✔	requires suitable switch
Dual Band WiFi option	O	802.11n, 300 MBit/s, 2.4 / 5 GHz
Enhanced performance	✔	for multi-monitoring, Web-Server, high-speed fieldbus modules

"✔" standard; "O" optional

Overview

Order Code	properties	housing	article no.
CRXT-2000	2000 kS/s	XT3	11100001

Required POWER option for device supply

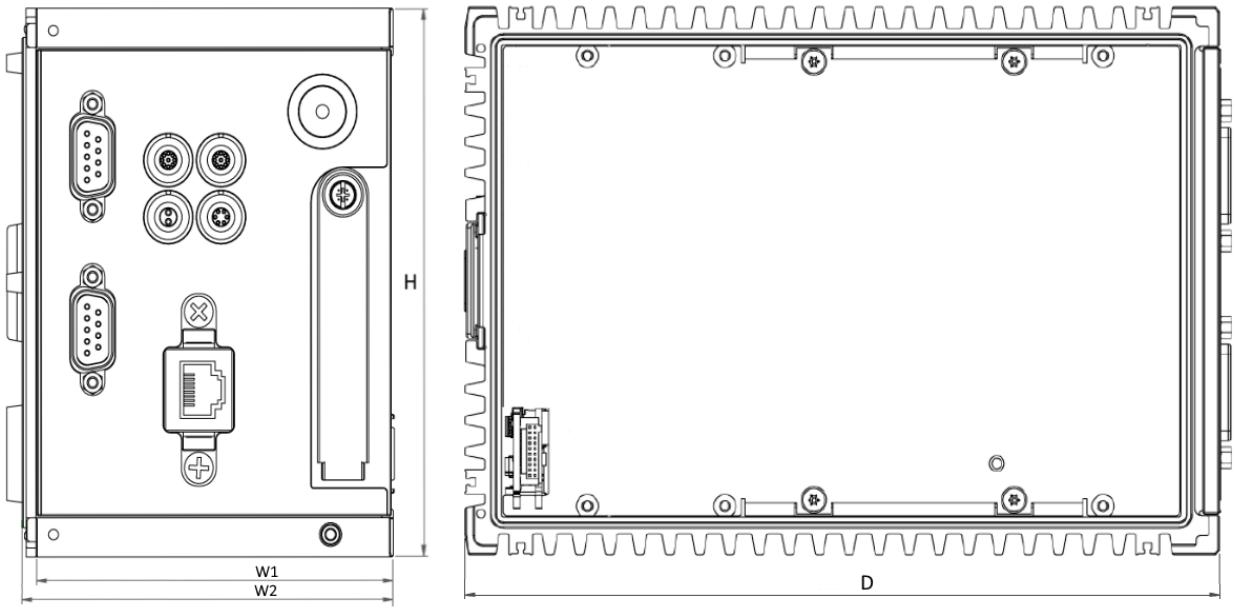
Order Code	properties	housing	article no.
CRXT/POWER	simple and direct supply connection (10 V to 35 V DC) via XT-Con	XT1	11100025
CRXT/POWER-X	with internal 34 V "bus" and EtherCAT-Interface	XT1	11100049

Extra options (factory order options)

In addition to the mandatory choice of a POWER option (input of the power supply: realized as an extra clickable module) CRXT base units can be equipped with additional options: such expansions can be implemented in a maximum of three modules, which can only be ordered as factory options and are installed permanently. The base unit housings start with the type XT3, which can be equipped with a maximum of one extension. Starting with the second extension (XT4), each additional option widens the base unit by 25.4 mm. The available options are:

- Automotive buses: CAN FD, LIN, FlexRay, ARINC, XCPoE (master and slave)
- Industry buses: EtherCAT (slave), Profinet

Dimensions



CRXT Base Unit shown in standard operating orientation: housing type XT3

Housing type:	XT1	XT2	XT3	XT4	Remarks
W: Width in mm	30.5 34	61 64.5	91.5 95	116.9 120.4	W1: modular spacing (effective stacking width) W2: complete width
H: Height in mm	130				
D: Depth in mm	186.5				

Overview of the available configuration options (fixed configuration ex-factory)

Order Code	properties	article no.
Fieldbus modules		
CRXT/CAN-FD	2 CAN FD nodes	11100003
CRXT/CAN-Power-1	Power supply: direct feed through to the CAN connection Power via CAN, forwarding to the first 2 CAN nodes (2x DSUB-9)	11100076
CRXT/LIN	2 LIN nodes	11100004
CRXT/FLEXRAY2	1 FlexRay node	11100005
CRXT/ARINC-8RX-4TX	ARINC Bus, 8x Receive and 4x Transmit	11100047
CRXT/ARINC-8RX	ARINC Bus, 8x Receive	11100048
CRXT/XCPOE2-MASTER	XCP over Ethernet, Master	11100045
CRXT/XCPOE2-SLAVE	XCP over Ethernet, Slave	11100046
CRXT/ECAT-SLAVE	EtherCAT Bus, Slave-Teilnehmer, M8 Stecker	11100051
CRXT/PROFINET-IRT	PROFINET-IRT Interface, RJ45	11100091

imc Application Module APPMOD		
CRXT/APPMOD-NET-COM	Applications specific custom solution for interfacing of devices, telemetry and protocols, Ethernet 100 Mbit, RS232/422/485	11100054

Technical data of the fieldbus modules and further special functions are specified in separate data sheets.

Additional device software (upgrade options)		
CRXT/OFA-UP	update from imc Online FAMOS to OFA-Professional	11100008
CRXT/imc-REMOTE	imc REMOTE	11100014
CRXT/ECU-P	ECU protocols for the CAN Interface	11100009

Software minimum requirements

Operation requires operating software of the following group:
imc STUDIO 5.2 R14 associated with firmware and driver package imc DEVICES 2.13 R5

Power supply possibilities (options for "Power-Module")

Exactly one of these POWER modules must be used and ordered separately.

- **Simple direct supply connection** 10 V to 35 V DC (CRXT/POWER):
  Located next to the left handle, suitable for XT-Con plug (2-pin)
- **Supply unit with voltage converter and ECAT interface** (CRXT/POWER-X):
  Converts the wide-range supply voltage: 10 V (min. 7 V) to 35 V to a stabilized internal 34 V DC bus (DC link). For large systems and vehicle use (on-board power supply). With additional EtherCAT interface for connecting further distributed amplifier modules.

Total power and size of a device

The current at the "internal supply bus" must not exceed the value specified in the technical data. Depending on the supply voltage used, this results in a maximum total power or size of the device. When using the "Power Module" with voltage converter or UPS function, this internal supply bus is supplied with constant 34 V by means of a voltage converter - even with an external 12 V on-board supply voltage, for example. For this reason, this extension is particularly recommended for mobile use in vehicles when larger systems are being assembled. An Excel assistant is available for estimating the limits and boundary conditions.

Sealing, IP rating and environmental specs

A single base unit or single CRXT slices cannot achieve an IP protection level at first because it is left open at the side. The given specifications are always only valid for a complete (closed) CRXT system. Only after it has been combined with a CRXT base unit (plus power module), CRXT slices if applicable, and the final sealing handles to form a complete CRXT system, sealing and environmental properties can be determined. The specification for shock, vibration and IP degree of protection applicable to the entire device is then derived from the weakest specification of the CRXT slices used in this combination (given in the technical data sheets of the respective CRXT slices). They assume that the individual CRXT slices are each mounted in conjunction with the additional stabilizing interconnect brackets (included in the standard accessories supplied).

According to IEC 60529 the Ingress Protection (IP) rating refer to protection classes provided by a housing, the protection of the electrical parts within the housing shell. If all functionally accessible contacts of the sockets are also to be protected, the corresponding plugs must be connected to all sockets. In many cases, a protective cover can also be used alternatively on unused sockets.

Covers and Handles

A clicked together block of e.g. power module, base unit and amplifier modules is hermetically sealed on both sides by the handles acting as end caps. For the base unit these two end covers / handles are already included in the standard scope of delivery.

Sealing and circular connectors (XT-Con)

The connection technology of the CRXT base units uses sealed DSUB-9 and circular connectors of type "XT-Con". This connector family is available from imc as an accessory and has the following properties:

- XT-Con is mechanically compatible with sealed LEMO.1T series:
  However, the specified tightness is only guaranteed with the appropriate plugs (XT-Con) available from imc as accessories!
- XT-Con is not compatible with the LEMO.1B series:
  This LEMO connector family is not mechanically compatible and does not snap and latch!

The standard AC/DC power adaptor is not sealed. IP65 compatible adaptors are available as optional accessories, as well as sealed connector plugs for installation in vehicles, etc. (do not replace inadequately dimensioned power cables).

The same applies to network cables with RJ-45 plugs: The cable included in the standard scope of delivery is a non-sealed laboratory version for commissioning purposes. A cable is available as an accessory with the RJ-45 plug sealed on one side and suitable for connection to standard equipment such as computers or network switches on the other side. In stand-alone mode, the RJ-45 socket must be closed with the protective cover (included in delivery).

The standard connection technology for amplifier modules is sealed DSUB-15 sockets. When equipped with other customer-specific plugs such as LEMO.1B, the specifications specified of the selected plugs apply to the complete device.

The DSUB sockets on the device side must be sealed either with the supplied sealed protective caps or with a suitable DSUB plug.

DSUB-15 Plug

For modules with DSUB-15 connection technology, the convenient terminal plugs for solderless screw terminal connection are available as optional accessories. These are to be used in the special IP65 version. This applies

regardless of whether sealing properties are required: The simple standard terminal plugs have shorter locking screws and therefore cannot be fixed to CRXT devices. The two types are not mutually compatible, but long screws are available as accessories for retrofitting: long bolts: only for CRXT, short standard bolts: only for CRFX, CRC, C-SERIES, etc.

Software options

Software options	features	licensing	
	● : included ○ : optional	license model	included
Operating software			
imc STUDIO Standard	operating software, integrated test and measurement suite	PC	○
imc STUDIO Professional / Developer	customized operation, scripting, application development	PC	○
imc CANSAS	configuration of CANSAS modules		●
imc SENSORS	sensor data base	PC	○
Real-time data analysis			
imc Online FAMOS	real-time calculations, immediate results	Device	●
imc Online FAMOS Professional	real-time control extensions, PID control etc.	Device	○
imc Online FAMOS Kits	class counting (fatigue analysis), order tracking	Device	○
Post Processing			
imc FAMOS Reader	data visualization	PC	●
imc FAMOS Standard / Professional	data visualization, analysis, reporting, scripting	PC	○
imc FAMOS Enterprise	incl. class counting, order tracking, ASAM-ODS browser	PC	○
Remote Access			
imc LINK	remote device access, automatic data transfer	PC	○
imc REMOTE	Web Server, secure https device access	Device	○
CAN			
Vektor database (*.dbc import)	Vector database interface	Device	●
ECU Protokolle	for CAN interface: KWP 2000, CCP, OBD-2	Device	○
Application development			
imc API	.NET programming interface (API) for imc STUDIO	PC	○

Accessories

Included accessories

AC/DC power adaptor 110-230V AC (with appropriate XT-Con plug) and plug		
CRXT/AC-ADAP-24-150	AC/DC power adaptor, 24 V DC, 150 W, plug: XT-Con (2-pin)	11100096
CRXT/CABLE-PWR-BAN-2M5	power cable CRXT, XT-Con (2-pin) - Banana, 2.5m	11100033

Handles - serve as end-covers		
CRXT/HANDLE-R	handle and end cover (lid) right side	11100021
CRXT/HANDLE-L	handle and end cover (lid) left side	11100022

Sealing caps		
4x ACC/CAP-XT-CON-IP67	Sealing caps for XT-Con sockets	13500341

Mounting accessories		
4x CRXT/BRACKET-CON	interconnect brackets, intended for increased stability	11100040

Miscellaneous
Certificates and calibration protocols: Detailed information on certificates supplied, the specific contents, underlying standards (e.g. ISO 9001 / ISO 17025) and available media (pdf) can be found on our website.
1x Ethernet network cable with latch protection (uncrossed, 2 m) not IP65 sealed
Getting Started (printed): "imc CRONOS-XT Getting Started"

Optional accessories

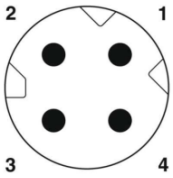
Power Supply (via Power module)		
CRXT/POWER	simple, direct power input connection (10 V to 35 V DC)	11100025
CRXT/POWER-X	Power input extended: with power converter for imc CRONOS-XT stabilized 34 V supply (DC bus) for large systems and vehicle applications, incl. EtherCAT interface for distributed systems	11100049

Power and Plugs		
CRXT/AC-ADAP-24-120W-IP65	AC/DC power adaptor IP65, 24 V DC, 120 W, connector: XT-Con (2-pin)	11100032
CRXT/POWER-PLUG	POWER plug CRXT, XT-Con (2-pin), sealed, for cable diameter 5.5 to 6.1 mm	11100039
CRXT/CABLE-PWR-CRFX-UPS-3M	Connection cable for power supply of CRXT via CRFX-UPS, 3 m	11100097
CRXT/CABLE-NET-3M	Ethernet cable CRXT, sealed on one side, 3 m	11100034
CRXT/REMOTE-PLUG	REMOTE-plug CRXT, XT-Con (6-pin), sealed, for cable diameter 4.5 to 5.1 mm	11100036
CRXT/SYNC-PLUG	SYNC-plug CRXT, XT-Con (4-pin), sealed, for cable diameter 4.5 to 5.1 mm	11100037

EtherCAT cable (CRXT system bus or ECAT Slave)		
CRXT/CABLE-ECAT-M8-2M	EtherCAT cable CRXT, on both sides M8-plug, 2 m	13500386
CRXT/CABLE-ECAT-M8-RJ45-2M	EtherCAT cable CRXT, on one side M8-plug to RJ-45, 2 m	13500387
CRXT/CABLE-ECAT-M8-10M	EtherCAT cable CRXT, on both sides M8-plug, 10 m	13500388
CRXT/CABLE-ECAT-M8-RJ45-10M	EtherCAT cable CRXT, on one side M8-plug to RJ-45, 10 m	13500389

M8 plug

Pin	Signal
1	+TxD
2	+RxD
3	-TxD
4	-RxD



M8 plug, D-coded (View on top of the stiches)

Further accessories (see separate price list of the accessories)

- XT-Con plug in a sealed and in a non-sealed variant
- recommended and verified removable flash storage media
- external display (via XT-Con plug)
- GPS-receiver (via XT-Con plug)
- PTP-capable 5-port network switch
- additional software options

Technical Specs imc CRONOS-XT Base Unit (CRXT-2000)

Parameter	Value	Remarks
Max. aggregate sampling rate	2000 kS/s	data rate of analog channels [1]
Terminal connections		
PC / network Ethernet TCP/IP	RJ45 1 GBit	sealed
Flash removable storage	CFast-Card Slot	can also be read out via network
Internal WiFi (WLAN) adaptor (optional)	2 antennas IEEE 802.11n max. 300 MBit/s dual band (2.4 / 5 GHz)	for antennas or cables wit RP-SMA
Sync	XT-Con (4-pin)	
Sync NTP / PTP	RJ45	PTP requires appropriate switch
External display	XT-Con (7-pin)	
External GPS module	XT-Con (7-pin)	
Power supply	XT-Con (2-pin)	is not located on the base unit itself, but on the power module option, which must always be explicitly combined
Remote	XT-Con (6-pin)	remote control main switch

Power supply		
Parameter	**Value**	**Remarks**
DC supply input	galvanically isolated	of housing (CHASSIS) remote control signals ("REMOTE") and forwarding the supply ("Power via CAN") on supply potential
Isolated system-electronics	galvanically block isolated	of housing and power supply input; applies to accessible interface connections such as Display, GPS (except Remote)
Power supply	10 V to 35 V DC	
Power-on threshold (typ.)	10.9 V	min. input voltage required for power-on (open circuit)
Shutdown threshold (typ.)	9.9 V	input voltage at which the automatic deactivation is triggered (data backup protected by internal UPS buffering)
Power consumption	typ. 23 W	depending on model and equipment e.g. with CAN FD-Interface
Max. current via internal power supply bus	5.5 A	Determines the minimum required supply voltage respectively the maximum system expansion. An Excel assistant is available for estimating the limits and boundary conditions.
AC/DC power adaptor	24 V DC, 150 W 110-230 V AC 50-60 Hz	connection: XT-Con (2-pin) included in delivery

1 2000 kS/s applies to a configuration without any trigger and a 16-bit resolution.
Due to the modules' sampling rate of 5 kHz, sampling rates < 5 kHz may result in a lower effective aggregate sampling rate. Please refer to the notes in the manual in the chapter *Sampling rate* under *Properties*.

"✔" standard; "O" optional; "-" not available

Data integrity	Value	Remarks
Autarkic operation without PC	✔	
Self start (Automatic data acquisition operation)	configurable	timer, absolute time, automatic start when power supply is available
Auto data-saving upon power outage	✔	buffering (UPS) with "auto-stop", data storage and automatic shutdown
UPS	integrated	Super-Caps
Charging time of the Super-Caps	6 min.	minimum required active operation for full UPS functionality
UPS coverage	CRXT base unit	no buffering of directly connected CRXT modules
UPS delay	0 s	"buffer-time constant": required duration of a continuous outage that will trigger auto shutdown procedure

Maximum channel count per device		
Active channels	512	including their monitor channels; active channels of the current configuration in total
Active analog inputs	128	including their monitor channels including also channels of DAC-8 and ports of DI-16, DO-16
Analog inputs (active + passive)	240 (+240 monitor channels)	
Fieldbus channels (active + passive)	1000	including their monitor channels
Incremental counter channels	16 (+16 monitor channels)	
DIO-Ports (digital IO) and DAC-Ports (analog outputs)	16	example: DI-16 module is equal to one DIO-Port
Process vector variables	800	

Data acquisition, trigger		
Channel individual sampling rates	selectable in 1-2-5 steps	
Number of sampling rates: analog channels, DI and counter	2	usable simultaneously in one configuration
Number of sampling rates: fieldbus channels	arbitrary	
Number of sampling rates: virtual channels	arbitrary	data rates generated via imc Online FAMOS (e.g. via reduction)
Monitor channels	✔ for all channels of the types: analog, DI and counter (incremental encoder)	doubled channels with independent sampling and trigger settings

Data acquisition, trigger		
Intelligent trigger functions	✔	e.g. logical combination of multiple channel events (threshold, edge) to create triggers that start and stop acquisition of assigned channels
Max. Trigger events per CRXT module	8	each CRXT module
Multi-triggered data acquisition	✔	Multiple trigger-machines and multi-shot
Independent trigger-machines	48	start/stop, arbitrary channel assignment

Storage, signal processing		
Parameter	**Value**	**Remarks**
Removable flash storage	CFast	recommended media available at imc; the specified operating temperature range of the media is relevant
Storage on NAS (network storage)	✔	alternatively to onboard Flash storage SMBv2+3
Arbitrary memory depth with pre- and post trigger	✔	maximum pretrigger limited by size of Circular Buffer RAM; posttrigger only limited by available mass storage (Flash)
Circular buffer mode	✔	cyclic overwrite of circular buffer memory on mass storage media
Synchronization	DCF 77 GPS IRIG-B NTP PTP	Master / Slave via external GPS-receiver TTL via network
Extensive real-time analysis and control functions	✔ imc Online FAMOS included in standard delivery	device-option, licensed via activation code

Operating conditions		
Parameter	**Value**	**Remarks**
Shock resistance	MIL-STD-810F IEC 60068-2-27, IEC 61373, Cat.1	
Vibration resistance	MIL-STD-810F Rail Cargo Vibration Exposure U.S. Highway Truck Vibration Exposure IEC 60068-2-64, IEC 61373, Cat.1	
Ingress Protection	IP67	The actual degree of protection depends on the connection technology (see CRXT module data sheets). The CRXT module with the lowest degree of protection determines the degree of protection of the entire system.
Operating temperature	-40°C to 85°C condensation allowed	
Pollution degree	2	
Dimensions (W x H x D) XT3	91.5 x 130 x 186.5 mm	CRXT housing: XT3 incl. optional CAN FD interface
Weight	2.1 kg	incl. optional CAN FD interface

Synchronization and time base

Time base of individual device without external synchronization			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Accuracy RTC		±50 ppm 1 µs (1 ppm)	not calibrated (standard devices), at 25°C calibrated devices (upon request), at 25°C
Drift	±20 ppm	±50 ppm	-40°C to +85°C operating temperature
Ageing		±10 ppm	at 25°C; 10 years

Time base of individual device with external synchronization					
Parameter	**GPS**	**DCF77**	**IRIG-B**	**NTP**	**PTP**
Supported formats	NMEA / PPS (1)		B000, B001, B002, B003 (2)	Version ≤4	Version 2
Precision	±1 µs			<5 ms after ca. 12 h (3)	<1 µs under good conditions
Jitter (max.)	±8 µs			---	
Voltage level	TTL (PPS) RS232 (NMEA)	5 V TTL Pegel		---	
Input impedance	1 kΩ (pull up)	20 kΩ (pull up)		---	
Input connection	XT-Con "GPS"	XT-Con: "SYNC" (isolated) (test voltage 300 V, 1 min.)		RJ45 "LAN"	

Synchronization of multiple devices via DCF / IRIG-B (Master/Slave)			
Parameter	**Value typ.**	**min. / max.**	**Remarks**
Max. cable length		30 m	BNC cable type RG58 (propagation delay of cable needs to be considered)
Number of devices		max. 20	only slaves
Common mode SYNC isolated		max. 50 V	with isolated BNC plug: SYNC-signal is already internally isolated, for reliable operation even with different ground voltage level (ground loops)
Voltage level	5 V		

Power via CAN

Parameter	Value	Remarks
Output voltage	10 V to 35 V DC	according to supply voltage; the base unit can supply further CANSAS modules via the optional CAN connections "CAN 1" and "CAN 2"
Output current	1 A (max.)	both CAN nodes together permanently
Short circuit protection (4)	unlimited duration	to reference ground of the output voltage; automatic restart
Isolation	isolated	opposite housing (system ground, CHASSIS)

1 PPS (Pulse per second): signal with an impulse >5 ms is required
2 Using BCD information only
3 Max. value, concerning the following condition: first-synchronization
4 Depending on the performance of the power supply of the measuring system, a short circuit can cause repercussions on the measuring system (e.g. short interruption of the supply of clicked CRXT amplifiers). After removing the short-circuit, the operability of the system is automatically restored.

Contact imc

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imc ACADEMY - Training center

The safe handling of measurement devices requires a good knowledge of the system. At our training center, experienced specialists are here to share their knowledge.

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International partners

You will find the contact person responsible for you in our overview list of imc partners:

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