

HV2-4U for imc CRONOSflex (CRFX/HV2-4U)

Module for the measurement of high voltages

The imc CRONOSflex High Voltage input module (CRFX/HV2-4U) is ideally suited for isolated measurements of high voltage signals up to 1000 V, as encountered in power quality monitoring and power efficiency analysis of electrical drive systems or hybrid vehicles.

Highlights

- Measurement ranges from $1000 V_{RMS}$ to $2.5 V_{RMS}$, selectable per channel to access voltages of $1000 V_{RMS} / 1414 V_{PK}$
- Safety ratings:
600 V_{RMS} CAT III and 1000 V_{RMS} CAT II
test voltage 5.4 kV
- 48 kHz analog bandwidth (-3 dB)



imc CRONOSflex High Voltage input module (CRFX/HV2-4U)

imc CRONOSflex - Frameless expansion, flexible modularity

The imc Click Mechanism and extruded aluminum case provide a firm mechanical and electrical connection. As a result, no mainframe or rack is needed.

An imc CRONOSflex system uses EtherCAT as an "internal" system bus for connecting various modules to the main base unit (CRFX-400 / CRFX-2000G). With the system bus, all imc CRONOSflex modules are guaranteed to be synchronized with each other. This allows various modules to be either connected in one central block or connected via standard network cable in a spatially distributed system.

Alternatively, connection can be made by means of standard Ethernet cables (RJ45, CAT5), thus creating a spatially distributed system.



imc Click Mechanism



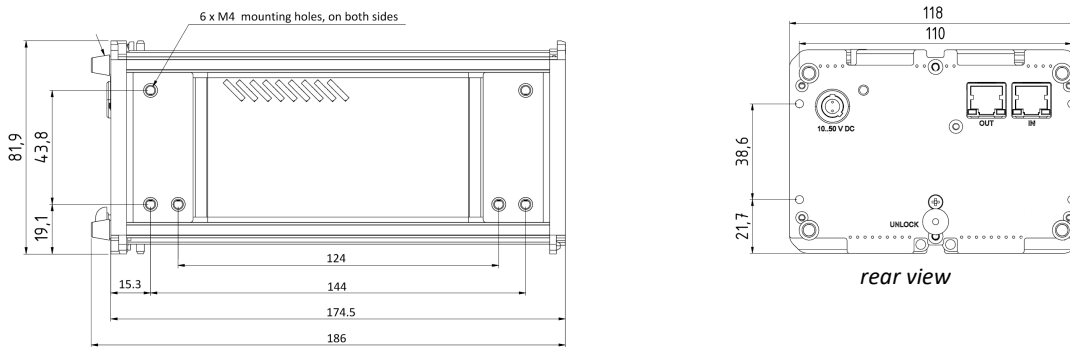
CRFX distributed system

Overview of the available variants

Order Code		article no.	ET version *
CRFX/HV2-4U	high voltage, 4 channel	11900120	11910074

* ET: Version in extended temperature range

Mechanical drawings with dimensions



Module power supply options

- Direct connection (LEMO.EGE.1B.302 power socket)
- Adjacent module (module connector / imc Click Mechanism)
- EtherCAT network cable: Power over EtherCAT (PoEC)

For further details refer to the power options documentation.

Included accessories

- Calibration certificate with test equipment verification as per DIN EN ISO 9001 (manufacturer's calibration certificate, PDF)

Optional accessories

AC/DC power adaptor 110-230 VAC 50-60 Hz (with appropriate LEMO.1B.302 plug)		article no.
48 V DC / 150 W	ACC/AC-ADAP-48-150-1B	13500148
24 V DC / 60 W	CRPL/AC-ADAPTER-60W-1B	10800066
Power plugs		
ACC/POWER-PLUG-5	Power plug for DC supply LEMO.FGE.1B.302 plug (male, E-coded: 2 coding keys)	13500150
CRFX/MODUL-PP-90	Power plug for DC supply 90° angular LEMO.FHE.1B.302 plug (male, E-coded: 2 coding keys)	11900074
Supply module (Power Handle)		article no.
CRFX/HANDLE-POWER-L	Handle with system power supply 50 V 100 W, without UPS	11900058
CRFX/HANDLE-UPS-L	Handle with system power supply 50 V 100 W, UPS with lead-gel battery	11900043
CRFX/HANDLE-LI-IO-L	Handle with system power supply 50 V 100 W, UPS with Li-Ion battery	11900010
Passive-Handle		
CRFX/HANDLE-L	standard unpowered left handle	11900008
CRFX/HANDLE-R	standard unpowered right handle	11900007

Mounting bracket for increased stability (recommended for lifetime and robustness)		
CRFX/BRACKET-CON	assembly element for 2 modules	11900071
Mounting brackets for fixed installations		
CRFX/BRACKET-90	mounting bracket 90°	11900068
CRFX/BRACKET-180	mounting bracket 180°	11900069
CRFX/BRACKET-BACK	rear panel mounting element	11900070
CRFX/RACK	19" RACK for imc CRONOSflex Modules	11900066
CRFX/BRACKET-RACK	mounting element in the RACK	11900072
Miscellaneous		
CRFX/CAL-P Calibration report set for each device	Report set with manufacturer's calibration certificate and individual readings, as well as list of test equipment used (PDF). Meets requirements of ISO 17025	11900051

Technical Specs - CRFX/HV2-4U

Measurement modes and categories		
Parameter	Value	Remarks
Inputs	4	
Measurement modes	voltage measurement	safety banana sockets
Measurement categories	600 V _{RMS} (CAT III) / 1000 V _{RMS} (CAT II)	
Pollution Degree	2	

Sampling rate, Bandwidth, Filter			
Parameter	Value typ.	min. / max.	Remarks
Sampling rate	≤100 kHz		per channel
Bandwidth	0 Hz to 48 kHz		-3 dB
Filter (digital) cut-off frequency characteristic order	10 Hz to 20 kHz		Butterworth, Bessel low pass filter: 8th high pass filter: 8th band pass: LP and HP each 4th order Anti-aliasing filter: Cauer 8.order with $f_{\text{cutoff}} = 0.4 f_s$
Isolation strength		5.4 kV _{RMS}	50 Hz, test voltage

Voltage measurement			
Parameter	Value typ.	min. / max.	Remarks
Input ranges	$\pm 1000\text{ V}$, $\pm 500\text{ V}$, $\pm 250\text{ V}$, ... , $\pm 2.5\text{ V}$ $1000\text{ V}_{\text{RMS}}$, $500\text{ V}_{\text{RMS}}$, $250\text{ V}_{\text{RMS}}$, ... , $2.5\text{ V}_{\text{RMS}}$ $\pm 1414\text{ V}_{\text{PK}}$, $\pm 707\text{ V}_{\text{PK}}$, $\pm 354\text{ V}_{\text{PK}}$, ... , $\pm 3.4\text{ V}_{\text{PK}}$		nominal RMS continuous peak measurement range (valid measurements): \geq nominal range * $\sqrt{2}$
Max. Overvoltage protection		$\pm 1450\text{ V}$	differential, continuous with operating temperature up to $70\text{ }^{\circ}\text{C}$
Input impedance	2 M Ω		
Input coupling	DC		isolated
Gain error	0.02%	$\leq 0.05\%$	of the reading, at $25\text{ }^{\circ}\text{C}$
Gain drift	$\pm 25\text{ ppm/K} \cdot \Delta T_a$	$\pm 60\text{ ppm/K} \cdot \Delta T_a$	$\Delta T_a = T_a - 25\text{ }^{\circ}\text{C} $; ambient temperature T_a
Offset error	0.02% 0.04%	$\leq 0.05\%$ $\leq 0.2\%$	of range ranges $> \pm 5\text{ V}$ range $\pm 2.5\text{ V}$
Offset drift	$\pm 20\text{ mV/K} \cdot \Delta T_a$ $\pm 2.0\text{ mV/K} \cdot \Delta T_a$ $\pm 0.1\text{ mV/K} \cdot \Delta T_a$	$\pm 35\text{ mV/K} \cdot \Delta T_a$ $\pm 3.5\text{ mV/K} \cdot \Delta T_a$ $\pm 0.5\text{ mV/K} \cdot \Delta T_a$	range $> \pm 100\text{ V}$ range $\leq \pm 100\text{ V}$ range $\leq \pm 10\text{ V}$ $\Delta T_a = T_a - 25\text{ }^{\circ}\text{C} $; ambient temperature T_a
IMRR (isolation mode rejection ratio)	160 dB 80 dB 54 dB	130 dB 70 dB 44 dB	DC 50 Hz 1 kHz
Bandwidth	0 Hz to 30 kHz	0 Hz to 48 kHz	$< \pm 0.03\text{ dB}$ -3 dB
Phase error		$< \pm 1^{\circ}$	0 Hz to 20 kHz
Signal noise	$3.8\text{ mV}_{\text{RMS}}$ $0.6\text{ mV}_{\text{RMS}}$		bandwidth: 0.2 Hz to 48 kHz range $\pm 250\text{ V}$ range $\pm 2.5\text{ V}$

Power supply of the imc CRONOSflex module		
Parameter	Value	Remarks
Input supply voltage	10 V to 50 V DC	
Isolation	60 V	nominal isolation specification of the supply input
Power-over EtherCAT (PoEC)	42 V to 50 V DC	supply via EtherCAT network cable
Power consumption	5.8 W	10 to 50 V DC

Terminal connections of the imc CRONOSflex module		
Parameter	Value	Remarks
EtherCAT connection	2x RJ45	system bus for distributed imc CRONOSflex components
Input supply plug (female)	LEMO.EGE.1B.302	multicoded 2 notches for optional individually power supply
Module connector	2x 20 pin	direct connection of modules (click) supply and system bus

Pass through power limits	
Directly connected (clicked) imc CRONOSflex Modules	<p>3.1 A (maximum current)</p> <p>Equivalent power with chosen DC power input:</p> <ul style="list-style-type: none"> • 149 W @ 48 V DC (e.g. AC/DC line adaptor) • 37 W @ 12 V DC (typical vehicle supplied DC input)
Power over EtherCAT (PoEC) for remote imc CRONOSflex Modules	<p>350 mA (maximum current corresponding IEEE 802.3)</p> <p>Equivalent power with chosen DC power input:</p> <ul style="list-style-type: none"> • 17.5 W @ 50 V DC (e.g. Power Handle) • 16.8 W @ 48 V DC (e.g. AC/DC line adaptor) • 14.7 W @ 42 V DC (minimum voltage for PoEC) <p>Note: minimum system power of 42 V DC required for PoEC</p>

Operating conditions		
Parameter	Value	Remarks
Operating environment	dry, non corrosive environment within specified operating temperature range	
Rel. humidity	80% up to 31°C, above 31°C: linear declining to 50%	according IEC 61010-1
Ingress protection rating	IP20	
Pollution degree	2	
Operating temperature (standard)	-10°C to +55°C	without condensation
Operating temperature (extended: "-ET" version)	-40°C to +85°C	condensation temporarily allowed
Shock- and vibration resistance	IEC 61373, IEC 60068-2-27 IEC 60062-2-64 category 1, class A and B MIL-STD-810 Rail Cargo Vibration Exposure U.S. Highway Truck Vibration Exposure	
Extended shock- and vibration resistance	upon request	specific tests or certifications upon request
Dimensions	82 x 118 x 186 mm	W x H x D
Weight	approx. 1.12 kg	