

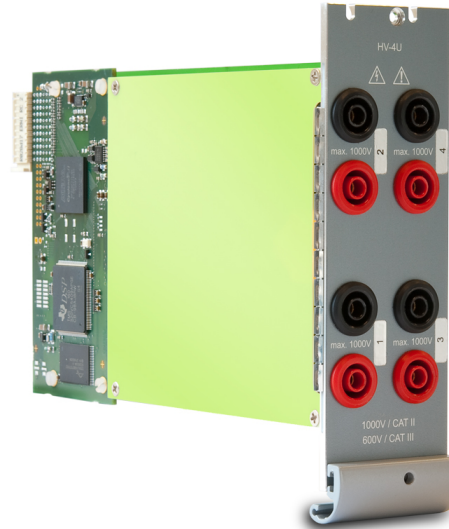
HV-4U, HV-2U2I for imc CRONOS-PL/compact

Datasheet Version 3.3

Module for direct measurement of high voltage and current



CRPL/HV-2U2I



CRC/HV-4U

The module can be used in imc CRONOS-PL/compact and comes standard with imc POLARES. It can be used with your choice of either 4 analog inputs for high voltage or 2 voltage and 2 current probe channels.

With the 4-channel measurement amplifiers **HV-4U** or **HV-2U2I**, high voltages of up to 1000 V can be measured. Two of the four channels can be configured upon customer request as low voltage channels for measurement with current probes. The particular strengths of this module are:

- Capture of voltages of up to 600 V_{RMS} with a protection class of up to CAT III (rf. table)
- Analog bandwidth enabling measurements of up to the 50th harmonic
- Measurement of current probe or low voltage signals possible
- Direct support for use of Rogowski coils
- Amplitude and phase response of current probes are recorded in a TEDS and taken into account during measurement.

Order codes:	Article #	Remarks
CRPL/HV-4U	1080146	for installation in the housing model imc CRONOS-PL
CRPL/HV-4U-ET	1081103	version in extended temperature range
CRPL/HV-2U2I	1080141	for installation in the housing model imc CRONOS-PL
CRPL/HV-2U2I-ET	1081083	version in extended temperature range
CRC/HV-2U2I	1170059	for installation in the housing model imc CRONOScompact
CRC/HV-2U2I-ET	1171034	version in extended temperature range
CRC/HV-4U	1170060	for installation in the housing model imc CRONOScompact
CRC/HV-4U-ET	1171035	version in extended temperature range
CRC/HV-2U2I-R	1170123	for installation in the housing model imc CRONOScompact RACK
CRC/HV-2U2I-R-ET	1171082	version in extended temperature range
CRC/HV-4U-R	1170124	for installation in the housing model imc CRONOScompact RACK
CRC/HV-4U-R-ET	1171083	version in extended temperature range

Physical Structure:

- Plug-in module for imc CRONOS-PL/compact systems, occupies 2 slots
- Can only be installed at purchase, or retrofitted, at factory.

Terminals:

- 2x or 4x safety banana sockets in accordance with protection class CAT III.
- 2x 3-pin Phoenix terminals with HV-2U2I

Power supply:

- supplied from imc CRONOS-PL/compact
- additional power consumption due to installed module: 2 W

Operating conditions:

- The module varieties' respective operating conditions (with or without an extended temperature range) depend on the corresponding housing type.

Installed software:

- The module is fully supported by the imc CRONOS-PL/compact operating software. The entire functionality, particularly the parameterization, storage and online computations is provided.

Included accessories:**Connection terminals:**

- 2x 3-pin Phoenix terminals to connect current transformers with HV-2U2I

Data storage:

- handled via imc CRONOS-PL/compact

Current transformers (optional):

- Clamp current probe
Mini measurement probe, AC-current measurement, 10 A~ / 1 V~, 1 channel
IEC 1010.2.032, CAT III, 600 V for industrial applications
Slip-proofing, cable crush guard
Enclosed diameter up to 20 mm
Connected directly to the device's current probe input.
Includes »PLUG & MEASURE« sensor recognition, per-channel memory chip (TEDS).
- Flexible current transformer, length 45 cm or 80 cm
(Rogowski-coil) AC-current measurement, 2000 A~ / 2 V~, 1 channel
IEC 61010-1, CAT III, 1000 V for industrial applications
Direct connection.
Includes »PLUG & MEASURE« sensor recognition, per-channel memory chip (TEDS).
- Re-equipping with and calibration of customer-supplied current probes possible upon request.

Technical Specs

Technical Datasheet Version 3.3

Parameter	typ.	min. / max.	Remarks
Measurement modes		voltage current	safety banana sockets Phoenix terminal
Measurement categories		600 V CAT III	Maximum possible meas. category Pollution Degree 2

General			
Parameter	typ.	min. / max.	Remarks
Filter (digital) cut-off frequency, characteristic, order		5 Hz to 10 kHz	Butterworth, Bessel low pass filter: 8th Anti-aliasing filter: Cauer 8.order with $f_{\text{cutoff}} = 0.4 f_s$
Sampling frequency/ channel		≤ 100 kHz	per channel
Isolation strength		5.4 kV _{RMS}	50 Hz, 1 min test voltage

Channels for voltage measurement			
Parameter	typ.	min. / max.	Remarks
Input range	± 1000 V, ± 500 V, ± 250 V, ... , ± 2.5 V		peak value
Overvoltage strength		± 1450 V	differential, long-term with operating temperature up to 70 °C
Input impedance	2.0 M Ω	$\pm 1\%$	
Input coupling		DC	isolated
Gain uncertainty Drift	0.02 % ± 5 ppm/K $\cdot\Delta T_a$	≤ 0.05 % ± 15 ppm/K $\cdot\Delta T_a$	$\Delta T_a = T_a - 25^\circ\text{C} $; ambient temperature T_a
Offset Drift	0.02 % ± 5 mV/K $\cdot\Delta T_a$ ± 0.5 mV/K $\cdot\Delta T_a$	≤ 0.05 % ± 15 mV/K $\cdot\Delta T_a$ ± 2 mV/K $\cdot\Delta T_a$	range $> \pm 100$ V range $\leq \pm 100$ V $\Delta T_a = T_a - 25^\circ\text{C} $; ambient temp. T_a
Isolation suppression		> 130 dB > 74 dB > 48 dB	Isolation voltage 500 V _{RMS} DC 50 Hz 1 kHz
Bandwidth	0 Hz to 6.5 kHz	0 Hz to 14 kHz	$< \pm 0.1$ % -3 dB
Phase uncertainty		0 Hz to 2.5 kHz	$< \pm 1^\circ$
Signal noise		< 60 mV < 6 mV	range $> \pm 100$ V range $\leq \pm 100$ V

Channels for current measurement with current probes			
Parameter	typ.	min. / max.	Remarks
Input range	$\pm 5 \text{ V}, \pm 2.5 \text{ V}, \pm 1 \text{ V}, \dots, \pm 250 \text{ mV}$		
Overvoltage strength		$\pm 100 \text{ V}$	long-term
Input impedance	100 k Ω 500 k Ω	$\pm 1 \%$ $\pm 1 \%$	isolated $\leq \pm 1 \text{ V}$ $\geq \pm 2.5 \text{ V}^*$
Gain uncertainty Drift	0.02 % $\pm 3 \text{ ppm/K} \cdot \Delta T_a$	$\leq 0.09 \%$ $\pm 15 \text{ ppm/K} \cdot \Delta T_a$	$\Delta T_a = T_a - 25 \text{ }^\circ\text{C} $ ambient temp. T_a
Offset Drift	0.02 % $\pm 10 \text{ } \mu\text{V/K} \cdot \Delta T_a$	$\leq 0.05 \%$ $\pm 25 \text{ } \mu\text{V/K} \cdot \Delta T_a$	$\Delta T_a = T_a - 25 \text{ }^\circ\text{C} $ ambient temp. T_a
Isolation suppression		>130 dB >105 dB > 80 dB	Isolation voltage: 500 V _{RMS} DC 50 Hz 1 kHz
Bandwidth	0 Hz to 6.5 kHz	0 Hz to 14 kHz	$< \pm 0.1 \%$ -3 dB
Phase uncertainty		0 Hz to 2.5 kHz	$< \pm 1^\circ$
Signal noise Noise suppression	75 μV	> 86 dB	Bandwidth: 100 Hz

* For input voltages higher than 3 V the impedance is 83 k Ω .

Current measurement with MN71 clamp sensor			
Parameter	typ.	min. / max.	Remarks
Input range	10 A _{rms} , 5 A _{rms} , ..., 2.5 A _{rms}		RMS-values, crest factor < 1.5
Overload strength		$\leq 200 \text{ A}_{\text{rms}}$	long-term, $f \leq 1 \text{ kHz}$, crest factor < 1.5
Measurement uncertainty	0.3 %	$\leq 0.7 \%$ $\pm 1 \text{ mA}$	50 Hz, sine, line centered
Bandwidth		40 Hz to 6.5 kHz	$< \pm 0.5 \%$
Phase uncertainty		40 Hz to 2.5 kHz	$< \pm 1^\circ$

Current measurement with AmpFlex A100 (2 kA)			
Parameter	typ.	min. / max.	Remarks
Input range	2000 A _{rms}		RMS-values, crest factor < 1.5
Overload strength		$\leq 3000 \text{ A}_{\text{rms}}$	long-term, $f \leq 1 \text{ kHz}$, crest factor < 1.5
Measurement uncertainty	0.2%	$\leq 0.6 \%$ $\pm 1 \text{ A}$	50 Hz, Sinus, line centered and orthogonal
Bandwidth		40 Hz to 6.5 kHz	$< \pm 0.6 \%$
Phase uncertainty		40 Hz to 2.5 kHz	$< \pm 1^\circ$

Current measurement with AmpFlex A100 (10 kA)			
Parameter	typ.	min. / max.	Remarks
Input range	10 kA _{rms}		RMS-values, crest factor < 1.5
Overload strength		$\leq 10 \text{ kA}_{\text{rms}}$	long-term, $f \leq 1 \text{ kHz}$, crest factor < 1.5
Measurement uncertainty	0.2%	$\leq 0.6 \%$ $\pm 2 \text{ A}$	50 Hz, sine, line centered and orthogonal
Bandwidth		40 Hz to 6.5 kHz	$< \pm 0.6 \%$
Phase uncertainty		40 Hz to 2.5 kHz	$< \pm 1^\circ$