

OSC-16 for imc CRONOS-SL/compact

16-channel isolated differential amplifier

The **OSC-16** is a scanner module with optical relays, equipped with 16 isolated and differential input channels. It comes with enhanced isolation strength of up to 60 V, and its 16 channels allow measurement of voltage, current, thermocouples and Pt100. The OSC-16 is available as a plug-in module for imc CRONOScompact and as a configuration module for CRONOS-SL.

Highlights

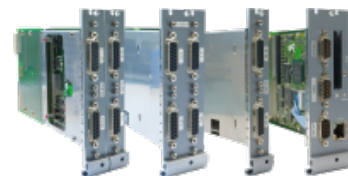
- Ideal for isolated measurement of passive sensors
- optimal suppression of 50 Hz interference
- support of TEDS (*imc Plug & Measure*, Transducer Electronic Data Sheets (IEEE 1451.4))

imc CRONOScompact - modular measurement system

imc CRONOScompact is a modular and reconfigurable hardware a "rack"-based series of devices available in a variety of housing sizes and device frames. imc CRONOScompact (CRC) plug-in-modules can be inserted into the system (CRC-400 / CRC-2000G).

Once the modules are plugged into a portable or rack-based housing, they are electrically connected to the CRC-system and are supplied by the system with power. The data storage will be managed by the CRC-system.

Rack-based modules ("-R") differ from the standard modules only in terms of the front panel's attachment mechanism.



imc CRONOScompact plug-in-modules



imc CRONOScompact portable housing

Overview of available variants

Order code	Article no.	Remarks
CRC/OSC-16	11700054	for installation in imc CRONOScompact, occupying 2 slots
CRC/OSC-16-ET	11710029	extended environmental temperature range
CRC/OSC-16-T	11700103	with thermocouple sockets, for installation in imc CRONOScompact, occupying 3 slots (12 TE)
CRC/OSC-16-T-ET	117100xx	extended environmental temperature range
CRC/OSC-16-R	11700118	for installation imc CRONOScompact RACK, occupying 2 slots
CRC/OSC-16-R-ET	11710077	extended environmental temperature range
CRC/OSC-16-T-R	11700184	with thermocouple sockets, for installation in imc CRONOScompact RACK, occupying 3 slots (12 TE)
CRC/OSC-16-T-R-ET	117100xx	extended environmental temperature range
CRSL/OSC-16-D	11800023	for installation in imc CRONOS-SL with DSUB terminal connection, occupying 2 slots

Integrated sensor supply

- Version with an integrated sensor supply, requires no extra module expansion. With adjustable supply voltages (globally selectable for 8 channels), output on reserved pins of DSUB terminal.

Required software version

- The module is fully supported by the imc operating software.

Included accessories for imc CRONOScompact:

DSUB-15 connector

- **ACC/DSUBM-T4:** DSUB-15 plug with screw terminals for 4-channel measurement of voltages as well as temperatures with PT100 and thermocouples with integrated cold junction compensation (CJC).

Included accessories for imc CRONOS-SL:

Optional accessories

DSUB-15 plugs

- | | | |
|-------------------------|--|----------|
| • ACC/DSUBM-TEDS-T4 | version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure | 13500190 |
| • ACC/DSUB-T4-IP65 | sealed version, suitable for ET series | 13500057 |
| • ACC/DSUBM-U4 | DSUB-15 plug with screw terminals for 4-channel voltage measurement | 13500166 |
| • ACC/DSUB-U4-IP65 | sealed version, suitable for ET series | 13500056 |
| • ACC/DSUBM-TEDS-U4 | DSUB-15 plug with screw terminals for 4-channel voltage measurement | 13500189 |
| • ACC/DSUB-TEDS-U4-IP65 | sealed TEDS version | 13500066 |
| • ACC/DSUBM-I4 | DSUB-15 plug with screw terminals for 4-channel current measurement of up to 50 mA (50 Ω shunt, scaling factor: 0.02 A/V) | 13500168 |
| • ACC/DSUB-I4-IP65 | sealed version, suitable for ET series | 13500058 |
| • ACC/DSUBM-TEDS-I4 | version with TEDS support, according to IEEE 1451.4 for use with imc Plug & Measure | 13500192 |
| • ACC/DSUB-TEDS-I4-IP65 | sealed TEDS version | 13500068 |
| • ACC/DSUB-ICP4 | DSUB-15 plug with screw terminals for conditioning of 4 IEPE/ICP inputs | 13500032 |

Technical details - OSC-16

Parameter	Value	Remarks
Inputs	16	
Measurement mode DSUB-15	voltage measurement current measurement thermocouple measurement RTD (PT100)	standard plug (ACC/DSUBM-U4) current plug (ACC/DSUBM-I4) Thermo-plug (ACC/DSUBM-T4)
Measurement mode OSC-16-T	temperature measurement thermocouple type-K	two pin thermo-sockets
Terminal connection DSUB-15	4x DSUB-15 or	4 channels per plug
OSC-16-T	16x thermo-sockets	one channel per plug

Sampling rate, Bandwidth, TEDS

Parameter	Value		Remarks
Sampling rate	≤ 500 Hz / channel ≥ 10 Hz (100 ms)		internal sampling: 2 Hz with additional interpolation: 5Hz for higher rates: output of doubled values max. allowable input signal frequency: 1 Hz filter / bandwidth like at 2 Hz / 5 Hz, additional values are duplicated
Bandwidth	1 Hz		-0.01 dB
Resolution	16 bit		
Noise suppression @ 50 Hz ($\pm 2\%$) at sampling rate: 1 Hz > 1 Hz	49 Hz to 51 Hz 68 dB 34 dB		noise frequency recommended sampling rate 1 Hz other sampling rates > 1 Hz
Bandwidth / max. signal freq. vs. noise suppression @ 50 Hz at sampling rate: 0.5 Hz 1 Hz 2 Hz 5 Hz	Bandwidth and max. signal frequency 0.25 Hz 0.5 Hz 1 Hz 1 Hz	noise suppression ≥ 60 dB 48.5 Hz 48.5 Hz 50 Hz 50 Hz	suppression of ≥ 60 dB is achieved for: noise frequency ≥ 48.5 Hz noise frequency ≥ 50 Hz
Max. settling time	max. 1 s		sampling rate 5 Hz (200 ms) complete settling as a response to input step
Synchronicity (at sampling rate)	constant time offset between two equally configured channels: max. 500 ms		sampling rate ≥ 2 Hz
TEDS	conforming to IEEE 1451.4 Class II MMI		esp. with ACC/DSUBM-TEDS-xx (DS2433)
Characteristic curve linearization	user defined (max. 1023 supporting points)		

General			
Parameter	Value typ.	min. / max.	Remarks
Isolation nominal test voltage	± 60 V 300 V (10 s)		channel to frame (housing, CHASSIS) and channel to channel
Overvoltage protection	± 60 V ESD 2 kV transient protection: automotive load dump ISO 7636		diff. input voltage, (long term) human body model $R_i=30\ \Omega$, $t_d=300\ \mu\text{s}$, $t_r<60\ \mu\text{s}$
Input coupling	DC		
Input configuration	differential, isolated		electrical isolation to system-GND (housing, CHASSIS)
Input impedance	10 M Ω 1 M Ω 50 Ω		voltage mode (range $\leq \pm 2$ V), temperature mode voltage mode (range $\geq \pm 5$ V) current mode (shunt plug)
Static input current	1 nA	10 nA	
Dynamic input current	0.1 mA 30 nA	1.5 mA 600 nA	peak dynamic input current value (typ. @100 mV, max. @2 V) mean dynamic input current value (typ. @100 mV, max. @2 V)
Input current upon overvoltage		1.5 mA	$ V_{in} > 7$ V in the range $\leq \pm 2$ V or device deactivated
Auxiliary supply voltage available current internal resistance	+5 V >0.26 A 1.0 Ω	$\pm 5\%$ >0.2 A <1.2 Ω	independent of integrated sensor supply, short circuit proof power per DSUB-plug

Voltage measurement				
Parameter	Value typ.	min. / max.	Remarks	
Input range	±60 V / ±50 V / ±25 V / ±10 V ±5 V / ±2 V / ±1 V / ±500 mV ±250 mV / ±100 mV / ±50 mV			
Gain error	<0.025%	<0.05%	of the reading, at 25°C	
Gain drift		6 ppm/K 36 ppm/K	ranges ≤±2 V ranges ≥±5 V	over entire temp. range
Offset error		<0.05% <3 μV	of input range	
Offset drift		3 ppm/K	over entire temperature range	
Non-linearity	<30 ppm		range: ±10 V	
Noise voltage (RTI)	<0.5 μV _{rms} <3.0 μV _{pkk} (<1 LSB)		sampling rate 5 Hz (200 ms)	
CMRR/ IMR (isolation mode rejection)	all sampling rates >110 dB (50 Hz) >95 dB (50 Hz) >65 dB (50 Hz)		range ≤±2 V range ≤±2 V range ≥±5 V	R _{source} = 0 Ω R _{source} = 100 Ω R _{source} = 100 Ω
Channel isolation	<50 pF, <100 nA		Channel to protection ground (CHASSIS); Channel-to-channel	
Channel cross-talk damping	all sampling rates >116 dB (50 Hz) >101 dB (50 Hz)		range ≤±2 V range ≤±2 V	R _{source} = 0 Ω R _{source} = 100 Ω
Suppression of square wave on neighboring channels	>123 dB @ sampling rate 200 ms		range ≤±2 V	R _{source} = 100 Ω
Max. source impedance	5 kΩ			

Current measurement with shunt plug				
Parameter	Value typ.	min. / max.	Remarks	
Input range	±1 mA / ±2 mA / ±5 mA ±10 mA / ±20 mA / ±40 mA			
Shunt resistor	50 Ω		external plug ACC/DSUBM-I4	
Gain error	<0.07%	<0.15%	of the reading, at 25°C	
Gain drift		6 ppm/K 36 ppm/K	ranges ≤±2 V ranges ≥±5 V	over entire temp. range
Offset error		<0.05%	of input range	
Offset drift		3 ppm/K	over entire temperature range	

Temperature measurement - Thermocouples			
Parameter	Value typ.	min. / max.	Remarks
Input mode	R, S, B, J, T, E, K, L, N		
Input ranges	-270°C to 1370°C -270°C to 1100°C -270°C to 500°C		type K
Resolution	0.063 K (1/16 K)		
Measurement error (gain error + offset)		<±0.5 K ±0.05%	type K, range -150°C to 1200°C plus indicated value
Drift (gain error + offset)	±0.02 K/K·ΔT _a		ΔT _a = T _a -25°C ambient temperature T _a
Error of cold junction compensation		<±0.15 K <±0.5 K <±0.7 K <±1 K	DSUB (ACC/DSUBM-T4) thermo plug (green) type K thermo plug (white) with type K thermo plug (white) other types
Drift of cold junction temp.	±0.001 K/K·ΔT _a		ΔT _a = T _a -25°C ambient temperature T _a
Sensor breakage recognition	display: "-2000°C"		indicating unconnected input

Temperature measurement – PT100 (RTD)			
Parameter	Value typ.	min. / max.	Remarks
Input range	-200°C to 850°C -200°C to +250°C		
Resolution	0.063 K (1/16 K)		
Measurement error (gain error + offset)	<±0.1 K ±0.05%		-200°C to +850°C, 4-wire configuration plus indicated value
Drift (gain error + offset)	±0.01 K/K· ΔT _a		ΔT _a = T _a -25°C ambient temperature T _a
Reference current (PT100)	250 μA		non-isolated (CHASSIS is Ground)

Technical specs - sensor supply module

Parameter	Value typ.		max.	Remarks
Configuration options	5 adjustable ranges			The sensor supply module always got 5 selectable voltage ranges. Default ranges: +5 V to +24 V
Output voltage	Voltage (+2.5 V) +5.0 V +10 V +12 V +15 V +24 V (±15 V)	Current 580 mA 580 mA 300 mA 250 mA 200 mA 120 mA 190 mA	Netpower 1.5 W 2.9 W 3.0 W 3.0 W 3.0 W 2.9 W 3.0 W	set globally for all channels of an amplifier special order: +12 V can be replaced by +2,5 V. +15 V can be replaced by ±15 V
Isolation Standard: option, upon request:	non isolated isolated			output to case (CHASSIS) nominal rating: 50 V, Test voltage (10 sec.): 300 V, not available with option ±15 V.
Short-circuit protection	unlimited duration			to output voltage reference ground
Accuracy of output voltage	<0.25 %		0.5 % 0.9 % 1.5 %	at terminals, no load at 25°C over entire temperature range plus with optional bipolar output voltage
Efficiency	typ. 72% typ. 66% typ. 55% typ. 50%			10 V to 24 V none isolated 5 V 10 V to 24 V isolated 5 V
Max. capacitive load	>4000 µF >1000 µF >300 µF			2.5 V to 10 V 12 V, 15 V 24 V