

# ORCA 2800

## TWO CHANNELS A/D CONVERTER

Orca 2800 is precise external two channels **24bit** A/D converter with two analog and four digital inputs, four digital outputs and one support D/A converter. Communication interface is **Ethernet (LAN)** with **DHCP**, **AutoIP** or static IP settings.

**Excellent signal to noise ratio** and choice of supported ranges and sampling rates allows use it for signal conversion from high sensitive analytical devices not only in HPLC or UHPLC.

Unit is calibrated and deliver with calibration protocol and this allows use it in regulated environments (IQ, OQ, GAMP).

Device is suitable for devices with analog output only. Also it can be used for control of simple devices by digital outputs and analog output.



Software ECOMAC with full support of unit and tool for configuration and searching device on LAN are supplied with unit. Development libraries in different languages under LGPL license are accessible on request. Full communication protocol is part of delivery.

### SPECIFICATION

#### COMMON PARAMETERS:

Powering	External 12V / 200 mA (adapter in accessories)
Communication interface	Ethernet 10 / 100 base (DHCP, AutoIP, Static)
Time of stabilization	15 min.
Dimensions (w x h x d)	105 x 36 x 124 mm
Weight	260 g

#### A/D CONVERTER:

Number of channels	2 independent (A, B)
Resolution	24 bit
Principle of converter	Sigma / Delta
Input	Symmetrical, isolated
Voltage ranges	$\pm 250\text{mV}$ , $\pm 2\text{V}$ , $\pm 20\text{V}$
Input impedance	1 M $\Omega$ ( $\pm 250\text{mV}$ ; $\pm 2\text{V}$ ) and 240 k $\Omega$ ( $\pm 20\text{V}$ )
Sampling rates	2, 5, 10, 20, 50, 60, 100, 200, 400, 800 sps
Short-time overload	$\pm 120\text{Vdc}$ (10 sec.)
Persistent overload	$\pm 50\text{Vdc}$
Overload signaling	2 x LED
Isolation qualities	200 Vdc / 140 Vac
Suppression of power frequency 50 Hz	2, 5, 10, 20, 50(R50), 50(R50/60) sps
Suppression of power frequency 60 Hz	2, 5, 10, 20, 50(R50/60), 60(R60) sps

## A/D CONVERTER - RANGE DEPENDENT PARAMETERS:

Range	Sampl. rate [sps]	Bandwidth (-3dB) [Hz]	Noise typ. [ $\mu$ V]	Offset max. [ $\mu$ V]	Calibr. point	Total error max. [%]
$\pm 250$ mV	2	0.48	0.5	1	$\pm 25$ mV	0.04 %
					$\pm 225$ mV	0.02 %
	5	1.15	0.6	2		
	$\pm 225$ mV	0.02 %				
	20	4.60	1.0	2		
	60	13.80	2.0	2		
	$\pm 225$ mV	0.02 %				
	200	46.00	4.0	2		
800	184.00	9.0	2			
						$\pm 2$ V
$\pm 1800$ mV	0.01 %					
5	1.15	1.5	2			
$\pm 1800$ mV	0.01 %					
20	4.60	3.0	2			
60	13.80	5.0	2			
$\pm 1800$ mV	0.01 %					
200	46.00	12.0	2			
800	184.00	30.0	2			
						$\pm 20$ V
$\pm 15$ V	0.01 %					
5	1.15	15	10			
$\pm 15$ V	0.01 %					
20	4.60	30	10			
60	13.80	50	10			
$\pm 15$ V	0.01 %					
200	46.00	120	10			
800	184.00	340	10			

Note: Total error max. [% from calibration point value]

**D/A CONVERTER:**

Number of channels	1
Resolution	8 bit
Output range	0 to 4.5 V
Precision of settings	1 % from range
DC output impedance	10 $\Omega$
Reference point	GND

**DIGITAL INPUTS:**

Number of inputs	4 (DIA, DIB, DIC, DID)
Polarity	Dual (polarity does not matter)
Input activation current	1.2 mA (4.6 Vdc)
Maximal input voltage	12 Vdc
Galvanic isolation	Optoelectronic 200 Vdc / 140 Vac
Sampling rate	optional 10, 100, 500 sps
Filter time constant (T63)	2 ms
Support powering	Yes, not isolated 5V / 20 mA

**DIGITAL OUTPUTS:**

Number of AC outputs	2 (ACA, ACB)
Number of TTL outputs	2 (DOA, DOB)
AC: Operational voltage	max. 60 Vdc, 42 Vac
Operational current	max. 240 mA
Impedance of ON switch	max. 2.5 $\Omega$
Cut-off current	max. 1 $\mu$ A
TTL: Output voltage	min. 0 V, max. 5 V
Output current	max. 32 mA
Log. 0	max. 0.6 V / 32 mA
Log. 1	min. 3.8 V / 32 mA
Reference point	GND

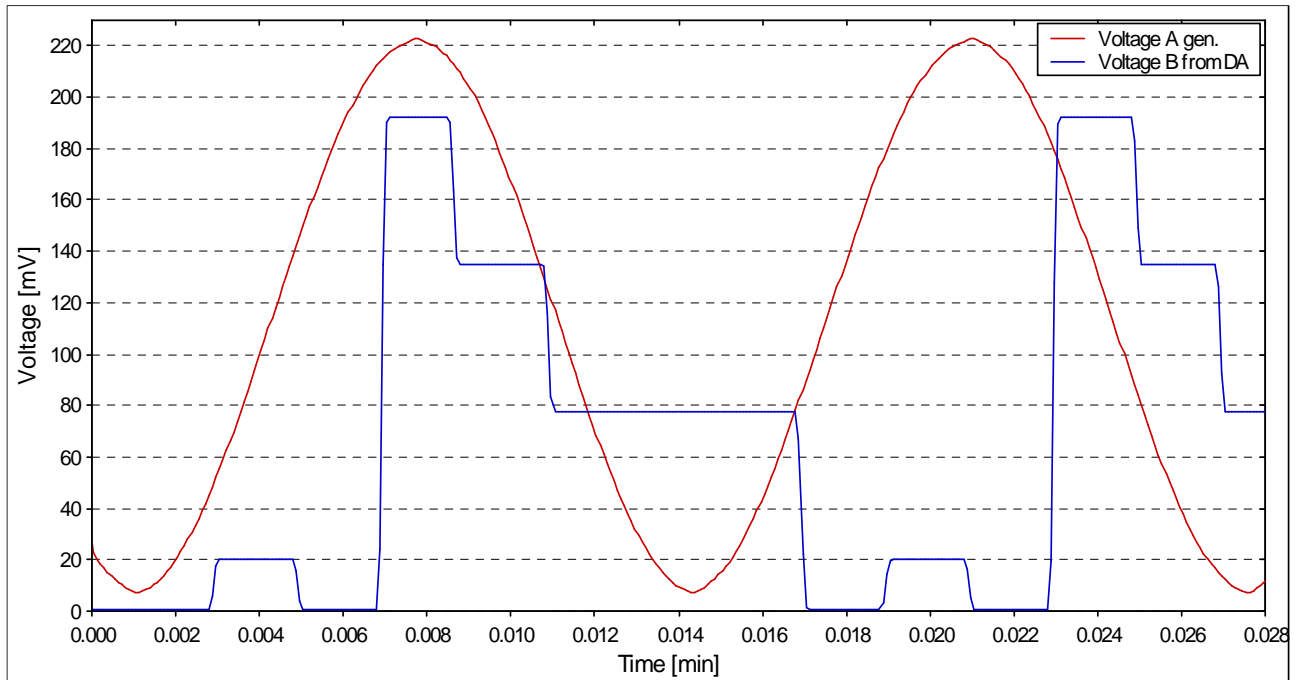
SHOWCASE DATA

Showcase data came from measurements when signal from sinus signal generator was connected to the analog input A and D/A converter was programmed to step change of voltage by ECOMAC software and connected to the analog input B.

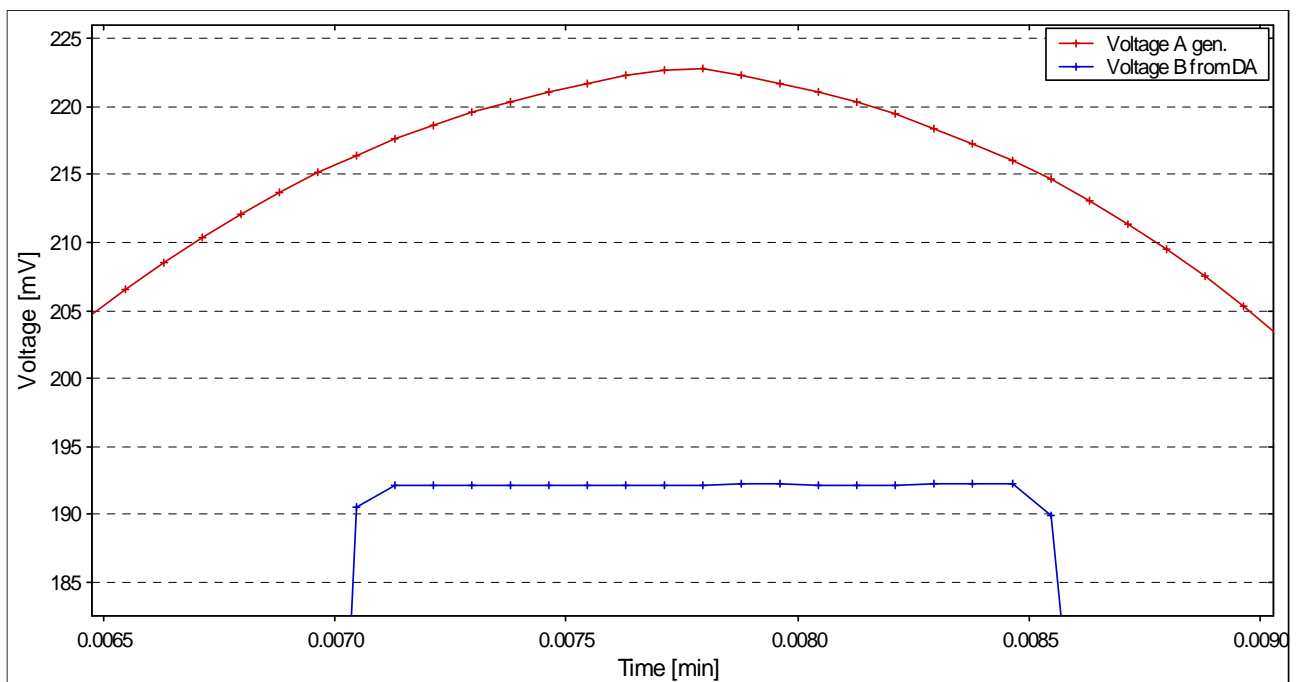
PARAMETERS:

Range AINA, AINB = ±2 V; Sampling rate AINA, AINB = 200 sps

GRAPH 1: SHOWCASE DATA



GRAPH 2: SHOWCASE DATA DETAIL



## EXAMPLE OF CALIBRATION PROTOCOL

First page of calibration protocol example.

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ECOM spol. s r.o.

Americka 3, 12035 Prague, Czech republic

## Calibration Protocol of ORCA-2800

Manufacturer : ECOM s.r.o.  
 Model : ORCA2800-002  
 Firmware : 100  
 Serial Number : ORPT/02  
 Date of Calibration : 25.3.2009 08:00:09  
 Name : ECOM  
 Temperature : 23.0 °C  
 Equipment Used : Agilent HP34401A, S/N: MY45010790 (E1001)

Calibration Data of Signal : **Voltage A (1/2)**

Range/freq.	Set Value [mV]	Read Value [mV]	Error [%]	Error spec. [%]	Result
0.25V, 2sps	+24.87674660	+24.87447077	-0.0091	+0.04	passed
0.25V, 2sps	-24.57537273	-24.57582538	-0.0018	+0.04	passed
0.25V, 2sps	+224.91349800	+224.90899308	-0.0020	+0.02	passed
0.25V, 2sps	-224.63777533	-224.63577615	+0.0009	+0.02	passed
0.25V, 10sps	+24.87741140	+24.87489820	-0.0101	+0.04	passed
0.25V, 10sps	-24.58039560	-24.58076639	-0.0015	+0.04	passed
0.25V, 10sps	+224.91520333	+224.90899689	-0.0028	+0.02	passed
0.25V, 10sps	-224.63238000	-224.63274246	-0.0002	+0.02	passed
0.25V, 100sps	+24.88632713	+24.88408606	-0.0090	+0.04	passed
0.25V, 100sps	-24.56355767	-24.56388827	-0.0013	+0.04	passed
0.25V, 100sps	+224.92562667	+224.91921168	-0.0029	+0.02	passed
0.25V, 100sps	-224.62842467	-224.62883027	-0.0002	+0.02	passed
2.0V, 2sps	+199.74878400	+199.74329231	-0.0027	+0.02	passed
2.0V, 2sps	-199.45068067	-199.44741538	+0.0016	+0.02	passed
2.0V, 2sps	+1800.32286667	+1800.29013846	-0.0018	+0.01	passed
2.0V, 2sps	-1799.96374667	-1799.92878462	+0.0019	+0.01	passed
2.0V, 10sps	+199.72476000	+199.72023934	-0.0023	+0.02	passed
2.0V, 10sps	-199.46257733	-199.45983934	+0.0014	+0.02	passed
2.0V, 10sps	+1800.32000000	+1800.29255082	-0.0015	+0.01	passed
2.0V, 10sps	-1799.97290667	-1799.94511639	+0.0015	+0.01	passed
2.0V, 100sps	+199.72737733	+199.72301065	-0.0022	+0.02	passed
2.0V, 100sps	-199.46015067	-199.45753028	+0.0013	+0.02	passed
2.0V, 100sps	+1800.32458000	+1800.30130433	-0.0013	+0.01	passed
2.0V, 100sps	-1799.96320000	-1799.93792862	+0.0014	+0.01	passed
20.0V, 2sps	+1999.93590000	+1999.93361538	-0.0001	+0.02	passed
20.0V, 2sps	-1999.56022000	-1999.56292308	-0.0001	+0.02	passed
20.0V, 2sps	+15003.04293333	+15003.03530769	-0.0001	+0.01	passed
20.0V, 2sps	-14999.09500000	-14999.30146154	-0.0014	+0.01	passed
20.0V, 10sps	+1999.73898667	+1999.74424590	+0.0003	+0.02	passed
20.0V, 10sps	-1999.61749333	-1999.62114754	-0.0002	+0.02	passed
20.0V, 10sps	+15002.95426667	+15002.98660656	+0.0002	+0.01	passed
20.0V, 10sps	-14999.13166667	-14999.36950820	-0.0016	+0.01	passed
20.0V, 100sps	+1999.73201333	+1999.73861730	+0.0003	+0.02	passed
20.0V, 100sps	-1999.60798000	-1999.61242429	-0.0002	+0.02	passed
20.0V, 100sps	+15002.86060000	+15002.90693677	+0.0003	+0.01	passed
20.0V, 100sps	-14999.11266667	-14999.34999002	-0.0016	+0.01	passed

**Total Result:** PASSED

Date:

Signature:

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