

next  
generation

# nano



## C<sup>1</sup> precision controlled industrial process chillers

cooling capacity: 6824 - 1,255,668 BTU /hr (0.6 - 104.6 tons)



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Leading edge technology and hundreds of years of **experience**... nano-purification solutions, your world-class manufacturer of state-of-the-art compressed air and gas solutions and process cooling equipment to industry.

Our commitment at nano is to work alongside our **customers** and provide unique solutions with the highest quality products to solve your specific challenges.

A wealth of experience and leading edge products are only part of the equation. nano recognize that world-class customer **service** is the most important component to any successful business.

Experience. Customer. Service... **nano**



## improved productivity & reduced costs

Process chillers are used in a variety of industrial applications to improve processes, reduce operating costs and increase productivity. Utilization of process chillers is becoming increasingly prevalent due to more stringent environmental water quality standards.

nano realize the importance of chilled water in industry and have developed the C<sup>1</sup> line of precision controlled industrial process chillers to meet the increasing demand for high quality complete packaged solutions which meet various industrial applications.



## design

Our experienced team of design engineers are always looking for new and unique technologies and products to bring you the highest level of performance and lowest overall operating cost.



## research & development

Our R&D team endeavors to provide solutions that go beyond developing an existing product. They are continually researching new technologies which can provide unique advantages over competitive offerings.



## manufacture

The reliable and energy saving nano C<sup>1</sup> industrial process chillers are manufactured in a state of the art facility to the highest standards of build quality to ensure reliability and high levels of performance.



# C<sup>1</sup> industrial process chillers

Chilled water is used in a wide range of applications to cool or cure anything from plastic injection molded parts to food ingredients. Oftentimes, production quality can be increased and time decreased through use of closed loop cooling systems.

The advanced nano C<sup>1</sup> industrial process chillers benefit from the experience of a design that has been perfected over 50 years and repeatedly proven through tens of thousands of units in operation around the world. Designed together with industrial users, these chillers have stood the test of time in virtually every industry and application.

The C<sup>1</sup> operates in a closed circuit (open circuit optional), offering precise water temperature control and rapid response to changes in ambient and thermal load. This design also eliminates the waste, corrosion and bacterial growth associated with open circuit systems.

In addition, energy efficient and reliable compressors combined with a unique, oversized, patented, NO FROST in-tank evaporator provide the lowest operating costs available on the market today.



## benefits - more for your money

### optimum energy efficiency

lower electricity consumption compared to other machines on the market

### quality components

CAREL microprocessor, Copeland Scroll™ compressors

### easy to install

adapts to any installation constraints, both inside and outside

### space saving design

fully packaged into a simple compact design, NCS will fit into the smallest spaces

### easy start-up

fully integrated packaged solution with expansion tank and bypass (models NCS 0015 US and above)

### total accessibility

all panels can be removed to facilitate maintenance

### environmentally friendly

closed water circuit, cycling chiller using environmentally-friendly refrigerant boasts lowest electricity consumption on the market

### manufacturing quality

meeting strict ISO 9001 certified specifications



# nano chillers – C<sup>1</sup> in detail



## air-cooled condenser

fitted with axial cooling fan with balanced aluminum blades and an air-cooled condenser in copper pipes and aluminum vanes. Reduces noise levels and improves ventilation air flow



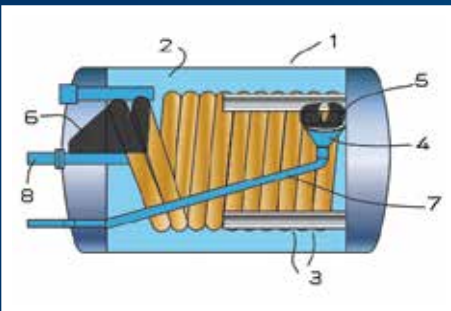
## CAREL microprocessor

the CAREL digital microprocessor continuously indicates water outlet temperature, operating instructions and various adjustable parameters and alarms



## integrated bypass

an integral centrifugal pump mounted within the chiller enclosure and a storage tank to avoid the risk of short cycles on all models. The standard adjustable bypass valve and integrated pressure gauge allows the water supply flowing out of the unit to be regulated (standard on models NCS 0015 to 1502 US)



## NO FROST evaporator

patented tube in flexible shell heat exchanger is integral to the buffer vessel and protects against damage which can occur with improper setup or maintenance (1 external shell, 2 buffer tank, 3 flexible shell, 4 gas distributor, 5 feeding circuits, 6 return circuits, 7 inlet gas pipe, 8 outlet gas pipe)





### ventilation grill

a grill to protect the condenser is standard and a cleanable mesh panel filter (as shown) is optional



### robust construction

aluminum sections and panels in plastic coated galvanized steel all mounted on an epoxy coated steel structural base (aluminum or stainless steel panels available as option)



### energy efficient & reliable compressor

C<sup>1</sup> features Copeland Scroll™ compressors as standard on models NCS 0015 to 1502 US. Scrolls minimize power consumption, noise, vibration and moving parts while maximizing reliability and resistance to liquid refrigerant returns



### integral pump

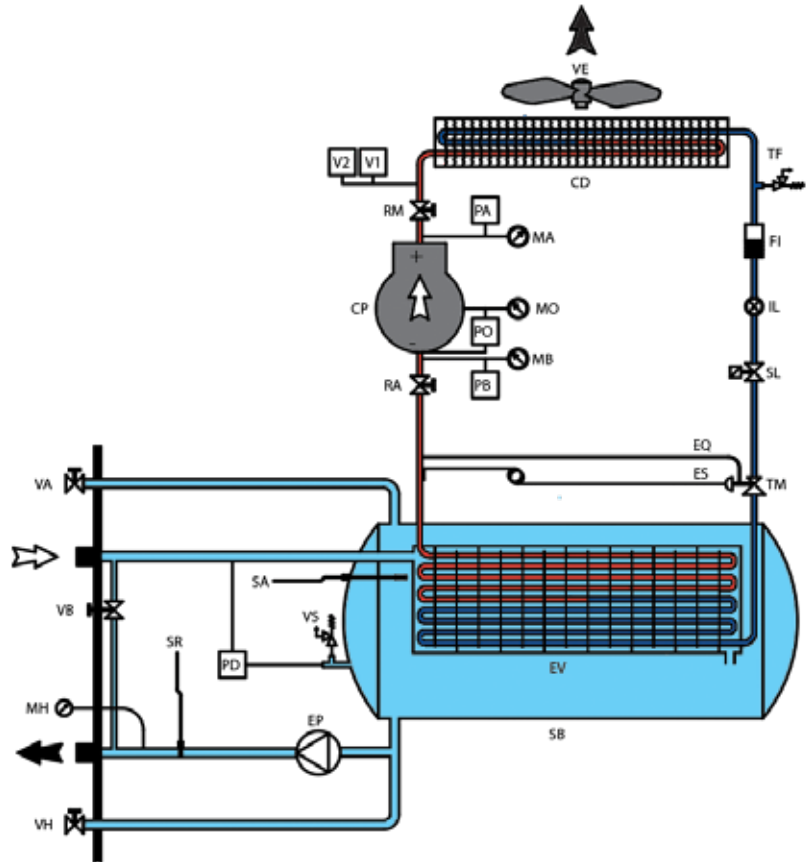
integrated pump standard on all models



# how it works

## typical single refrigeration circuit

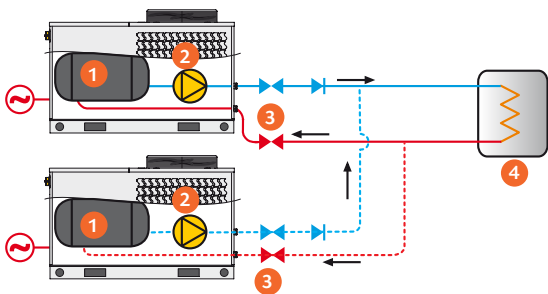
- CP compressor
- RM discharge valve
- PA high pressure switch
- MA high pressure gauge
- V1 1st stage fan pressure controller
- V2 2nd stage fan pressure controller
- CD condenser
- VE fan
- TF relief valve
- FI filter/dryer
- IL sight glass
- SL liquid solenoid valve
- TM thermostatic expansion valve
- EQ equalization
- ES thermal bulb
- EV NO FROST evaporator
- RA suction valve
- PB low pressure switch
- MB low pressure gauge
- PO oil pressure switch
- MO oil pressure gauge
- VA air bleed valve
- VB bypass valve
- MH water pressure gauge
- VH drain valve
- SA anti-freeze sensor
- SR regulating sensor
- PD water pressure differential cut-out
- VS water pressure relief valve
- EP pump
- SB tank



\*models NCS 0002 to NCS 0351 US contain only one refrigeration circuit

## typical configurations

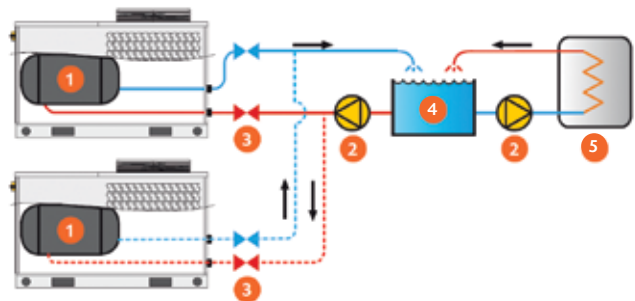
### closed circuit installation (standard)



- 1 accumulation tank
- 3 isolation valve
- 2 pump
- 4 user process

Expansion tanks are required for all closed circuit installations. When multiple chillers are installed in parallel, the expansion tanks must be automatic.

### open circuit installation (optional)



- 1 accumulation tank
- 4 open tank
- 2 pump
- 5 user process
- 3 isolation valve

Expansion tanks are not required for open circuit installations. Open circuits also typically use an external pump so, the internal pump may not be required.

# process cooling solutions

## standard features



3 bar pump



closed expansion tank

- 3 bar pump
- dynamic condensation control
- phase monitor
- crankcase heater
- closed expansion tank

## options



centrifugal fan



duplex pump skid

- 5 bar pump or higher
- centrifugal fan
- EC fan
- dew point compensation probe
- remote control panel
- RS 485 interface
- PICO controller
- duplex pump skid
- ElectroFin<sup>®</sup> coating (*for marine and corrosive ambient environments*)



refrigerant and oil gauges



aluminum panels

- condenser air filter
- non-ferrous
- automatic overpressure bypass valve
- open expansion tank
- refrigerant and oil gauges (*standard on models NCS 0251 US and above*)
- casters
- aluminum panels
- stainless steel panels

## more capabilities



free cooling chillers



high capacity process chillers

- free cooling chillers
- high capacity process chillers
- cooling towers
- dry fluid coolers
- heat exchangers

# sizing & specifications

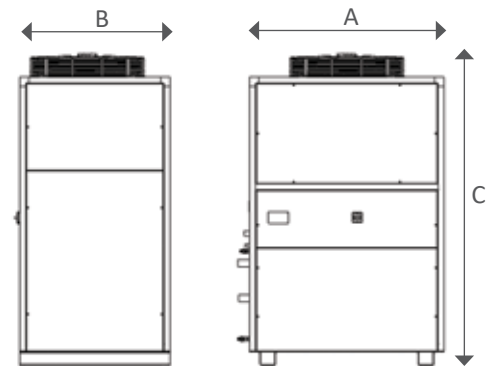
model	water inlet & outlet	cooling capacity <sup>(1)</sup>		total installed power <sup>(2)</sup>		water pump	tank capacity	dimensions (inches)			approx. weight	
		NPT	BTU/h	tons	kW			hp	gal	A	B	C
NCS 0002 US	½"	6,824	0.6	1.3	0.5	6.1	30	22	37	187	238	
NCS 0004 US	½"	12,966	1.1	2.3	0.5	6.1	30	22	37	220	271	
NCS 0006 US	½"	19,108	1.6	3.0	0.5	6.1	30	22	37	238	288	
NCS 0015 US	½"	23,885	2.0	6.6	0.8	7.9	33	26	56	352	418	
NCS 0020 US	½"	32,893	2.7	7.2	0.8	7.9	33	26	56	374	440	
NCS 0031 US	1"	43,675	3.6	9.3	0.7	15.9	39	32	72	550	682	
NCS 0051 US	1"	56,983	4.7	10.7	0.7	15.9	39	32	72	594	726	
NCS 0061 US	1"	65,854	5.5	11.7	0.7	42.3	51	39	83	990	1342	
NCS 0081 US	1½"	73,702	6.1	12.6	1.5	42.3	51	39	83	1078	1430	
NCS 0101 US	1½"	100,999	8.4	16.8	1.5	42.3	51	39	83	1122	1474	
NCS 0121 US	1½"	123,520	10.3	20.6	1.5	42.3	51	39	83	1144	1496	
NCS 0151 US	1½"	146,040	12.2	23.3	1.5	42.3	51	39	83	1177	1529	
NCS 0201 US	1½"	201,999	16.8	32.1	2.9	76.6	76	39	87	1562	2200	
NCS 0251 US	1½"	247,039	20.6	41.1	2.9	76.6	76	39	87	1892	2530	
NCS 0351 US	2"	292,079	24.3	46.0	2.9	121.5	102	39	91	2222	3234	
NCS 0401 US	2"	335,755	28.0	55.6	4.0	121.5	102	39	91	2464	3476	
NCS 0502 US	3"	379,430	31.6	63.7	4.0	132.1	139	39	89	3960	5060	
NCS 0602 US	3"	477,700	39.8	77.6	5.4	132.1	139	39	89	4136	5236	
NCS 0652 US	3"	552,767	46.1	87.4	5.4	132.1	139	39	89	4224	5324	
NCS 0802 US	3"	671,510	56.0	107.8	5.4	243.0	154	79	76	4840	6864	
NCS 1002 US	3"	758,860	63.2	115.2	10.1	243.0	154	79	76	4840	6864	
NCS 1202 US	3"	955,400	79.6	150.9	10.1	264.2	197	79	89	5676	7876	
NCS 1402 US	4"	1,105,534	92.1	177.5	10.1	264.2	197	80	89	5940	8140	
NCS 1502 US	4"	1,255,668	104.6	198.5	10.1	264.2	197	80	89	6028	8228	

for larger sizes and other voltages, consult factory

specifications		0002 - 0006	0015 - 1502
power supply <sup>(3)</sup>	voltage/phases	230V/1Ph/60Hz	460V/3Ph/60Hz
refrigerant	type	R410A	R410A
inlet water temperature <sup>(1)</sup>	minimum	32°F	32°F
	maximum	86°F	86°F
outlet water temperature <sup>(1)</sup>	minimum	32°F	32°F
	maximum	68°F	68°F
ambient temperature <sup>(1)</sup>	minimum	23°F	23°F
	maximum	106°F	106°F

additional specifications available, consult factory

correction factors <sup>(4)</sup>								
water outlet temperature (°F)		30	35	40	45	50	55	60+
correction factor		0.73	0.82	0.91	1	1.09	1.17	1.25
ambient temperature (°F) <sup>(5)</sup>	70	75	80	85	90	95	100	105
	correction factor	1.21	1.12	1.09	1.06	1.03	1	0.97
propylene glycol (%)		0	10	20	30	40	45	50
	correction factor		1	0.99	0.98	0.97	0.96	0.95



(1) assumes 45°F cooling water supply, 55°F cooling water return and 95°F ambient temperature. For all other conditions refer to the correction factors

(2) total nominal absorbed power by (all) compressor(s) at rated inlet conditions using 230/1/60 or 460/3/60 power supply as applicable

(3) all models are 60 Hz. Protection class IP55 standard except for NCS 0002 - 0006 US IP44 standard. Contact support@n-psi.com for 50Hz electrical options

(4) to be used as a guide only. All applications should be confirmed by nano. Contact support@n-psi.com for sizing assistance

(5) consult nano for sizing assistance for ambient temperatures below 32°F or above 106°F

(6) assumes no change to condenser inlet water temperature

(7) assumes no change to evaporator outlet water temperature

• standard water temperature control is +/- 3.5°F. Close temperature control is available

• crankcase heater included as standard

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