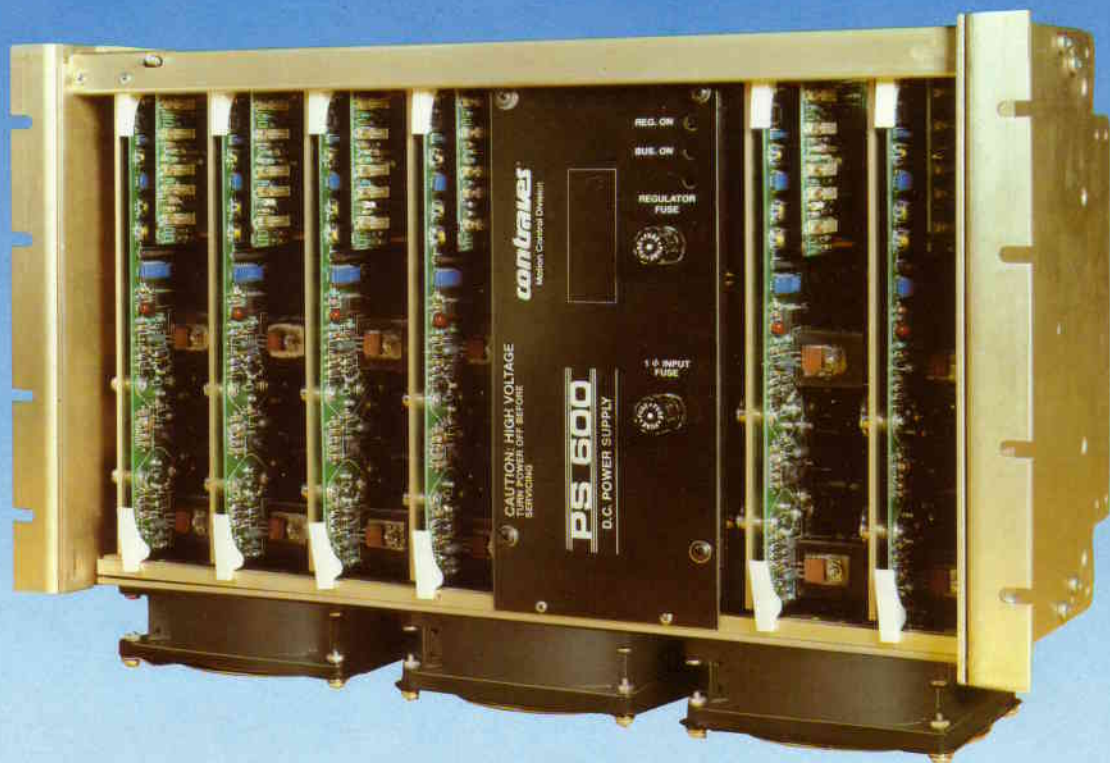


**contraves**<sup>®</sup>



## **NC600 SERIES**

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**2 to 8 Axis, 40 to 160V Bus PWM DC Servo Controllers**

## NC600 Series PWM DC Servo Controllers

The new NC600 compact, plug-in, PWM servo controllers offer reliable, efficient, precise control of permanent-magnet servo motors for such demanding applications as:

- Robot mechanism drives.
- Machine tool feed drives.
- PCB drilling and component insertion machine drives.
- Precision X-Y table drives.

The NC600 series employs our unique TRI-STATE PWM technique for smooth, efficient servo motor control. Motors needn't be derated as with SCR controllers, and in most cases there's no need to add armature inductors.

Patented short-circuit-fault circuitry, combined with other unique protection features, assures trouble-free operation. Full protection against accidents and excessive performance demands is afforded without the need for expensive additional protection devices.

The compact, low profile design of the NC600 series allows up to eight axes in a single 19 inch rack chassis. In addition, matched power supply modules with built-in bias supplies and bus regulators are integral to the chassis, so wiring and hook-up time are minimized.

The reliability of the NC600 series is assured through the use of automated assembly and test methods, combined with a 48 hour, high-temperature burn-in and the use of high grade pre-screened components.

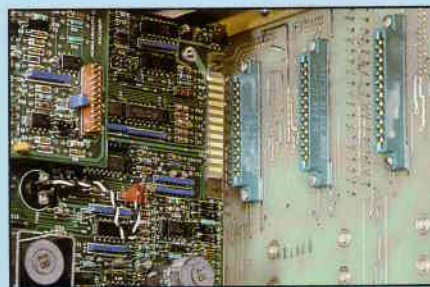
Contraves pioneered the use of the PWM technique for industrial servo motor control, and the NC600 series represents the culmination of over a decade of continued refinements in the design and manufacture of servo controllers.

## Features

- **Low cost.** Extensive use of automated production, test and burn-in facilities allows us to offer a very economical servo controller without sacrificing inherent quality.



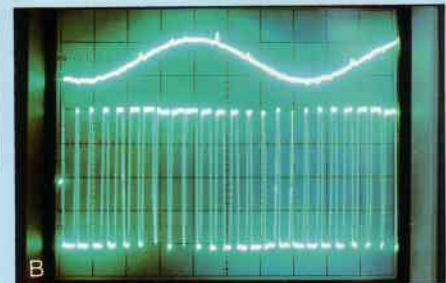
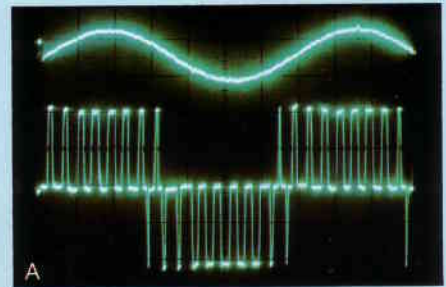
- **Small size.** The compact, yet rugged, design of the NC600 series allows more drive per unit of space than comparable designs. Eight axes take less than 1.4 cubic feet (0.04m<sup>3</sup>) of cabinet space.



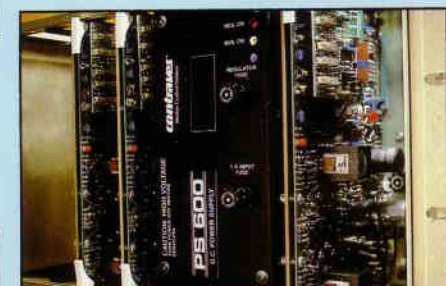
- **Plug-in.** The NC600 servo controller is a true plug-in assembly and the velocity amplifier is a plug-on assembly, so wiring errors and machine downtime are virtually eliminated.



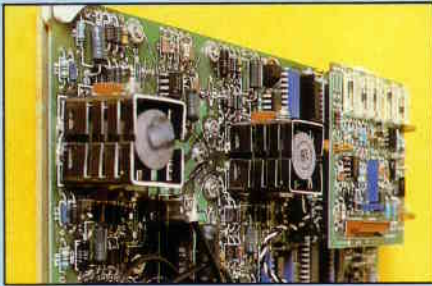
- **Full protection.** Multiple protection circuits in the NC600 series insure trouble-free operation and enhance system safety. Accidents and misuse such as short-circuits and excessive current demands are handled without damage to machine, motor or controller. An indicator visually signals a fault and other electronics alert the control when the drive shuts down under a fault condition.



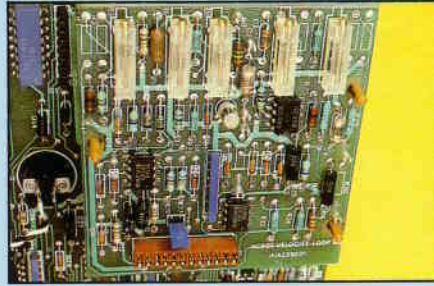
- **Tri-state modulation.** This unique switching technique reduces current ripple and RFI compared to other controller designs. Motor heating and armature inductance requirements are also minimized, while bandwidth and dynamic performance are maximized. The oscillographs show a comparison of the motor voltages for TRI-STATE PWM (A) versus standard PWM (B).



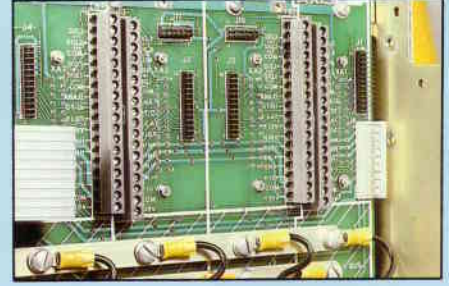
- **Wide bus range.** Bus voltages from below 40V to as high as 160V can be used, allowing proper matching to the motor. In addition, the optional velocity amplifier has an integral speed-dependent current clamp circuit insuring proper commutation.



• **Isolated output section.** Ohmic isolation of the output stage and differential signal input stages eliminate cross-talk between axes and ground loop noise disturbances. Ground and shield wiring is simplified.



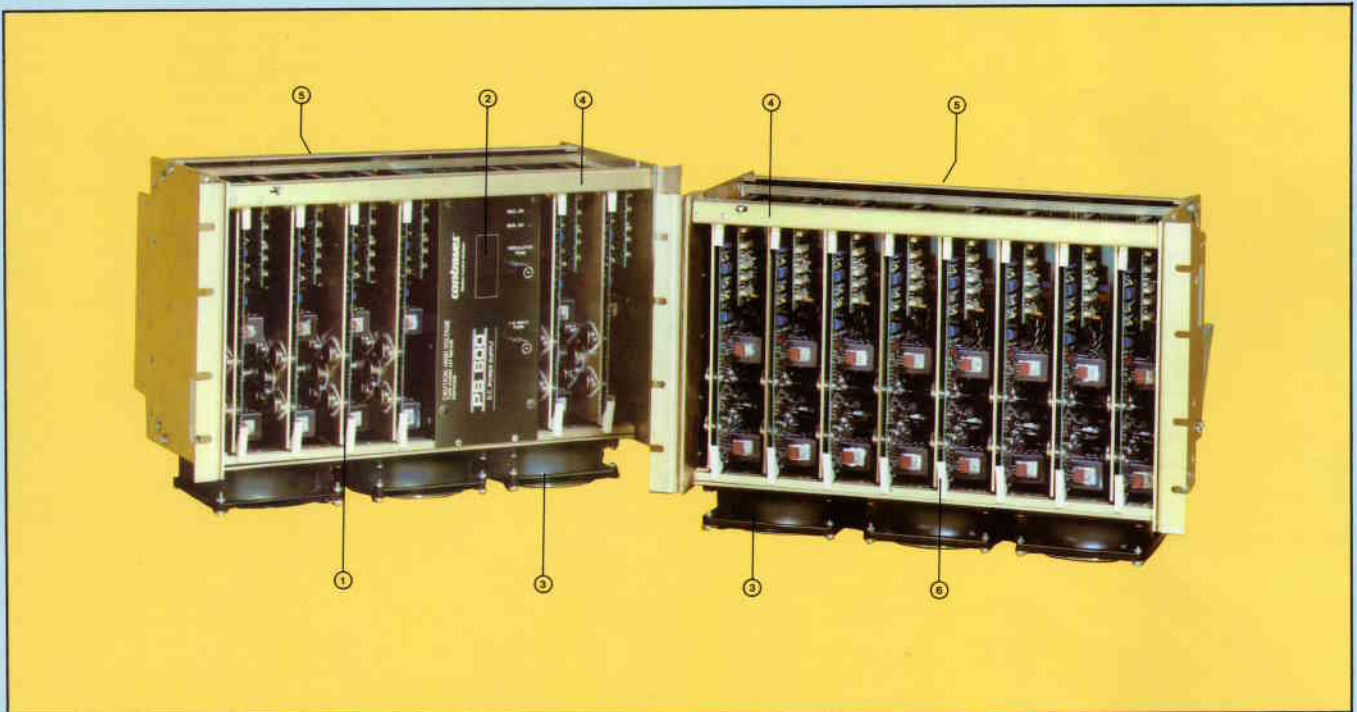
• **Ease of use.** No adjustments are needed on the basic current amplifier section, and the plug-on velocity amplifier is our proven, easily set-up design with multi-turn, non-interactive adjustments.



• **Easy connections.** Connections are easily made to the NC600 series mounting chassis. Signal and power terminal blocks are well-marked, including functional descriptions, and mass termination headers are provided as an alternative signal connection means.

**Mounting chassis features:**

- Up to 6 axes plus power supply in single 19" rugged mounting frame.①
- Integral dc power supply with built-in bus regulator supplies up to 5kW continuous power.②
- Multiple, integral cooling fans for conservative operation at high ambient temperatures.③
- Easily removed securing bar, or optional metal dead-front cover (not shown), for trouble-free operation in high vibration applications.④
- Separate, clearly identified power and signal terminals for ease of hook-up.⑤
- Alternative versions for 2, 3,4 or 8 axes are available.⑥



## Specifications:

### Current Amplifier (A2390)

Parameter	Value	Units
Output Voltage Range:	± 32 to 152	VDC
Output Current:		
Peak (1.0 sec. nom.)	± 25	Amperes
RMS	12.5	Amperes
Power Rating (160V bus):		
Peak	3200	Watts
Continuous	1600	Watts
Efficiency: (nom.) (@ continuous power)	90%	
Form factor (max.): (@ continuous current and min. inductance)	1.01	
Min. Load Inductance Range: (For 40V to 160V bus range)	0.4 to 1.6	mH
Bandwidth: (@ rated rms current)	500	Hz
Gain (± 10%)	2.5	A/V
Switching Frequency (nom.):	5000	Hz
Temp. Range (operating):	0 to 50	°C
Size:	2.1W x 9.3H x 6.3D 53W x 237H x 175D	in. mm
Weight (max.):	2.2 1.0	Lbs. kg

### Optional Velocity Amplifier (A2392)

Offset:	Adj. to zero	mV
Drift (max.): (referred to input)	10	μV/°C

#### Inputs:

Signal 1 (Differential):		
Gain (adj.)	0 to 3300	V/V
Input Resis. (min.):	10	K ohm
Signal Magnitude (max.):	± 15	V
Common mode:	± 10	V
Signal 2 (Tach):		
Gain (adj.):	80 to 1000	V/V
Input Resis. (min.):	10	K ohm
Signal Magnitude (max.):	± 100	V

Servo Compensation:	Adj. lag lead
Auto-current taper:	Selectable speed/slope

Note: Specifications subject to change without prior notice.

## Assembly descriptions:

The catalog part numbers for the various assemblies in the NC600 family are listed below with a brief description of each assembly.

- A2390** Model NC616 current amplifier plug-in assembly.
- A2391** Model NC616 amplifier above with plug-on velocity card assembly.
- A2392** Optional plug-on velocity amplifier card assembly.
- A2332** Eight axis 19" rack chassis with rear mounted 20A continuous power supply and bus regulator.
- A2333** Six axis panel-mounting chassis with integral 30A continuous power supply and bus regulator.
- A2334** Six axis 19" rack chassis with integral 30A continuous power supply and bus regulator.
- A2335** Four axis panel-mounting chassis with integral 30A continuous power supply and bus regulator.
- A2410** Four axis panel-mounting chassis with 20A continuous power supply and bus regulator.
- A2411** Two axis panel-mounting chassis with 20A continuous power supply and bus regulator.

NOTE: All integral bus regulators are rated up to 100W continuous, 1500W peak. Ask your Contraves sales engineer for further technical details of the NC600 series.



R400 series rare-earth magnet dc servo motors.

## Other Contraves products

Contraves manufactures a broad range of servo motor products, both ceramic and rare-earth types, for use with our servo controllers. Their rated torques range from 12 lb-in to 300 lb-in, and they can be equipped with options such as feedback transducers.

In addition, Contraves manufacturers shunt-wound dc motors to 400 hp, 3- and 6- pulse SCR servo and spindle drives, ac servo controllers and motors, and positioning systems. Please ask your Contraves sales engineer for further information and applications assistance.