

# ELECTRIC SERVO NUTRUNNER

## AFC1500 MULTI SYSTEM

# SAN UNIT OPERATION MANUAL

**Stand-Alone & MULTI Type**

Original Models - SAN2-12M/SAN2-24M/SAN2-40M/SAN2-80M/SAN2-120M

Updated Models - SAN3-24M/SAN3-40M/SAN3-120TM/SAN3-120WM

SAN3-24HM/SAN3-60HM



Sixth Edition

October 2009



AUTOMATION SYSTEMS

Certified ISO 9001:2000

# WARNING

All applicable national and local codes must be followed when installing and operating the equipment detailed in this manual.

**FAILURE TO ABIDE BY THESE CODES AND THE SPECIFICATIONS DESCRIBED IN THIS MANUAL CAN RESULT IN SERIOUS INJURY TO PERSONNEL AND/OR DAMAGE TO THE EQUIPMENT!**



Any questions regarding the contents of this document or any related matter should be directed to FEC INC. at (586) 781-2100, faxed to (586) 781-0044 or emailed to [support@fec-usa.com](mailto:support@fec-usa.com).

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## Revision History

Revision date	Manual No.	Content of revision
1998/01/12	First Edition	Original Manual
2002/01/12	Second Edition	First update
2003/01/03	Second Edition	Corrections to First Update (internally referred to as 3 <sup>rd</sup> edition)
2007/01/30	AFC1500E-HS-4	First major revision. Combination of SAN2 and SAN3 Servo Drive into a single Manual. Combination of Stand-Alone and Multi Unit operation into a single Manual.
2008/02/19	AFC1500E-HS-5	Updated for SAN3-24HM & SAN3-60HM models (High Speed motors) Updated power consumption specifications
2009/10/30	AFC1500E-HS-6	Updated for SAN3-DP1 & DP2 (including RTC setup for this) Updated for special Dual Transducer setup Various text, notes & edits

## Manual Numbering Convention

AFC1500 E - HS - 6

**DSP1500** = Servo Press  
**AFC1500** = Nutrunner  
**FUSION** = DC Hand Tool

**E** = English Version  
**S** = Spanish Version

\*Japanese Version furnished by DDK  
uses DDK numbering convention.

Version Number  
(Major Revision Level)

**HS** = SAN Unit Hardware Operation Manual  
**HM** = Multi / Main Unit Hardware Operation Manual  
**HM-ENET** = Ethernet Manual for Multi / Main Unit  
**SW** = Software Manual

# Introduction

Thank you for purchasing our **Electric Servo Nutrunner - AFC1500 System**.

This instruction manual describes the procedures for installation, wiring, and handling, and actions to be taken in case of any failure.

- ◆ This instruction manual shall be delivered to the end user who operates the equipment.
- ◆ Read all instructions before use, and always keep this instruction manual with the equipment.
- ◆ Items not described in this instruction manual shall be considered “unavailable”.
- ◆ The product specification and appearance described in this instruction manual is subject to change without notice.
- ◆ All rights reserved. Any disclosure, copying, distribution, or use of the information contained herein for other than its intended purpose, is strictly prohibited.

## For the safety of operator and equipment

- ◆ It is important for you to read all “Safety Precautions” before using the equipment, and understand and observe all instructions and recommendations included in this manual.
- ◆ Read all instructions and recommendations included in this manual, understand the functions and performance of this nutrunner, and correctly use this machine.
- ◆ Wirings and parameter settings shall only be conducted by a qualified professional.
- ◆ Never conduct a withstand voltage test or insulation resistance test on this equipment.
  
- ◆ Indicate the following on all instruction manuals that use this equipment.  
”**This equipment is capable of high voltages hazardous to human life.**”

## Points to check when unpacking

Please confirm the followings when unpacking this equipment.

- ◆ Ensure that you received the correct model, as ordered.
- ◆ Ensure that there are no missing parts.
- ◆ Check for any damage caused during transportation.

# Introduction

## Warranty

### Warranty Period

FEC Inc. warrants that the equipment manufactured by it and delivered hereunder will be free of defects in material and workmanship for a period of twelve (12) months from the date of placing the equipment in operation, or eighteen (18) months from the date of shipment, or 500,000 machine cycles - whichever shall first occur.

### Provision of warranty

Should any failure to conform to this warranty be reported in writing to the company within said period, the company shall at its option, correct such nonconformity by suitable repair to such equipment or furnish a replacement part from FEC or an FEC approved facility, provided the purchaser has stored, installed, maintained and operated such equipment in accordance with good industry practices and has complied with specific requirements & recommendations of the company. Accessories or equipment furnished by the company shall not be liable for any repairs, replacements or adjustments to the equipment or any costs of labor performed by the purchaser or others without the company's prior written approval.

The effects of corrosion, erosion and normal wear and tear are specifically excluded from the company's warranty. Performance warranties are limited to those specifically stated within the company's proposal. Unless responsibility for meeting such performance warranties are limited to specified shop or field tests, the company's obligation shall be to correct in the manner and for a period of time provided above.

**THE COMPANY MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY DISCLAIMED.**

Correction by the company of nonconformity's, whether patent or latent in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of the company for such nonconformity's, whether based on contract, warranty negligence, indemnity, strict liability or otherwise with respect to, or arising out of such equipment.

The following are defined as non-warranty situations that are outside the scope of warranty provided;

- Product is out of the warranty period as determined by FEC serial number tracking.
- Any cause external to the equipment, including but not limited to any act of God, lightning or power surges, abuse, negligence, accident or failure to maintain the proper operating environment.
- Use of equipment or adjustments or devices not approved by the manufacturer and FEC.
- Cosmetic damage to unit or any of the parts
- Consumable parts - for example; sockets, rest/wear pads, bushings, etc.
- Physical damage (example - damage caused by dropping, cut cables, etc.)
- Field Service required on a Warranty Part - FEC warranty covers the parts and labor only onsite at FEC.

Extended warranties are available as an addition to the standard warranty period outlined above - for all FEC Inc. systems. Please contact FEC if you are interested in an extended warranty.

# Safety Precautions

Read all instructions before operating the equipment in order to use this equipment safely and correctly. Prior to use, read this instruction manual carefully and fully understand the equipments functions, safety precautions and instructions. Safety precautions in this manual are marked with two symbols [Warning] and [Caution].

To prevent danger to the user and other persons as well as property damage, instructions that must be fully observed are marked with the symbols below.

- ◆ This instruction manual uses the following two symbols according to the degree of damage that may be caused when the instruction is not observed.



This symbol indicates that failure to observe instruction marked with this symbol may result in severe personal injury or death.



This symbol indicates that failure to observe instruction marked with this symbol may result in minor personal injury or material damage.

Even instructions that are marked with  may result in severe damage if they are not observed according to conditions.

Contents marked with the above symbols are very important instructions. For your safety, follow all instructions and especially those marked with these symbols.

- ◆ This instruction manual uses the following additional symbols for instructions that shall be observed.



**Warning:  
Electric shock**



**Warning:  
Fire**



**Caution:  
Fire**



**Caution:  
Electric shock**



**Caution:  
High Temperature**



**Prohibited**



**Do not disassemble**



**Required**



**Ground**

# Safety Precautions



Do not remove the motors and gear cases of tools while power is applied..  
The tool output spindle may rotate and cause injury.



Do not repair, disassemble, or modify the equipment individual components of the system..  
Failure to observe this instruction may cause injury, electric shock, fire, and malfunction.



Never operate the equipment where it is exposed to water, near a corrosive atmosphere  
or flammable gases. Failure to observe this instruction may cause fire.



Keep fingers away from the connectors while the equipment is turned ON and for a while after  
the equipment is turned OFF. Failure to observe this instruction may cause electric shock.



Wiring operation and maintenance work shall be conducted by a qualified professional.  
Failure to observe this instruction may cause electric shock and injury.



Turn OFF the power when conducting wiring operation and maintenance.  
Failure to observe this instruction may cause electric shock and injury.



Never damage the cables, apply excess stress to cables, or squeeze the cables.  
Never use damaged cables.  
Failure to observe this instruction may cause electric shock and fire.



Conduct type-3 grounding of FG terminals.  
Failure to observe this instruction may cause electric shock.



In case of an abnormal odor, noise, or operation error occurrence, stop operation immediately  
and turn OFF the power source. Failure to observe this instruction may cause injury and fire.



Install a Power shutdown device in order to ensure the safety of equipment.  
Failure to observe this instruction may cause injury.



Install an emergency stop circuit on the outside of equipment in order to stop operation  
promptly. Failure to observe this instruction may cause injury.



Keep away from the equipment during recovery from a temporary blackout, and ensure safety  
measures are conducted after restarting the equipment. The equipment may suddenly restart.  
Failure to observe this instruction may cause injury.

# ety Precautions



Transport the equipment properly according to its weight.  
Failure to observe this instruction may cause injury and malfunction.



The conditions when transporting the equipment by ship is as below.

- ◆ Ambient temperature:  $-5^{\circ}\text{C}\sim+55^{\circ}\text{C}$  (Avoid freezing)
- ◆ Ambient humidity: 50% RH or lower (Avoid moisture)
- ◆ Package: Tight seal
- ◆ Rust prevention measure: Apply grease or oil on tools.

Failure to observe this instruction may cause earth leakage and malfunction.



Do not hold cables and output spindles when transporting the tools.  
Failure to observe this instruction may cause injury and malfunction.



Do not hold the indicator on the front panel when transporting the AXIS Unit.  
The indicator may come off and drop from the front panel.  
Failure to observe this instruction may cause injury and malfunction.



The equipment shall be stored under the following conditions.

- ◆ Ambient temperature:  $-5^{\circ}\text{C}\sim+55^{\circ}\text{C}$  (Avoid freezing)
- ◆ Ambient humidity: 90% RH or lower (Avoid moisture)
- ◆ Atmosphere: Indoors (Avoid direct sunlight)
  - No corrosive gases or flammable gases
  - No oil mist, dust, water, salt, iron powder
- ◆ Avoid direct vibration or shocks

Failure to observe this instruction may cause earth leakage and malfunction.

# Safety Precautions



Install all tools firmly where they can bear the maximum torque during operation.  
Failure to observe this instruction may cause injury and malfunction.



Install the AXIS Unit firmly inside the control panel using the specified screws.  
Failure to observe this instruction may cause malfunction.



Use the specified tool for the AXIS (SAN) Unit.  
Failure to observe this instruction may cause fire and malfunction.



The AXIS (SAN) Unit shall maintain the specified distance from other devices.  
Failure to observe this instruction may cause fire and malfunction.



Do not block the ventilation hole of the AXIS (SAN) Unit.  
Avoid any foreign body from entering inside the equipment.  
Failure to observe this instruction may cause fire and malfunction.



The power source shall be provided with safety measures such as breakers and circuit protectors. Failure to observe this instruction may cause fire and malfunction.



Do not use tools or AXIS (SAN) Units that are damaged or missing parts.  
Failure to observe this instruction may cause fire, injury, and malfunction.



Do not get on the top of equipment or do not place heavy objects on the top of equipment.  
Failure to observe this instruction may cause injury, and malfunction.



Do not subject the equipment to excess shock and impact.  
Failure to observe this instruction may cause malfunction.



Conduct wirings properly and firmly.  
Failure to observe this instruction may cause injury, false operation, and malfunction.



Operate the equipment within the specified power supply voltage.  
Failure to observe this instruction may cause injury, electric shock, fire, and malfunction.



When operating the equipment in the following conditions, take sufficient measures to shield the equipment.

- ◆ Location where electrical noise is generated
- ◆ Location where the equipment is subjected to a strong electric field or magnetic field
- ◆ Location near a high power wire.

Failure to observe this instruction may cause injury, false operation, and malfunction.

# Safety Precautions

0n



Never operate the equipment with wet hands.  
Failure to observe this instruction may cause electric shock.



Keep fingers away from the AXIS (SAN) Unit radiating fin and tool motors while the equipment is turned ON or for a while after the equipment is turned OFF. These parts may become very hot. Failure to observe this instruction may cause burns.



Use the equipment under the following conditions.

- ◆ Ambient temperature: 0°C ~ +45°C (Avoid freezing)
- ◆ Ambient humidity: 90% RH or lower (Avoid moisture)
- ◆ Atmosphere: Indoors (Avoid direct sunlight)
  - No corrosive gases or flammable gases
  - No oil mist, dust, water, salt, iron powder
- ◆ Avoid direct vibration or shocks

Failure to observe this instruction may cause earth leakage and malfunction.



Confirm and adjust all parameters before operation in order to prevent unexpected movement of the equipment.  
Failure to observe this instruction may cause injury, false operation and malfunction.



Never conduct extreme adjustments or setting changes that may cause instability of operation.  
Failure to observe this instruction may cause injury, false operation and malfunction.



The equipment may restart suddenly when the equipment is reset with the start signal ON.  
Always ensure that the start signal is OFF before resetting the equipment.  
Failure to observe this instruction may cause injury.



Do not turn ON and OFF the equipment repeatedly.  
Failure to observe this instruction may cause malfunction.



Do not use the equipment at torque higher than the maximum torque.  
Failure to observe this instruction may shorten equipment life or cause malfunction due to the high temperature caused by overload.



In case any abnormality occurs, remove the cause and ensure safety before resetting and restarting the equipment.  
Failure to observe this instruction may cause injury.

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