Brushless Drive Controller
Application Detail Guide
Specifications and Installation

POWERTEC
INDUSTRIAL MOTORS

The information contained in this manual may be modified without notice and Powertec will not be responsible for changes that may occur in the future.

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Before drive installation, wiring, commissioning and inspection, read this instruction manual carefully.

Keep the manual in a safe place and available to engineering and installation personnel when the drive is operated.

Powertec is not responsible for those mistakes that may be found in this manual and for the damages that they may cause.

This manual is updated according to software version 1.1 (1.X)

Variation of the number replacing "X" has no influence on the functionality of the drive.

The identification number of the software version can be read on the Drive nameplate or on the label on the FLASH memories mounted on the regulation card.

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0. SAFETY PRECAUTIONS

ATTENTION!

According to the EEC standards the XVy and accessories must be used only after checking that the machine has been produced using those safety devices required by the 89/392/EEC set of rules, as far as the machine industry is concerned.

Drive systems cause mechanical motion. It is the responsibility of the user to insure that any such motion does not result in an unsafe condition. Factory provided interlocks and operating limits should not be bypassed or modified.

WARNING - ELECTRICAL SHOCK AND BURN HAZARD:

When using instruments such as oscilloscopes to work on live equipment, the oscilloscope's chassis should be grounded and a differential amplifier input should be used. Care should be used in the selection of probes and leads and in the adjustment of the oscilloscope so that accurate readings may be made. See instrument manufacturer's instruction book for proper operation and adjustments to the instrument.

WARNING - FIRE AND EXPLOSION HAZARD:

Fires or explosions might result from mounting Drives in hazardous areas such as locations where flammable or combustible vapors or dusts are present. Drives should be installed away from hazardous areas, even if used with motors suitable for use in these locations.

WARNING - STRAIN HAZARD:

Improper lifting practices can cause serious or fatal injury. Lift only with adequate equipment and trained personnel.

ATTENTION:

Drives and motors must be ground connected according to the NEC.

WARNING:

Replace all covers before applying power to the Drive. Failure to do so may result in death or serious injury.

WARNING:

Adjustable frequency drives are electrical apparatus for use in industrial installations. Parts of the Drives are energized during operation. The electrical installation and the opening of the device should therefore only be carried out by qualified personnel. Improper installation of motors or Drives may therefore cause the failure of the device as well as serious injury to persons or material damage.

Drive is not equipped with motor overspeed protection logic.

Follow the instructions given in this manual and observe the local and national safety regulations applicable.

CAUTION:

Do not connect power supply voltage that exceeds the standard specification voltage fluctuation permissible. If excessive voltage is applied to the Drive, damage to the internal components will result.

CAUTION:

Do not operate the Drive without the ground wire connected. The motor chassis should be grounded to earth through a ground lead separate from all other equipment ground leads to prevent noise coupling.

The grounding connector shall be sized in accordance with the NEC or Canadian Electrical Code. The connection shall be made by a UL listed or CSA certified closed-loop terminal connector sized for the wire gauge involved. The connector is to be fixed using the crimp tool specified by the connector manufacturer.

CAUTION:

Do not perform a megger test between the Drive terminals or on the control circuit terminals.

CAUTION:

Because the ambient temperature greatly affects Drive life and reliability, do not install the Drive in any location that exceeds the allowable temperature. Leave the ventilation cover attached for temperatures of 104° F (40° C) or below.

CAUTION:

If the Drive's Fault Alarm is activated, consult the TROUBLESHOOTING section of this instruction book, and after correcting the problem, resume operation. Do not reset the alarm automatically by external sequence, etc.

CAUTION:

Be sure to remove the desicant dryer packet(s) when unpacking the Drive. (If not removed these packets may become lodged in the fan or air passages and cause the Drive to overheat).

CAUTION:

The Drive must be mounted on a wall that is constructed of heat resistant material. While the Drive is operating, the temperature of the Drive's cooling fins can rise to a temperature of 194° F (90°C).

NOTE: The terms "Inverter", "Controller" and "Drive" are sometimes used interchangably throughout the industry. We will use the term "Drive" in this document

1. Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or inside the device is listed in section 4.11 on Instruction manual .

2. Do not touch or damage any components when handling the device. The changing of the isolation gaps or the removing of the isolation and covers is not permissible. If the front plate has to be removed because of a room temperature higher than 40 degrees, the user has to ensure that no occasional contact with live parts may occur.

3. Protect the device from impermissible environmental conditions (temperature, humidity, shock etc.)

4. No voltage should be connected to the output of the drive (terminals U2, V2 W2). The parallel connection of several drives via the outputs and the direct connection of the inputs and outputs (bypass) are not permissible.

5. A capacitative load (e.g. Var compensation capacitors) should not be connected to the output of the drive (terminals U2, V2, W2).

6. Always connect the Drive to the protective ground (PE) via the marked connection terminals (PE2) and the housing (PE1). Adjustable Frequency Drives and AC Input filters have ground discharge currents greater than 3.5 mA. EN 50178 specifies that with discharge currents greater than 3.5 mA the protective conductor ground connection (PE1) must be fixed type and doubled for redundancy.

7. The electrical commissioning should only be carried out by qualified personnel, who are also responsible for the provision of a suitable ground connection and a protected power supply feeder in accordance with the local and national regulations. The motor must be protected against overloads.

8. No dielectric tests should be carried out on parts of the drive. A suitable measuring instrument (internal resistance of at least 10 kΩ/V) should be used for measuring the signal voltages.

9. If the Drives have been stored for longer than three years, the operation of the DC link capacitors may be impaired. Before commissioning devices that have been stored for long periods, connect them to a power supply for two hours with no load connected in order to regenerate the capacitors, (the input voltage has to be applied without enabling the drive).

10. The drive may start accidentally in the event of a failure, even if it is disabled, unless it has been disconnected from the AC input feeder.

1. FUNCTIONS AND GENERAL FEATURES

Flexmax represents a new concept in motion control technology; this very fast servodrive based on the DSP (digital signal processor) VECON™ is aimed at providing real-time control of servosystems and it is integrated with versatile and innovative power hardware.

Flexmax is an IGBT servodrive particularly suitable for high bandwidth applications with brushless servomotors. Thanks to the innovative software installed on the flash eprom, it can be considered as a combination of a digital drive and a PLC using a special software tool called WinPx.

Flexmax features full-digital regulation with a 16KHz cycle, a 5KHz current loop bandwidth, a position loop with zero tracking failure, an analog interface, some dedicated digital interface and I/O expansion.

The drive position loop, (PI type) is based on two symmetrical register circuits, which store the desired and the actual information. The PID speed loop (a position loop derivative) and the PID^2 acceleration control (a second position loop derivative) are added to increase the accuracy of the controlled axes, both in a feedback and in a feedforward condition.

The drive has the following features:

- Torque control.
- Speed control.
- Position control
- Electrical line shaft.
- PLC functions.
- Linear motor control.
- Two configurable encoder/resolver inputs:

  Sinusoidal encoder input with 5 or 3 channels, absolute in a revolution or with Hall effect signals.

  Input of a 3-channel encoder, which can be programmed as an input for a second encoder (Master encoder) on EXP-BRS board.

  Encoder repetition output, 5V line driver, with programmable PPR according to the motor encoder on EXP-BRS board.

- 2 analog differential inputs (11bits + sign).
- 2 analog outputs (9 bits + sign).
- 7 programmable digital inputs.
- 2 programmable digital outputs, (plus 4 more on resolver card)
- 1 digital relay output 1A 250V.
- 1 RS485 asynchronous opto-isolated multi-drop serial port.
- IP20 (NEMA 1) protection, book case, removable connectors, serial encoder interface brought out via 1/2 D-sub connectors, ground connection screws for shielded cables mounted on board.
- 1 optional expansion board for digital I/O (8 inputs + 4 outputs). Cannot be installed when EXP-BRS resolver board is used.
- EXP-BRS resolver input board, provided standard with drive. 2 fast synchronous serial ports for a master-slave communications between drives. Plus 4 programmable digital outputs.