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# Single-Axis, Stand-Alone Motion Controller

## UNIDEX® 100 Series



- **Complete package includes controller, driver, and power supply**
- **Brushless, DC servo, and microstepping driver models**
- **Advanced motion control for master-slave, cam profile, and registration-based applications, plus output-on-the-fly**
- **Autotuning feature minimizes set-up time**
- **Multi-tasking operating system enables background PLC function or operator interface**
- **Stand-alone operation: store user programs in 32 KB nonvolatile memory**
- **RS-232 interface standard; RS-422 and IEEE-488 optional**
- **16 opto-isolated digital I/O points; 2 position latch inputs; dedicated home, limit, and analog inputs**
- **Compatible with LabVIEW® for Windows™**

Aerotech's UNIDEX 100 is a single-axis servo controller with power supply, amplifier and position controller in a single package. With features such as variables, math and multitasking, the UNIDEX 100 is ideal for your toughest factory automation projects. The UNIDEX 100 also has high-speed position latch inputs and advanced data logging capabilities, making it ideal for laboratory and test instrument applications.

Our GDS100 graphical development software is so easy to use you may never need to consult the manual. This Windows-based interface provides powerful diagnostic, development and analysis tools for generating and executing your application.



GDS100 Development Software

### Total Solution

The UNIDEX 100 cuts your design time by providing matched drives, and taking care of details like tuning and cabling to assure a trouble-free installation. Units are fully tested, burned-in and ready to run right out of the box.

### Practical Power

Four UNIDEX 100 models are available to drive a wide range of motors, including brushless, DC servo, and microsteppers. Brushless motors are sinusoidally commutated to minimize torque ripple.

The UNIDEX 100 uses a PIDF (feedforward) servo algorithm to determine the precise drive command profile to tightly track velocity and position trajectories with virtually zero position error. On-board autotuning makes servo tuning simple.

### Variables, Math and More

With variables and math capability, one program can be used to produce a variety of parts by simply prompting the user for new application data. The UNIDEX 100 can send and receive messages from a terminal or thumbwheels so you can customize your operator interface. You can even teach the UNIDEX 100 positions with a digitizing joystick.

### Application Versatility

The UNIDEX 100 has other built-in features such as axis calibration and backlash compensation, so you can maximize your machine's precision and accuracy. The "user units" feature makes it easy to customize the UNIDEX 100 to your specific machine,

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# UNIDEX® 100 Introduction/Specifications



whether you want to display English or metric, linear or rotary units.

The UNIDEX 100 comes standard with 16 programmable I/O, two analog I/O, and 12 dedicated I/O and limit inputs. Operator interfaces are available including a hand-held terminal, thumbwheel assembly, and LED display.

The UNIDEX 100 is equipped with dual encoder inputs, so you can tackle master-slave applications and solve transmission compliance problems with dual-loop control.

Precise registration-based moves are also possible because of the UNIDEX 100's fast 0.1 microsecond acknowledge time. The UNIDEX 100 easily handles complex functions such as output-on-the-fly and velocity profiling.

| | |
|---|---|
| ***Resolution*** | |
| Stepping | User programmable from 1.8 degree to 0.007 degree (200 to 50,000 steps/revolution in 50 steps/revolution increments) |
| DC Servo | 0.09 degree (4000 steps/revolution) standard |
| Brushless | 0.09 degree (4000 steps/revolution) standard |
| ***Accuracy*** | |
| Stepping | ±5 arc minute typical, unloaded, bidirectional, motor dependent |
| DC Servo and Brushless | ±3 arc minute ±1/2 count typical, loaded, bidirectional, encoder dependent |
| ***Repeatability*** | |
| Stepping | ±5 arc second typical, unloaded, unidirectional |
| DC Servo and Brushless | ±1/2 count typical, loaded |
| ***Hysteresis*** | 3 arc minute unloaded, bidirectional (stepping models only) |
| ***Position Range*** | ±1.4 x $10^{14}$ counts |
| ***Velocity Range*** | 1 Hz to 4 MHz after x4 feedback signal multiplication |
| ***Acceleration Ramp*** | 1 ms to 8000 seconds; independent acceleration and deceleration capability |
| ***Acceleration Profile*** | Linear, modified parabolic |
| ***Positioning Modes*** | Absolute and incremental |
| ***Positioning Control*** | Point-to-point, velocity profiling, output-on-the-fly, registration-based moves, master-slave, dual-loop control, torque control, axis calibration, backlash compensation, free-run, digitizing teach mode, auto focus, manual feedrate override |
| ***Servo Loop*** | 0.1 ms proportional (Kp), integral (Ki), derivative (Kd), feedforward (Kf1) servo loop; automatic Kp, Ki, Kd, Kf1, servo loop tuning; stepper encoder verification |
| ***Memory*** | 32 KB battery-backed for user programs and variables |
| ***Modes*** | EDIT: Enter new programs, modify existing program<br>FILE: Copy, delete, directory, transfer, check sum<br>MACHINE: Run programs, immediate command execution<br>PARAMETER: Machine and drive setup<br>AUTOBOOT: Run program on power-up<br>MULTITASKING: Run 2 tasks simultaneously<br>STATUS: Position, velocity, error status |
| ***Language*** | Mnemonic, menu-driven from HT, personal computer or terminal |
| ***Variables*** | 1000 integer, 200 long integer, 1000 floating point, 20 string |
| ***Math*** | Integer and floating point format; add, subtract, multiply, divide, square root, trig functions, absolute value |
| ***Logic*** | AND, OR, EXCLUSIVE OR |
| ***Comparisons*** | Greater than, less than, equal, not equal, equal or greater than, equal or less than |
| ***Branching*** | Conditional, interrupt, and program initiated IF, ELSE, WHILE, GOTO, GOSUB |
| ***Interrupt*** | 5 microsecond acknowledge time |
| ***User Units*** | Permits programming in English or metric, rotary or linear units |
| ***Programmable Message*** | Display operator prompts, input/output data and variables via interface |
| ***Safe Zone Programming*** | Permits safe operating zones to be programmed through software |
| ***Data Acquisition*** | Store data to variables while running programs |

# UNIDEX® 100 Specifications

| | |
|---|---|
| ***Command (9 pin D)*** | RS-232, (RS-422 optional) with programmable baud, parity, data bits, stop bit. Up to 30 UNIDEX 100's can be daisy-chained on one RS-232 or RS-422 line; 5 VDC output |
| ***Input/Output (37 pin D)*** | 8 programmable inputs; 8 programmable outputs.<br>Analog input (0 to ±10 VDC, 8 bit); analog output (0 to ±10 VDC, 8 bit); two position latch inputs (one per encoder interface, 0.1 microsec acknowledge time); interrupt (5 microsec acknowledge time); set-up; feedhold IN, shutdown IN; enable OUT; reset IN.<br>All I/O except analog are optically isolated. Opto-isolated I/O require external 5-24 VDC, 250 mA supply. |
| ***Limits/Primary Encoder (25 pin D)*** | Buffered inputs for CW, CCW, home limits, marker, 5 VDC complementary line driver encoder; RS-422, 4 MHz max after quadrature; Hall-effect device; 5 VDC output; tachometer input (tach optional) |
| ***Auxiliary Encoder (9 pin D)*** | Inputs for 5 VDC complementary line driver encoder, 5 VDC output; RS-422, 4 MHz max after quadrature |
| ***Expansion Bus (64 pin DIN)*** | 24-bit interface to option cards, maximum of two expansion bus option cards per system. Options include: IEEE 488 interface card; thumbwheel assembly and interface card; interface card to two OPTO 22 PB8 boards; resolver (Inductosyn)-to-digital converter card; LED display and interface card. |
| ***Motor Output (Screw Terminals)*** | Stepping Models: 0-160 VDC, 0-10 A, 20 kHz PWM<br>DC Servo Models: 0-160 VDC, 20 A peak, 12 A continuous, 20 kHz PWM<br>Brushless Models: 0-320 VDC, 20 A Peak, 12 A continuous, 20 kHz PWM |
| ***Status LEDs*** | + limit, - limit, overload, remote, reset, in-position, marker, control fault, drive fault, shunt |
| ***Status Registers*** | Four 24-bit status registers; abort, halt, disable, fault, interrupt, and output conditions are programmable via status register bit masks |
| ***Output Short Circuit Protection*** | Line-to-line, line-to-ground |
| ***Current Limiting*** | Software selectable peak and rms output current limits; AC inrush |
| ***Fusing*** | AC input, motor output |
| ***Shunt Regulator*** | Protects power supply against regenerative energy in high-current models |
| ***U100 Chassis Weight*** | 6.4 kg (14 lb) with transformer; 2.7 kg (6 lb) without transformer |
| ***U100i Chassis Weight*** | 1.7 kg (3.7 lb) |
| ***Ambient Temperature*** | |
| Operating | 0 to 50°C (32 to 122°F) |
| Storage | -20 to 70°C (-4 to 158°F) |
| ***Humidity*** | 0 to 95%, non-condensing |
| ***AC Power (screw terminals)*** | 115 VAC (nom) single-phase, 60 Hz, 1000 VA (max)<br>Optional 230 VAC single-phase, 50/60 Hz, or 100 VAC single-phase, 50/60 Hz |

# UNIDEX® 100I Motion Controller

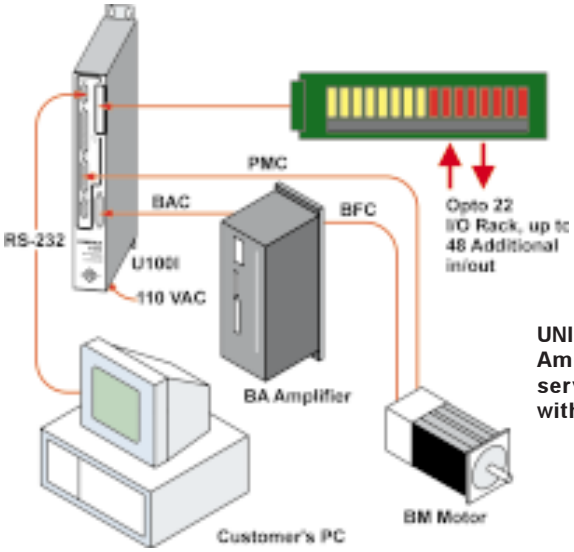
- **Full-featured UNIDEX 100 motion controller for use with external amplifiers**
- **Integral logic power supply for direct 110-230 VAC input operation**
- **Autotuning feature minimizes set-up time**
- **Stand-alone operation: can interface to any standard analog AC or DC servo amplifier**
- **Slim panel-mount packaging with expansion capability**



The UNIDEX 100I motion controller utilizes the same powerful motion processor as the UNIDEX 100, and is packaged as a stand-alone controller for use with any AC or DC servo amplifier.

With the UNIDEX 100I you have the added flexibility of controlling any standard servo amplifier such as Aerotech's BA series. This extends the power capability of the UNIDEX 100 system to up to 100 A peak when used with Aerotech's BA100 series amplifier.

The U100I contains all required logic level power supplies and accepts 110/220 VAC directly.

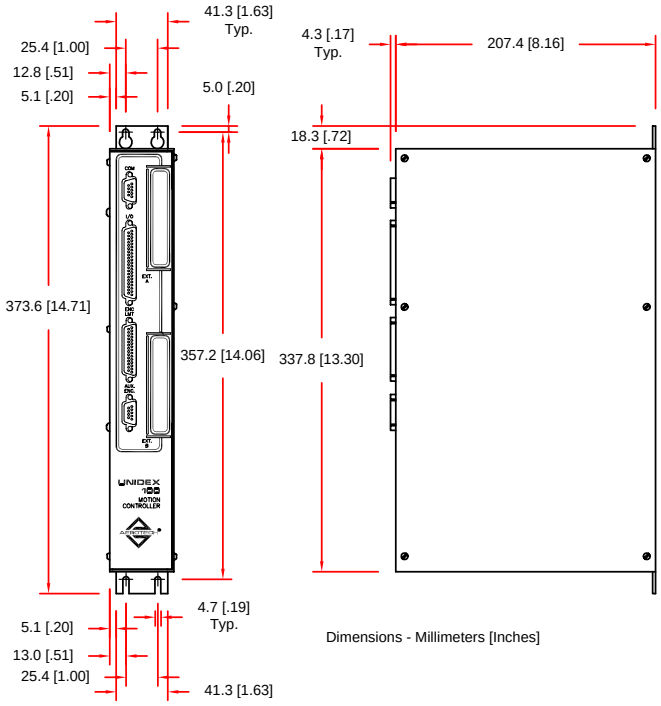



**UNIDEX 100I and BA Amplifier high-powered servo system configuration with expanded I/O.**

## AEROTECH ADVANTAGES



*The U100I controller can be teamed with any BA series amplifier and Aerotech motor for a high-powered (100 A) servo solution.*




Dimensions - Millimeters [Inches]

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# UNIDEX® 100 Series Motion Controller Compatible Motor Specifications

## U100 AND MOTOR SYSTEM SPECIFICATIONS

| TYPE | MOTOR MODEL | TORQUE | | SPEED rpm | MOTOR OUTPUT POWER watts | INERTIA kg-m² (oz-in-s²) | MOTOR WEIGHT kg (lb) | BUS VOLTAGE VDC(1) (nom.) | $F_n$ /Amp | CABLES |
|---|---|---|---|---|---|---|---|---|---|---|
| | | CONTINUOUS N-m (oz-in) | PEAK N-m (oz-in) | | | | | | | |
| U100M (STEPPER MOTORS) | 50SMB2 | 0.3 (38) | 0.3 (38) | 900 | 12 | $11.8 \times 10^{-6}$ ($1.7 \times 10^{-3}$) | 0.6 (1.4) | 40 | 1.0 | SMC-15 |
| | 55SMB2 | 0.4 (55) | 0.4 (55) | 1,500 | 40 | $10 \times 10^{-6}$ ($1.42 \times 10^{-3}$) | 0.7 (1.5) | 160 | 0.8 | SMC-15 |
| | 101SMB2 | 0.6 (90) | 0.6 (90) | 2,200 | 53 | $35 \times 10^{-6}$ ($5 \times 10^{-3}$) | 1.3 (2.8) | 40 | 5.0 | SMC-15 |
| | 140SMB2 | 1.0 (140) | 1.0 (140) | 2,200 | 90 | $35 \times 10^{-6}$ ($5 \times 10^{-3}$) | 1.4 (3.1) | 160 | 1.4 | SMC-15 |
| | 310SMB3 | 2.6 (370) | 2.6 (370) | 2,200 | 250 | $187 \times 10^{-6}$ ($27 \times 10^{-3}$) | 3.5 (7.8) | 80 | 6.0 | SMC-15 |
| | 450SMB3 | 3.2 (450) | 3.2 (450) | 2,200 | 240 | $187 \times 10^{-6}$ ($27 \times 10^{-3}$) | 3.6 (8.1) | 160 | 3.5 | SMC-15 |
| | 1010SMB4 | 7.4 (1050) | 7.4 (1050) | 1,500 | 380 | $805 \times 10^{-6}$ ($114 \times 10^{-3}$) | 9.1 (20.0) | 160 | 8.6 | HPC-15 |
| U100S (DC BRUSH MOTORS) | 1035LT | 0.25 (35) | 1.8(260) | 5,000 | 90 | $38 \times 10^{-6}$ ($5 \times 10^{-3}$) | 1.2 (2.5) | 40 | 4.0 | DCC-15 |
| | 1050LT | 0.35 (50) | 2.5 (355) | 4,200 | 115 | $57 \times 10^{-6}$ ($8 \times 10^{-3}$) | 1.6 (3.5) | 40 | 5.0 | DCC-15 |
| | 1075LT | 0.35 (75) | 2.9 (406) | 5,000 | 140 | $160 \times 10^{-6}$ ($23 \times 10^{-3}$) | 2.40 (5.3) | 80 | 5.0 | DCC-15 |
| | 1135LT | 0.95 (135) | 5.2 (736) | 3,600 | 200 | $360 \times 10^{-6}$ ($52 \times 10^{-3}$) | 3.7 (8.1) | 80 | 5.0 | DCC-15 |
| | 1210LT | 1.5 (210) | 4.9 (700) | 2,500 | 220 | $920 \times 10^{-6}$ ($130 \times 10^{-3}$) | 4.5 (10.0) | 80 | 6.0 | DCH-15 |
| | 1410LT | 2.89 (410) | 6.3 (890) | 2,750 | 380 | $1.3 \times 10^{-3}$ ($180 \times 10^{-3}$) | 6.0 (13.3) | 80 | 9.0 | DCH-15 |
| | 1580LT | 4.10 (580) | 9.2 (1300) | 2,750 | 650 | $1.8 \times 10^{-3}$ ($260 \times 10^{-3}$) | 12.0 (26.4) | 160 | 9.0 | DCH-15 |
| U100Z (BRUSHLESS MOTORS) | BMS60 | 0.42 (59) | 1.68 (238) | 4,000 | 175 | $1.96 \times 10^{-5}$ ($2.8 \times 10^{-3}$) | 1.1 (2.5) | 160 | 1.8 | BMP2HPD-15, BFCD-15 |
| | BMS100 | 0.69 (98) | 2.76 (391) | 3,000 | 217 | $3.7 \times 10^{-5}$ ($5.3 \times 10^{-3}$) | 1.5 (3.3) | 160 | 1.5 | BMP2HPD-15, BFCD-15 |
| | BM75E | 0.53 (75) | 1.4 (200) | 4,000 | 210 | $5.2 \times 10^{-6}$ ($0.7 \times 10^{-3}$) | 1.1 (2.5) | 160 | 6.0 | BMP2-15, BFC-15 |
| | BM130E | 1.0 (140) | 2.5 (350) | 4,000 | 290 | $9.2 \times 10^{-6}$ ($1.3 \times 10^{-3}$) | 1.5 (3.3) | 160 | 4.2 | BMP2-15, BFC-15 |
| | BM200E | 1.4 (200) | 3.5 (500) | 4,000 | 450 | $13 \times 10^{-6}$ ($1.9 \times 10^{-3}$) | 2.0 (4.3) | 160 | 7.0 | BMP2-15, BFC-15 |
| | BM250E | 1.94 (275) | 5.0 (700) | 4,000 | 560 | $78 \times 10^{-6}$ ($11 \times 10^{-3}$) | 3.6 (8.0) | 160 | 7.0 | BMP2-15, BFC-15 |
| | BM800E | 5.5 (780) | 14.0 (2,000) | 3,000 | 1,400 | $300 \times 10^{-6}$ ($42 \times 10^{-3}$) | 6.6 (14.5) | 320 | 8.0 | BMP4-15, BFC-15 |
| U100I | BM500E | 3.6 (510) | 9.0 (1,275) | 4,000 | 1,100 | $139 \times 10^{-6}$ ($20 \times 10^{-3}$) | 5.0 (11.0) | 160 | BA50 | BMP4-15, BFC-15 |
| | BM1400E | 9.6 (1,365) | 24.0 (3,400) | 3,000 | 2,330 | $560 \times 10^{-6}$ ($80 \times 10^{-3}$) | 10.7 (23.5) | 320 | BA50 | BMP4-15, BFC-15 |
| | BM2000E | 14.7 (2,082) | 43.9 (6,216) | 2,700 | 3,282 | 0.0011 ($157.1 \times 10^{-3}$) | 16.3 (36.0) | 320 | BA50 | BAC2-3, PMC2-15, BFC-15 |
| | BM3400E | 23.7 (3,356) | 70.8 (10,000) | 2,700 | 5,073 | 0.0022 ($309.8 \times 10^{-3}$) | 23.1 (51.0) | 320 | BA75 | BAC2-3, PMC2-15, BFC-15 |
| | BM4500E | 31.5 (4,460) | 94.4 (13,400) | 2,,00 | 6,790 | 0.0033 ($464.7 \times 10^{-3}$) | 29.9 (66.0) | 320 | BA100 | BAC2-3, PMC2-15, BFC-15 |

Notes: 1. Bus voltages of 40, 80 VDC include internal transformer with U100; 160 VDC bus includes transformer for 230 VAC input systems with U100.

2. $F_n$ = cont. stall current.

# UNIDEX® 100 Command Structure



Commands are English or mnemonic statements of ASCII characters of the form <command> (arg1,arg2) <delimiter>. Arguments (arg1, etc.) are integers or long, floating point, or string variables. The delimiter is a space or carriage return. "Op" is a math or logical operation.

## General Motion Commands

| | |
|---|---|
| A(arg1) | Acceleration/deceleration ramp time in user units/sec$^2$ |
| ABSL | Absolute positioning mode |
| D(arg1) | Distance in user units |
| DD(arg1) | Move command for slew and straight ratio slaved motion; arg1 is velocity in user units/sec |
| DW(arg1) | Dwell time in sec; resolution is 1 msec |
| GO | Begin move |
| HM | Go home |
| INCR | Incremental positioning mode |
| T(arg1) | Acceleration time in sec |
| V(arg1) | Velocity in user units/sec |

## Program Control Commands

| | |
|---|---|
| BEGIN | Program begin |
| DEFarg1 | Definition file where arg1 is a constant |
| DI | Disable interrupt |
| EI | Enable interrupt |
| ELSE | Else |
| ELSEIF | Else if |
| END | Program end |
| ENDIF | End if |
| ENDMAC | End of macro |
| ENDSUB | End subroutine |
| ENDWHL | End of while loop |
| EXIT | End program before subroutine |
| GOSUB:arg1 | Goto subroutine arg1 where arg1 is a constant |
| GOTO:arg1 | Goto label arg1 where arg1 is a constant |
| IF (arg1) op (arg2) | If/then |
| LB:arg1 | Label where arg1 is a constant |
| MACarg1 | Macro file where arg1 is a constant |
| RI | Reset interrupt latch |
| SRQ(arg1) | Send service request code arg1 |
| SUB:arg1 | Subroutine where arg1 is a constant |
| SYNC | Synchronize tasks for FV, LV variable manipulation |
| TITLE | Program title comment line |
| WHL(arg1) op (arg2) | While |

## Math and Logical Operators

| | |
|---|---|
| + | Add |
| - | Subtract |
| * | Multiply |
| / | Divide |
| = | Assigns value from the right of the "=" to variable to the left of "=" |
| ABS(arg1) | Absolute value of arg1 |
| AND | Logical and |
| CBI(arg1) | Convert arg1 BCD to integer |
| CIB(arg1) | Convert arg1 integer or floating point to BCD |
| COS(arg1) | Cosine arg1 in radians |
| DEC(arg1) | Decrement arg1 |
| EQ | Test for equality |
| GE | Greater than or equal to |
| GT | Greater than |
| INC(arg1) | Increment arg1 |
| LE | Less than or equal to |
| LT | Less than |
| NE | Not equal |
| OR | Logical or |
| SIN(arg1) | Sine arg1 in radians |
| SQRT(arg1) | Square root arg1 |
| TAN(arg1) | Tangent arg1 in radians |
| XOR | Exclusive or |

## Communication Commands

| | |
|---|---|
| CLN(arg1) | Clear screen from cursor to column arg1 where arg1 is a constant or variable |
| CLS | Clear screen |
| CUR(arg1,arg2) | Move cursor to row arg1, column arg2 |
| GC | Get ASCII value of character |
| GM(arg1) | Get message ending at column arg1 in current row |
| PM(arg1) | Print message arg1 where arg1 is a variable or a quote |
| PM(arg1,arg2) | Print message arg1 where arg1 is variable or a quote; arg2 is a quote |

## UT100 Utility Software

UT100 utility software is provided free with each UNIDEX 100. This software simplifies communication with the host. It has a simple DOS executable program that allows you to create, edit, download, and run UNIDEX 100 parts programs from your PC. You can also execute immediate commands, change parameters, or view position, velocity, and system status.

The UT100 utility software also includes a Windows-based program that will plot your tuning results. You can autotune the system based on your load and speed requirements, or manually adjust gain parameters, then plot the results. If a PC host will be a permanent part of your system, our C and BASIC source code procedures will reduce your programming time. Aerotech has written routines that you can embed in your host program for both RS-232 and IEEE-488 .

# UNIDEX® 100 Application Examples

## Basic Move

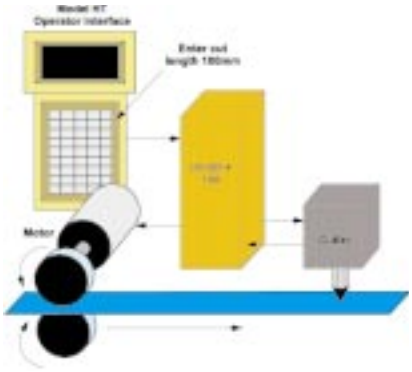
Point-to-point moves are easy to program with the UNIDEX 100. A move distance and velocity can be entered in user units such as inches, mm, or degrees. Acceleration time and profile can also be programmed, or you can use default values.

```
BEGIN
D(5)        ;move distance is 5 inches
V(10)       ;velocity is 10 inches/second
GO          ;begin move
END         ;end of program
```

## Cut-to-Length Application

The UNIDEX 100 has a user-friendly operator interface. Option HT is a hand-held terminal with a 4 x 20 character display and keypad. You can prompt the operator for data such as cut length and number of cuts. It is easy to customize the display.

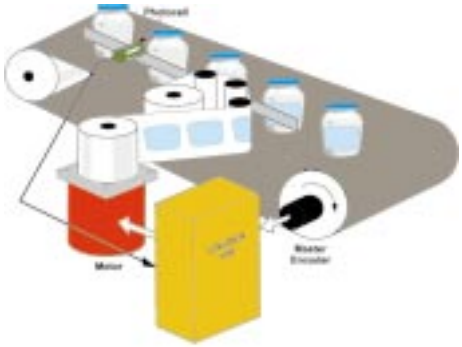
The UNIDEX 100 advances the material, starts the cutter, then waits for the cutter to finish before advancing again.



## Labeling Application

Accurate label placement requires a motion controller that can respond to changes in line speed and initiate motion quickly. Typically, product travels to the label machine on a conveyor, but the conveyor can speed up, slow down, or even stop. All the while, the labeling mechanism must maintain synchronous with the product conveyor.

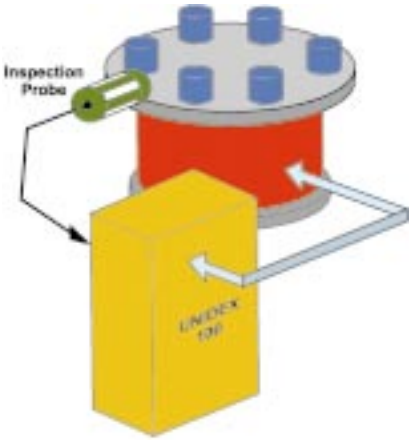
The UNIDEX 100 can synchronize the label motor speed to the conveyor like an electronic gearbox based on the master encoder. Motion is initiated a preset distance after each photo cell input to accurately place the label.



## Rotary Inspection Device

Inspection applications often require defect locations to be data logged. The UNIDEX 100 has built-in position capture logic to grab encoder positions on-the-fly.

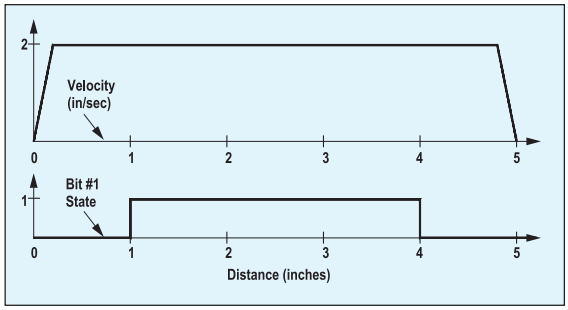
The multitasking operating system permits one task to run the motion while another task stores the defect locations to variables. The system host can later retrieve the defect locations over RS-232 or IEEE-488 interfaces.




## Gluing Application

Adding an output-on-the-fly to the previous basic move example application can put down a uniform bead of glue while moving. Using output bit #1 (least significant bit of register 2), turn the glue gun on and off. This program will lay down a three-inch-long bead at constant velocity.

```
BEGIN
REG:2=0     ;reset output bit #1
D(1)        ;move 1 inch before turning
            ;on glue
V(2)        ;velocity is 2 inches/second
GO
REG:2=1     ;set bit #1 hi to turn on glue
D(3)        ;move 3 inches with glue on
GO
REG:2=0     ;reset bit #1 to turn off glue
```




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# UNIDEX® 100 Accessories



## Model HT Programming Terminal



- Lightweight, compact hand-held terminal with cable
- 4 x 20 character, easy-to-read display
- Powered from UNIDEX 100

The convenient HT programming terminal plugs into the COM port of the UNIDEX 100 to permit local program selection and execution, plus editing.

Operations are menu assisted, minimizing errors and programming time. You can program position to be displayed on the HT, or prompt the user to enter data allowing the HT to serve as an operator interface.

SEE THE ACCESSORIES SECTION FOR DETAILED SPECIFICATIONS

## Model JOY Joystick

The JOY joystick lets the user manually slew an axis with proportional speed control. Additionally, program points can be digitized in the U100 teach mode by pressing the joystick fire button. The joystick is provided with 1.5 m (5 ft) flying leads for connection to the I/O port or option TS terminal strip. Power is from the UNIDEX 100.

## Model THM Thumbwheel Assembly

The THM is a six-digit plus sign thumbwheel assembly with 3 m (10 ft) cable. THM includes an interface card which plugs into the U100 expansion bus.

With the THM option, users can enter data such as distance, speed, or number of cycles into parts program variables. Power is provided by the U100. THM is housed in a 159 W x 95 H x 57 mm D (6.25" W x 3.75" H x 2.25" D) box, which can be panel mounted.



## Model DISP Display

DISP is a six-digit plus sign LED display with 3 m (10 ft) cable and interface card. Users can display position, velocity, cycle number or any other parts program variable.

DISP includes an interface card which plugs into the expansion bus. DISP is housed in a 159 W x 95 H x 57 mm D (6.25" W x 3.75" H x 2.25" D) box and can be removed for panel mounting. Power is from the U100.




## Model IE488 Interface

Option IE488 adds the IEEE-488 (GPIB) interface to the UNIDEX 100. IE488 functions as both a listener and talker, so interactive control and uploading of status, data, and program information to a host is possible.

The option IE488 board plugs into the UNIDEX 100 expansion bus and mounts to the indexer board. Power is provided by the UNIDEX 100.

## Model INT I/O Interface

Option INT is an interface to two Opto 22™ PB8, PB16, or PB 24 boards. Each INT provides 48 additional I/O points, which can be scanned by the U100 in a background task or served in the parts program.

I/O points can be configured as inputs (with interrupt capability) or outputs. Each INT includes an interface card which plugs into the U100 expansion bus and a 1 m (3 ft) cable. Power is provided by the UNIDEX 100. PB8, PB16, and PB24 boards and I/O modules are sold separately.

## Model TB-DB25-P Terminal Strip



The TB-DB25-P terminal strip provides an easy way to connect to the I/O port with a standard DB25 25-pin style connector. A TB-DB37-P is also available for the U100's I/O connector. TB includes mounting hardware and a 1 m (3 ft) cable.

# UNIDEX® 100 Accessories

## GDS100 Graphical Development Software

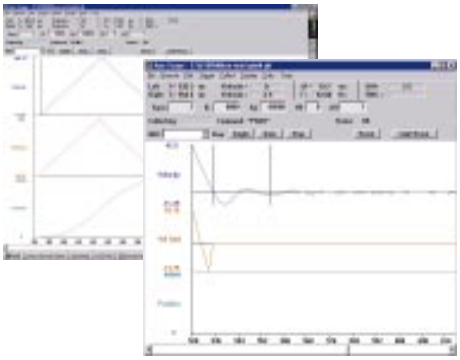
- For personal computers with Windows 3.x, 95, 98, NT
- Simplifies U100 programming and reduces setup and debug time
- Create and run programs; view results
- Includes PC-to-U100 RS-232 cable

GDS100 is a menu-driven development system for the Windows environment. It simplifies U100 programming and reduces debug time. Users can create, download, and run programs and view results.

Powerful tuning and plotting functions quickly analyze machine dynamics for optimum performance.

Parts program development is simplified by choosing from a command list with fill-in dialog boxes. Parameters, registers, and variables are displayed with descriptions and min/max values. Default parameter files are provided for all Aerotech motors.

Users can jog, home, stop axes and display position, status, and I/O in friendly formats.



**Powerful plotting utilities can generate moves to analyze settling.**



**Edit and debug U100 programs quickly and easily using GDS100 software.**

## LabVIEW® for Windows

National Instrument's LabVIEW for Windows is a software development system for data acquisition and instrument control. Aerotech has written UNIDEX 100 software drivers for LabVIEW for both RS-232 and IEEE-488 interfaces.

Running LabVIEW reduces programming time and allows a user to configure their personal computer as a "Virtual Instrument" with graphical user interfaces.

Users can select motion parameters using pictorial controls on a function panel without typing and editing program code. Functions can be executed immediately or placed in programs.

## Resolver to Digital Converter

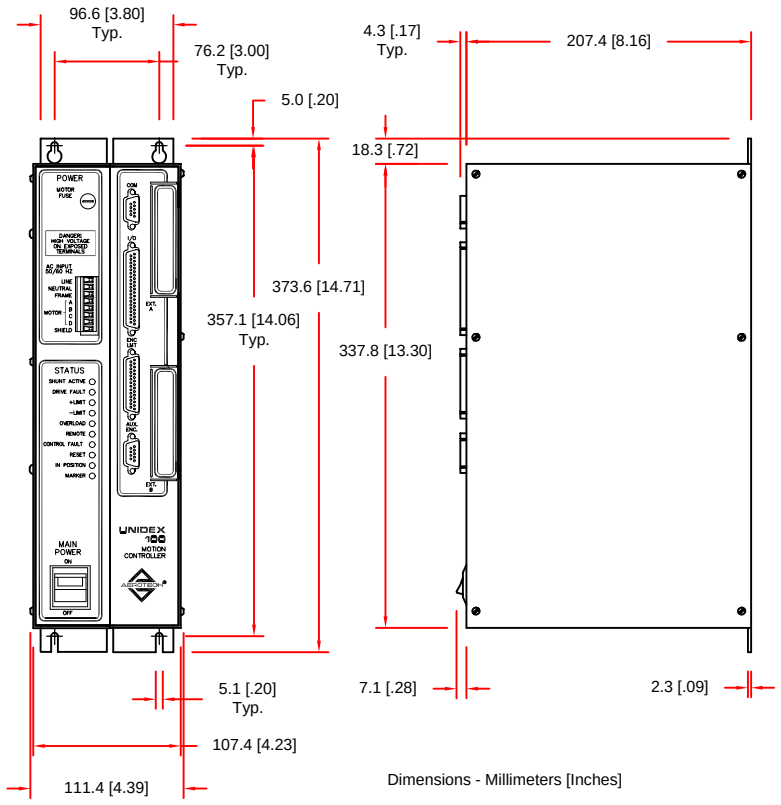
Option RD enables the U100 to control axes where a resolver or Inductosyn® is the position feedback transducer.

For example, with RD the U100 can accept resolver feedback from third party brushless motors for commutation and positioning.

## MEM Memory Option

The MEM memory option adds 57 KB of battery-backed memory to the U100. This additional memory can be used to store programs, data, or cam tables. For example, with the MEM option long programs can be created that incorporate extensive operator interface menus.

The MEM option plugs into the expansion bus and mounts to the indexer board. Power is from the U100.




Dimensions - Millimeters [Inches]

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# UNIDEX® 100 Series Motion Controller Ordering Information



### PART NUMBER AND ORDERING EXAMPLE: U100M-A-160-F5/INT

| U100 | M | -A | -160 | -F5 | INT |
|---|---|---|---|---|---|
| U100 = Sub-panel mount package | Drive Type<br>M = Microstepping drive<br>S = DC servo drive<br>Z = AC brushless servo drive | Power Input<br>A = 115 VAC, 60 Hz single phase<br>B = 230 VAC, 50/60 Hz single phase<br>C = 100 VAC, 50/60 Hz single phase | Bus Voltage<br>40 = 40 VDC<br>80 = 80 VDC<br>160 = 160 VDC | Output Drive Fusing | Options<br>INT = Interface card to one Opto-22 PB8 I/O rack with 3 ft. cable |

### PART NUMBER AND ORDERING EXAMPLE: U100I-A

| U100 | I | -A |
|---|---|---|
| UNIDEX 100 series position controller | Stand-alone indexer | Line cord option<br>A = 100 - 115 VAC input plug (USA)<br>B = 230 VAC input plug (Europe) |

## UNIDEX 100 Series – Single Axis

| | |
|---|---|
| U100M | Sub-panel mount package with microstepping drive |
| U100S | Sub-panel mount package with DC servo drive |
| U100Z | Sub-panel mount package with brushless servo drive |
| U100I | Sub-panel mount package indexer without servo drive. Input voltage range 100-240 VAC single phase |

**Power Input**

| | |
|---|---|
| -A | 115 VAC, 60 Hz single phase |
| -B | 230 VAC, 50/60 Hz single phase |
| -C | 100 VAC, 50/60 Hz single phase |

This option designates the type of line cord ONLY. U100i is the same unit.

### Bus Voltage

| | |
|---|---|
| -40 | 40 VDC bus for U100 (no external transformer required) |
| -80 | 80 VDC bus for U100 (no external transformer required) |
| -160 | 160 VDC bus for U100 (with 115 VAC input) |
| -160 | 160 VDC bus for U100 (with 230 VAC input) |

### Output Current

| | |
|---|---|
| -F1-F5 | 1-5 Amps continuous current (no shunt regulator) |
| -F6-F10 | 6-10 Amps continuous current with shunt regulator. Example: U100S-A-160-F5/RS422/INT |

### Options

| | |
|---|---|
| IE488 | IEEE-488 interface card |
| RS422 | RS-422 Interface (replaces RS-232) |
| THM | 6-digit plus sign thumbwheel assembly with 3 m (10 ft.) cable and interface card |
| INT | Interface card to one Opto22 PB8, includes 1m (3 ft.) cable |
| RD | Resolver/Inductosyn to digital converter card |
| DISP | 6-digit plus sign LED display with 3 m (10 ft.) cable and interface card |
| FLASH | 684 KB nonvolatile FLASH ROM memory (requires MEM accessory for software development). |
| INTEGRATION | Setup and tune U100 system with motor and set parameters for customer specific motor. Provide parameter spec sheet. |

### Accessories

| | |
|---|---|
| MEM | 57 KB battery-backed memory card |
| HT | Hand-held terminal |
| GDS100 | Graphical development software with RS-232 PC cable |

# UNIDEX® 100 Series Motion Controller Ordering Information

## UNIDEX 100 Series – Single Axis (continued)

| | |
|---|---|
| JOY | Joystick with 1.5 m (5 ft) cable |
| TB-DB25-P | 25 conductor, DIN mount, screw terminal interface with 25-pin D-shell male, 1 m cable |
| TB-DB37-P | 37 conductor, DIN mount, screw terminal interface with 37-pin D-shell male, 1 m cable |
| PB8 | 8 point I/O module mounting board |
| PB16 | 16 point I/O module mounting board |
| OAC5A | AC output module, 24 to 280 VAC, 2 A |
| IAC5 | AC input module, 90 to 140 VAC |
| ODC5 | DC output module, 5 to 60 VDC, 2 A |
| IDC5 | DC input module, 10 to 32 VDC |
| IDC5B | DC input module, 4 to 16 VDC |
| AF5 | EMI filter module, in-line enclosure for DC servo models with 1-5 A continuous current |
| AF6 | EMI filter module, in-line enclosure for DC servo models with 6-10 A cont. current |

## Cables

| | |
|---|---|
| BAC2-3 | Cable, U100I to BA amplifier control, 3 ft. |
| SMC-15 | Stepper Motor to controller cable, 4.6 m (15 ft) for connection to stepper motors with B2, B3 endcovers (Vero bulkhead) |
| HPC-15 | Stepper Motor to controller cable, 4.6 m (15 ft) for connection to stepper motors with B4 endcovers (MS3102A-24 conn) |
| DCC-15 | DC Motor to controller cable, 4.6 m (15 ft) for connection to 1-5 A continuous servo motors with MSO1 endcovers (MS3102A-24 conn) 1017,1035,1050,1075,1135 |
| DCH-15 | DC motor to controller cable, 4.6 m (15 ft) for 6-10 A continuous servomotors with MSO1 endcovers (MS3102A-24 conn) 1210, 1410, 1580, 1960 |
| BMP2-15 | Brushless Motor to controller cable, 5 m (15 ft) for connection to BM75, BM130, BM200, BM250 motors. |
| BMP2HPD-15 | Brushless Motor to controller cable, 5 m (15 ft) for connection to BMS60, BMS100 motors. |
| BMP4-15 | Brushless Motor to controller cable, 5 m (15 ft) for connection to BM500, BM800, BM1400, motors. |
| BFC-15 | Motor to controller encoder and limits cable, 5 m (15 ft) for use for all brushless motors. |
| DDP | Motor and limits cable, 4.6 m (15 ft) for ADR series stages |
| DDE | Encoder cable, 4.6 m (15 ft) for ADR stages (not required for external multipliers) |
| DDN | Inductosyn cable, 4.6 m (15 ft) for ADR series stages |
| I488-3M | IEEE488 cable, 3 m (10 ft) |
| CBL232 | PC to Unidex 100 RS232 cable, 3 m (10 ft) |
| BADC-MSO1-15 | Cable, U100 (or BAI) to DC Motor, 4.6 m (15 ft) (DC Motor must have MS0x connector option) |

## Miscellaneous

| | |
|---|---|
| W100 | MOTOR option which makes motor integral cable wiring compatible with UNIDEX 100 |
| COV | Protective cover and strain relief for AC and motor connectors |
| MCKU100 | Mating connector kit, All 5 D-shell connector on U100 and U100I |

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