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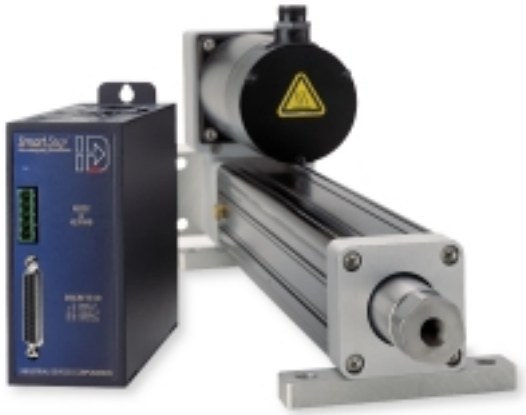
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# Overview

IDC's SmartStep is a complete, packaged microstepping drive/control that provides a user friendly system, as well as many compelling features and benefits. Consider a SmartStep when your application requires:

- **High Throughput.** The SmartStep has the same outstanding dynamic performance as the NextStep® microstepping drive which incorporates the latest in Anti–Resonance technology to maximize the torque, and optimize the performance of step motors.
- **Ease of Integration.** The SmartStep uses IDC's IDeal™ programming language, and Application Developer software package which simplifies system set–up and integration.
- **Small Panel Space.** The SmartStep has an internal heatsink and fan which keeps the panel space required for each unit small, and allows multiple units to be stacked together in multi–axis applications.
- **Smoother performance** across the entire motion profile.
- **Up to 8 amps of motor current.** The SmartStep is compatible with both standard and enhanced 17 frame to 42 frame step motors.

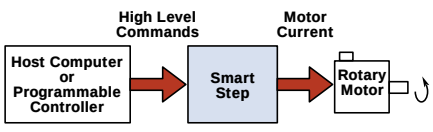


## Additional SmartStep Features

- CE rated
- Flash memory allows the SmartStep to be completely reconfigured from a file obtained via the Internet for easy upgrades of both hardware and firmware
- 60K memory, up to 400 programs standard
- RS–232 communications standard, RS–485 optional
- Operates from 120 VAC standard, or 240 VAC optional
- All system configuration and drive settings are software configurable, which means there are no switches to set
- High Speed Registration input
- Faster microprocessor and data bus improves the SmartStep's computational horsepower compared to the S6961
- Go Immediate Mode. This mode of operation allows the controller to multitask between motion control and I/O operations
- User scaling of position, velocity, and acceleration
- Descriptive variables, math and conditional branching
- Accepts encoder feedback for Stall Detection, Closed Loop operation, and Position Maintenance
- 1–99 Axis of immediate control via host RS–232C communication
- Compatible with IDC's Application Developer Software
- Sixteen configurable I/O (8 inputs, 8 outputs,) 1 dedicated home and 2 dedicated end of travel inputs
- Optically isolated I/O, 12/24 VDC compatible
- Compatible with IDC's S series step motors, and P/K series enhanced step motors. See page G-52 for more information on IDC step motors
- A handful of accessories simplify integration. See page G-30 for information.

For 17 or 23 frame step motor applications IDC has developed the SmartStep23. Some of the features included in the SmartStep23 are:

- The SmartStep23 provides up to 3 amps of current which makes it ideal for 17 or 23 frame step motor applications
- Same outstanding dynamic performance as the NextStep microstepping drive
- Operates from 120 VAC
- All the same features and benefits found in the SmartStep




**Compatible Mechanics:**
EC2-S, EC3-S, EC4-S, EC5-S
NV-S, N2-S, R2A-S, R3-S, R4-S
Positioning Tables



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# Specifications

| | SmartStep | SmartStep23 | SmartStep–240 |
|---|---|---|---|
| **AC Power Input** | 90-120 VAC Single Phase, 50/60 Hz, 500 VA max, @ 7.9 amp setting | 90-120 VAC Single Phase, 50/60 Hz, 250 VA max, @ 3.0 amp current setting | 100-240 VAC Single Phase, 50/60 Hz, 500 VA max, @ 3.9 amp setting |
| **Motor Current** | 0-7.9 amps, 0.1 amp increments If current setting is higher than 6 amps, drive will fold back current to 6 amps when the motor is at rest | 0-3 amps, 0.1 amp increments | 0-3.9 amps, 0.1 amp increments |
| **Bus Voltage** | 160 VDC nominal | 160 VDC nominal | 320 VDC nominal |
| **System Resolution** | 36,000 steps/motor rev | | |
| **Motor Compatibility** | | | |
| Type | 2 phase, hybrid permanent magnet; 0.9°, 1.8° or 7.2° full step | | |
| Inductance | 2-60 mH for SmartStep and SmartStep23; 8-240 mH for SmartStep-240. | | |
| **Amplifier** | | | |
| Switching Frequency | 20 kHz | | |
| Protection | | | |
| Short Circuit | Amp disabled if phase to phase, or phase to ground short detected | | |
| Brownout (Under Voltage) | Amp disabled if supply drops below 90 VAC (100 VAC for -240 version) | | |
| Over Temperature | Amp disabled if heatsink exceeds 70° C | | |
| Interlock | Amp disabled if interlock connection is broken on motor connector | | |
| Regen/Over Voltage | Amp disabled if regen condition causes bus voltage to exceed 220 VDC for 120 VAC input voltage, or 440 VDC for 240 VAC input voltage | | |
| **Current Settings** | | | |
| Rest | Software selectable. If selected, will reduce motor current to 1 amp after no motion has occurred for 20 minutes. Full current level will resume upon receipt of next motion command. Reduces drive and motor temperature | | |
| Idle | Software selectable. If selected will reduce current to 75% of drive setting if no motion is commanded for 10 ms. Full current level will resume when motion is commanded. Reduces drive and motor temperature. | | |
| Waveform | Software selectable. Configures the shape of the current waveform. Default is pure sinusoid. Selecting On changes waveform to -4% 3rd harmonic. Optimizes smoothness and step-to-step accuracy. | | |
| **Additional SmartStep Specifications** | | | |
| Inputs 8 Programmable, Limits, Home | 12 VDC or 24 VDC compatible, optically isolated, as little as 3.0 mA sinking current required | | |
| Incremental Encoder | Optically isolated, differential line driven 5 VDC signal, 2 mHz max frequency (post quadrature); 5 VDC, 200 mA available on SmartStep to power encoder | | |
| Outputs 8 Programmable | Open collector, 12 VDC or 24 VDC compatible, optically isolated, 100 mA max sink current per output. 350 mA total sink current | | |
| LED Indications | Green—functioning normally; Red—Fault; Amber—FLASH fault | | |
| **Environment** | | | |
| Operating Ambient Temp. | Max. ambient temperature of 50°C (122°F) @ 6 amps current setting | | |
| Storage Temperature | -40°C to 80°C (-40°F to 176°F) | | |
| Humidity | 0% to 90% non-condensing | | |
| **Dimensions** | 5.9” (L) x 2.5” (W) x 6.3” (H) | | |





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# Accessories

## SmartStep I/O Accessories



### Optional Keypad

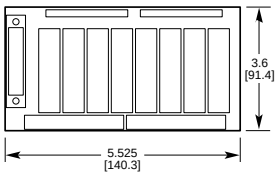
- Both a programming tool and an operator interface
- Menu-driven set up, online help function, diagnostic screens and trace mode provide straightforward set up, troubleshooting and program debugging
- Easy to read, backlit 40-character display
- Connects to control or mounts remotely
- Scratch-proof, large keys
- Displays current position and I/O status
- Keypad is protected to NEMA 4 (IP65) standards when panel is mounted with gasket
- See page G-38 for more information on keypad.



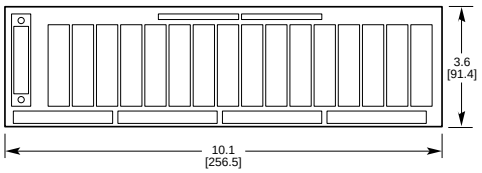
### OPTO44 Board

OPTO rack that accepts up to 8 OPTO modules (up to 4 OPTO inputs and 4 OPTO outputs). OPTO I/O is useful when your application needs to switch on and off large voltages or currents (i.e., turning on a solenoid, switching on and off a 230 VAC brake, etc.). OPTO44 racks parallel all 16 I/O points to a second set of screw terminals so unconditioned I/O may still be used.

#### OPTO44 Dimensions




#### OPTO88 Dimensions

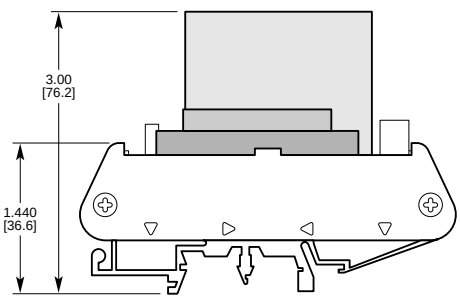





### OPTO88 Board

OPTO rack that accepts up to 16 OPTO modules (up to 8 OPTO inputs and 8 OPTO outputs). OPTO I/O is useful when your application needs to switch on and off large voltages or currents (i.e., turning on a solenoid, switching on and off a 230 VAC brake, etc.). OPTO44 racks parallel all 16 I/O points to a second set of screw terminals so unconditioned I/O may still be used.

#### OPTO44/88 Rack Dimensions




Add 0.7 [17.8] for Greyhill G5 modules.





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# Accessories

### DB25BO Breakout Board

This accessory converts the DB25 I/O connector on the SmartStep to screw terminals.



### SS-IO and SS-IO-6 Cables

I/O cables that connect SmartStep to other devices or PLC.

SS-IO cable is 2 ft
SS-IO-6 cables is 6 ft



### SS-RS232 Cable

Cable for connecting SmartStep to PC (9-pin comm. port).



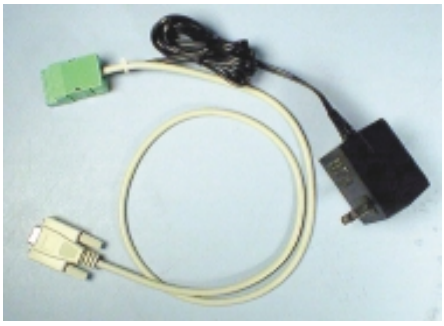
### SS-PNP-BO Breakout Board

Screw terminal breakout board that converts the SmartStep's sinking outputs to sourcing outputs.



### PCS-5004 Cable

PC-keypad cable for copying programs between keypad and PC (5 VDC power supply not included).





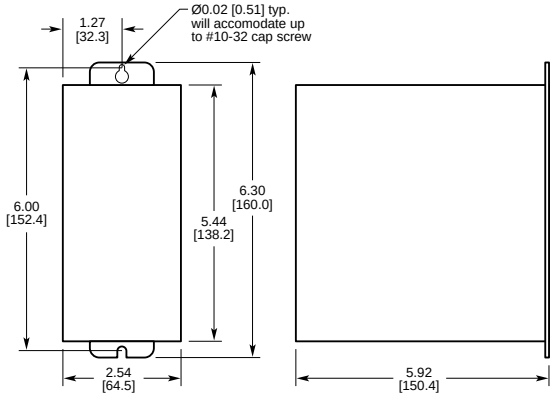


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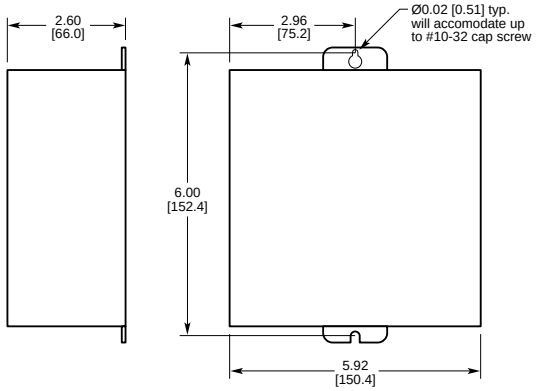
# Specifications

## Mounting Dimensions in [mm]

### Minimum Width (Standard)




### Minimum Depth (must order as an option)




# How To Order

| Model | Description |
|---|---|
| SmartStep | Single axis, 7.9 amp programmable microstepping drive/ control, operates from 120 VAC |
| SmartStep–240 | Single axis, 3.9 amp programmable microstepping drive/ control, operates from 240 VAC |
| SmartStep23 | Single axis, 3 amp programmable microstepping drive/ control, operates from 120 VAC |

| Option | Description |
|---|---|
| RS485 | RS–485 option |
| FP | Front Panel option |
| MD | Minimum Depth Option |
| DB25 | Includes DB25BO Breakout Board |

To confirm your selection, review the checklist on page G-6.

### SmartStep Accessories

| Model | Description |
|---|---|
| OPTO44 | OPTO breakout board (4I/4O). First 4 slots must be inputs; last 4 slots must be outputs. |
| OPTO88 | OPTO (8I/8O). First 8 slots must be inputs; last 8 slots must be outputs. |
| DB25BO | 25 pin D-Shell to screw terminal I/O connector for SmartStep |
| SS–IO | 25 pin D–Shell I/O cable |
| SS–RS232 | RS–232 cable for PC to SmartStep |
| SS-PNP-BO | 25 pin D-Shell to screw terminal adapter that converts outputs to PNP logic |
| PCS-5004 | PC to keypad RS-232 cable |

OPTO44 Position*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

OPTO88 Position*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |

Inputs

| Code | I/O Module Description |
|---|---|
| A | DC/AC In, 10-32 VDC, 12-32 VAC |
| B | DC In, TTL |
| C | DC In, 35-60 VDC |
| D | AC In, 90-140 VAC |
| E | AC In, 180-240 VAC |
| I | Input test switch |
| J | Analog In, 0–10 volts |
| K | Analog In, 4–20 mA |
| X | Empty |

Outputs

| Code | Output Module Description |
|---|---|
| F | DC Out, 5-60 VDC, 3 Amps |
| G | AC Out, 12-140 VAC, 3 Amps |
| H | AC Out, 24-280 VAC, 3 Amps |
| X | Empty |

* If no OPTO modules are desired, leave blank.



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