

Rack mounting stepper drives with AC or DC power input

SD Series drives are full/half and ministeping modules that offer high standards of performance for low to medium power applications. Delivering nominal currents of 2A, 3A and 5A, they provide the benefits of bipolar chopper operation at an economic price.

These rack-mounting modular drives are extremely flexible in terms of power supply requirements and motor compatibility. They may be powered directly from the secondary winding of an isolating transformer or from unregulated DC supplies. Motor current is programmable using simple jumper links on the card, with selectable automatic current reduction at standstill.

On standard drives the resolution is selectable between 200 and 400 steps/rev, whilst the SD15M offers four selectable resolutions up to 4000 steps/rev. This makes it the perfect choice for applications requiring smooth rotation over a wide speed range.

Step and direction pulses may be derived from a user-supplied pulse source, a rack-mounted indexer card, a standalone Parker indexer or an integral clock generator on the drive. The SD15M clock generator compensates automatically for resolution changes so that the preset shaft speed remains constant regardless of the selected resolution.

Features common to the entire SD range include short circuit protection across and between phases, overvoltage protection and a remote de-energise facility. Versions with an integral power dump are available - please see below for further details. A range of pre-wired rack systems is available to house SD Series drives together with optional indexers. Please refer to the information on rack systems later in this catalogue.

Regenerative power dump option

Applications which involve rapid deceleration of high-inertia loads may require that the drive is fitted with a power dump circuit. The SD15MD and WD versions have the same electrical specification as the SD15 but incorporate a power dump with a continuous rating of 15 watts (170 watts peak).

The MD or WD will be required if the deceleration time in seconds is less than $\{J\omega^2 - 0.3\}$ where ω is the maximum speed in revolutions per second and J is the total system inertia in Kg-m^2 . If the expression in brackets is negative, no power dump is required. The power dump is strongly recommended if a 106-size stepper motor is being used.



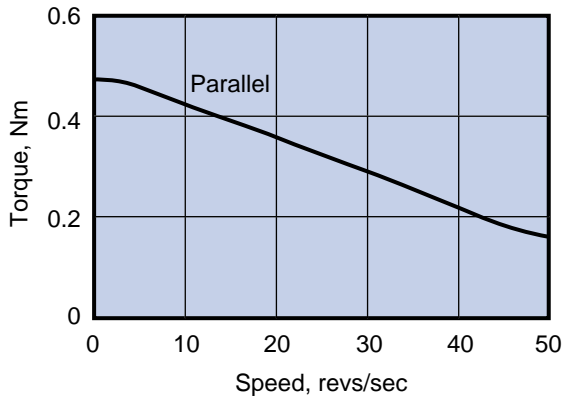
SD series features

- Bipolar switch-mode drive with integral oscillator
- High-reliability, surface mount design
- 60VDC motor supply for improved high-speed torque
- Selectable resolutions up to 4000 steps/rev
- Output current up to 5A per phase
- Operation from AC or DC supplies
- Phase-to-phase short circuit protection
- Motor current programmable by jumper links
- Selectable automatic current reduction at standby
- Regenerative power dump option
- Standard 3U rack mounting
- Compatible with standard 2/4 phase stepper motors

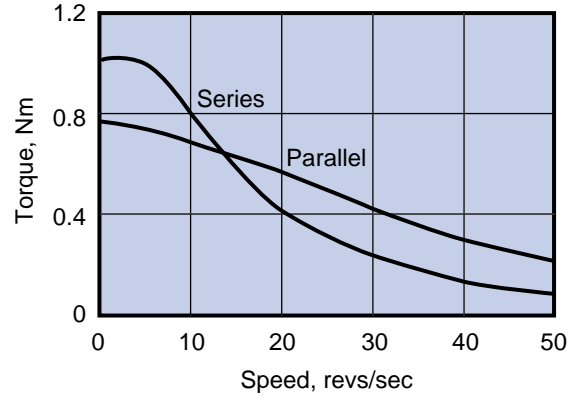
| <i>Parameter</i> | <i>Value</i> |
|---|--|
| Power | |
| Motor Supply Voltage | 18-0-18 to 44-0-44 VAC or 24 to 60 VDC |
| Motor Supply Current | SD12 - 1.5A, SD13 - 2.5A, SD15 & SD15M - 5A |
| Logic Supply Voltage | 18-0-18 VAC or +24 VDC at 350 mA max |
| Amplifier | |
| Type | Bipolar chopper |
| Motor Resolution (selectable) | SD12, SD13 & SD15 - 200 or 400 steps/rev SD15M - 400, 1000, 2000 or 4000 steps/rev |
| Short Circuit Protection | Phase-to-phase |
| Nominal Output Current | SD12 2A/phase, SD13 3A/phase, SD15 & SD15M 5A/phase Current may be set to lower values by jumpers |
| Maximum Stepping Rates | 10 kHz @ 200 step/rev, 20 kHz @ 400 step/rev (200 kHz @ 4000 step/rev for SD15M) |
| Nominal Chopping Frequency | 20 kHz |
| Edge Connector | 32-way DIN 41612 Type D |
| Physical | |
| Dimensions | See diagram |
| Rack mounting data | Front panel 14HP wide, 3U high (see optional panels below) |
| Weight | 200g |
| Command Interface | |
| SD Drive only | via SDC Opto Motherboard |
| Input Impedance/current | 4K7 to +12VDC 20mA max. |
| Input Logic Low Level | <2.0V TTL, <0.8V |
| Input Logic High Level | 10V to 12V or open circuit TTL, >3.5V |
| Clock (Step) Input | Low-going pulse, 10µS min. (2.5µS for SD15M) Differential TTL pulse, 10µS min. (1µS for SD15M) |
| Output Circuit | NPN open-collector, 25V OFF max, 15mA ON max. Isolated NPN open-collector, 12V OFF max, 5mA ON max. |
| Internal oscillator speed ranges | |
| SD12, SD13, SD15 | SD15M |
| Slow (not ramped) | 30–1000 steps/sec 3–130 rpm (independent of resolution) |
| Fast (ramped) | 600–20,000 steps/sec 60–3,000 rpm (independent of resolution) |
| Acceleration Time | 60 mS |
| Deceleration Time | 30 mS – acceleration and deceleration times may be increased by additional capacitor |
| Environmental | |
| Operating Temperature | 0° to 50°C |
| Storage Temperature | –40° to 85°C |
| Humidity | 0 to 95% non-condensing |
| Motors | |
| Type | 2 phase hybrid; 4, 6 or 8 leads |
| Minimum Inductance | 1 mH |
| Recommended induct. range | 1 - 10mH |
| Optional front panels | FP36 for SD12; FP37 for SD13; FP38 for SD15; FP48 for SD15M |
| Transformers | T0193 (300VA); T0194 (600VA) |

Typical performance data

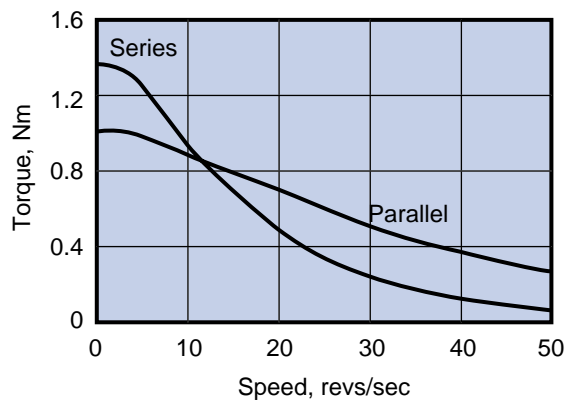
SD13 with ST57-51P motor



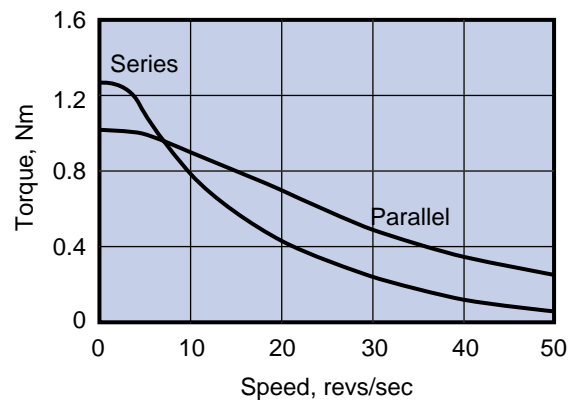
SD15 with ST57-83P motor



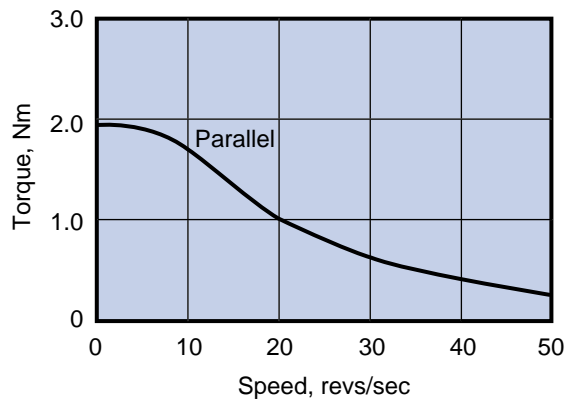
SD15 with ST57-102P motor*



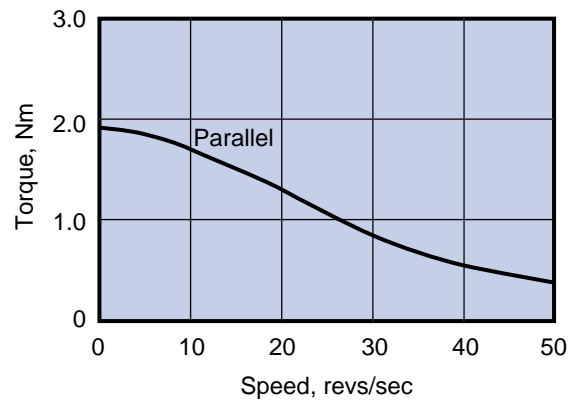
SD15 with ST83-62P motor



SD15 with ST83-93P motor

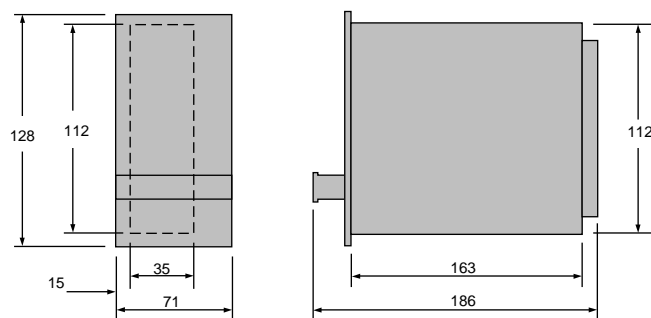


SD15 with ST83-135P motor



* Series connection available only on flying lead version of this motor

SD dimensions (mm)



A range of pre-assembled rack systems for SD and CD series stepper drives

To simplify the installation and commissioning of rack-mounted drive modules, Parker offer a range of pre-assembled rack systems to house up to six drives. The system is based on individual motherboards for each drive, with additional motherboards catering for power supplies and control cards. Each rack system is fitted with the appropriate number of motherboards according to the module complement, allowing all external connections to be made via screw terminals or plug-in connectors.

All assemblies are based on the standard Euro-rack system and are 3U high (132mm). Module and panel widths are always quoted in horizontal pitches (HP), the width of a standard rack being 84HP. For example, SD drive front panels are 14HP wide, so six panels will occupy the full rack width of 84HP.

All drive motherboards used in SC and CN series racks incorporate opto-isolation of the control signals, making them directly compatible with the Parker indexers listed later in this catalogue.

SC series racks for SD drives

The SD drive operates directly from an isolating transformer and therefore requires no separate power supply module. This allows up to six SD drives to be housed in a single SC series rack. When combined with IFX indexer cards, the maximum number of axes per rack is three.

CN series racks for CD drives

CD60M and CD80M drives require a separate PM2000CN power supply module, which is 24HP wide. This still allows room for six drives in a CN series rack since each drive front panel is only 10HP wide. When combined with IFX indexer cards, up to three axes can be accommodated in a single rack.

PM2000CN power supply module

The PM2000CN offers a convenient and economic method of powering CD series drives. All necessary components are included with the exception of the mains transformer which is mounted separately from the rack. The power module has an output current rating of 16A DC at a bus voltage of 120V. A regenerative power dump circuit is included, and the module comes complete with a 24HP front panel. The AC input to the PM2000CN may be single or three phase.



Transformers

There is a range of standard transformers available to power SD or CD series drives. The required transformer size depends partly on motor size, shaft power demand and duty cycle, however the quantities listed in the table form a useful guide. These are based on no more than half the axes being in motion at any one time.

All single-phase transformers may be operated from 115V and 230V supplies. Models TO181 and TO182 have four-winding primaries which also permit line-to-line connection on 400V 3-phase supplies.

Ordering information

SC and CN racks can be supplied as drive-only versions or for drives with indexer cards. Please refer to the order codes and select the appropriate rack according to the number of axes required. Standard rack systems do not allow for a mix of drives with and without indexer cards, however other combinations are available to special order. The rack order code refers to the rack assembly only; all plug-in drive modules, power supplies, front panels and transformers are ordered separately. When all parts are ordered at the same time, the rack will be supplied with all modules and front panels fitted.

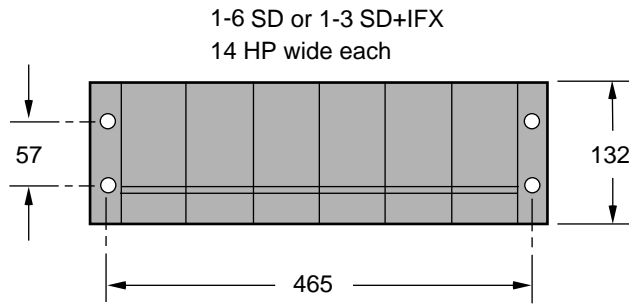
Order codes

SC: for SD drives
CN: for CD drives
Number of axes

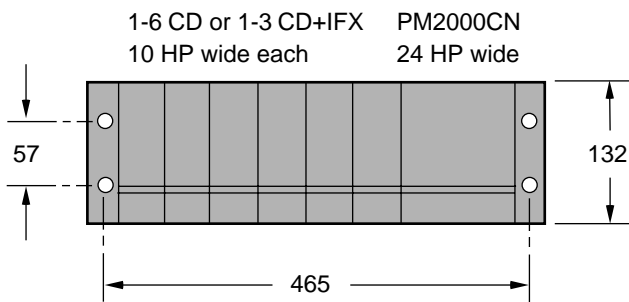
SC 1 0
0: drives only
2X/RS232C: drives with IFX indexer cards

Example - SC30: three SD drives

CN22X/RS232C: two CD drives with IFX cards

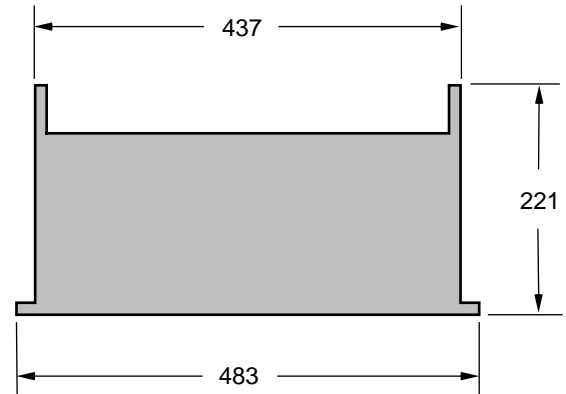


SC-Series Racks



CN-Series Racks

SC & CN rack dimensions (mm)



Top view, all types

Completing the rack

The table below shows the number of blank panels required for each rack type in order to cover control cards or empty slots in the rack.

| Rack type | Number of blank panels required | | |
|-------------|---------------------------------|------|------|
| | FP55 | FP39 | FP54 |
| SC10, SC12X | | 5 | |
| SC20, SC22X | | 4 | |
| SC30, SC32X | | 3 | |
| SC40 | | 2 | |
| SC50 | | 1 | |
| CN10, CN12X | 1 | | 2 |
| CN20 | | | 2 |
| CN30 | 1 | | 1 |
| CN40 | | | 1 |
| CN50 | 1 | | |
| CN22X | 2 | | 1 |
| CN32X | 3 | | |

Ordering front panels

Optional front panels are available for all drive modules as well as blank panels to cover control cards or unused spaces in the rack. Please note that these panels are not included with the drive and must be ordered separately if required.

| Panel type | Width | Part No. |
|------------|-------|----------|
| SD12 | 14HP | FP36 |
| SD13 | 14HP | FP37 |
| SD15 | 14HP | FP38 |
| SD15M | 14HP | FP48 |
| CD60M | 10HP | FP52 |
| CD80M | 10HP | FP53 |
| Blank | 10HP | FP55 |
| Blank | 14HP | FP39 |
| Blank | 20HP | FP54 |

Transformers for rack-mounting drives

| | Models for SD drives | | Models for CD drives | | | |
|------------------------|----------------------------------|----------------------------------|------------------------|------------------------|------------------------|-------------------------|
| | TO193 | TO194 | TO181 | TO182 | TO185 | TO186 |
| AC input range | 110-240v | 110-240v | 90-480v | 90-480v | 180-480v | 180-480v |
| Single/three phase | 1 | 1 | 1 | 1 | 3 | 3 |
| DC bus voltage | 60 | 60 | 120 | 120 | 120 | 120 |
| VA rating | 300 | 600 | 2600 | 1200 | 2500 | 5000 |
| Max. number of drives* | 3 x SD12 2 x SD13 1 x SD15 | 6 x SD12 4 x SD13 2 x SD15 | 8 x CD60M 6 x CD80M | 4 x CD60M 3 x CD80M | 8 x CD60M 6 x CD80M | 11 x CD60M 8 x CD80M |
| Dimensions w x d x h | 117x117x181 | 126x168x212 | 172x215x261 | 135x195x234 | 302x132x319 | 380x140x359 |
| Weight kg | 3.5 | 7.5 | 25 | 16 | 34 | 50 |

* Assumes 50% duty cycle. Larger numbers of drives may be accommodated at lower duty cycles