

E-520 MOTION CONTROLLERS  
INSTALLATION AND WIRING INSTRUCTIONS

E-521 : BASIC CARD CRATE for 3 SDM Motor Drivers
E-521-3 : ADDITIONAL CRATE for 3 SDM Motor Drivers

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(Edition February 89)

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## 1. GENERAL INFORMATION

The E-521 Card Crate is a basic building bloc of every E-520 Motion Controller intended to drive 2-phase step-motors. It is build as an open frame, light metal card housing with a printed circuit back-panel wiring. It has provision for up to 6 logic modules of the PINX-E family and up to 3 SDM drivers (Distributor: SELECTRON, LYSS Switzerland).

Two driver models are available:

SDM 51: 3.5 A/phase, 36 V unipolar driver (for motors with center-tapped phase windings),

SDM 50: 7 A/phase, 60 V bipolar driver.

Both models are micro-stepping units with selectable step division ratios, see sect. 4.4.

If more than 3 axes are to be controlled, an additional crate, E-521-3, will extend the capability to 6 axes, the maximum supported by a single PINX-E Main Unit.

The E-521 crate is built according to the protection degree IP00; it is intended to be mounted with its power supply and associated electrical gear into a sheet metal enclosure or in a protected area, such as the basement of the controlled machine.

If the surrounding temperature exceeds 40 C and/or the drivers are used at high current or at high duty cycle, a forced air circulation is required around the drivers. The crates must then be fitted with the blower unit E-525.

The drawing Nb 334 gives the mounting dimensions.

All external wiring is done by pluggable screw terminals.

## 2. PINX-E MODULES

The PINX-E modules plug into the right part of the crate. The MAIN UNIT and the AXIS EXTENSION have dedicated slots 1 and 2, see Drawing Nb 330. The 4 slots fitted with single line DIN 41612 connectors can accomodate different PINX-E modules. Several printed wiring peculiarities restricts the module arrangement.

### I/O INTERFACE:

The low address range (IN/OUT[0] to IN/OUT[31]) is available in slots 3 and 5.

The high address range (IN/OUT[32] to IN/OUT[63]) is available in slots 4 and 6.

The 5 V-Supply to the I/O INTERFACE is delivered by the MAIN UNIT.

#### BEE-CARD MODULE:

If the digital-to-analogue converter of the BEE-CARD MODULE comes to use, the module must be plugged into slot 3. The analogue output will then be available at terminal 21 of the mother board. The analogue input to ADC[3] of the AXIS EXTENSION is no more available.

The 5 V-Supply for the BEE-CARD MODULE is delivered by the MAIN UNIT.

#### SERVO ADAPTER:

The SERVO ADAPTER can be plugged into any one of the slots 3 to 6. The SERVO ADAPTER has its own on board regulated supply.

The whole PINX-E card complement is powered by an unregulated 24 V supply, + 24 V at terminal 1 and return wire at terminal 2 of the mother board. This supply is fused on the mother board by a 1.6 A, 5 x 20 mm fuse.

### 3. LOGIC CONNECTIONS, TERMINAL DESCRIPTION

- Term 1: + 24 Volt Supply input.
- Term 2: Supply Return. This terminal is the 0 Volt potential for all logic circuits.
- Term 3: Fused + 24 V Supply, intended to power the operator panel.
- Term 4: TXD, Transmit signal (out of the MAIN UNIT) of the RS 232 serial link. The pull-down resistor is connected to TXD through the mother board wiring, refer to the MAIN UNIT Product Specifications.
- Term 5: Supply Return from the operator panel. This terminal is internally connected to terminal 2.
- Term 6: RXD, Recieve signal (into the MAIN UNIT) of the RS 232 serial link. It will be good practice to use a shielded cable for the serial link, terminals 3 to 6.
- Term 7: Fused 24 Volt, intended to be used as a common return to the limit switches.
- Term 8: LSNO, Limit switch for axis 0, negative direction.
- Term 9: LSP0, Limit switch for axis 0, positive direction.

The limit switches must be normally closed switches or proximity switches with N.C. function. The return of the switches must be at +24 V, terminal 7. For more information, see the MAIN UNIT Product Specifications.

./.



Term 10

to 19: Limit switches for the axes 1 to 5. Note, that the axes 3,4 and 5 implemented in the additional crate have their limit switches on the main crate. The terminals 8 to 19, when not used as limit switches, are available as regular inputs.

Optical coupling is not provided on LSN and LSP inputs.

Term 20: Analogue Ground. When analogue inputs or outputs come to use, the analogue circuit return must be made here.

Term 21: Analogue input to ADC[3] of the AXIS EXTENSION.

Input range: 0 to + 5 V.

Analogue output, DAC of the BEE-CARD MODULE.

If the DAC is used, ADC[3] will read the output of the DAC.

Term 22: Analogue input to ADC[2], 0 to 5 V

Term 23: Analogue input to ADC[1], 0 to 5 V

Term 24: Analogue input to ADC[0], 0 to 5 V

Term 25: Analogue input to ADC[8], (MAIN UNIT), 0 to 5 V

Term 26: + 5 V source for potentiometers, max. drain 5 mA

Term 27: Driver fault, positive terminal

Term 28: Driver fault, negative terminal, see sect.4.4.

## 4. THE SDM DRIVERS

### 4.1. Inputs to the Drivers

All inputs of the SDM drivers are optically coupled, a feature which allows voltage drops in the supply wiring and a supply not directly referenced to the common system ground.

The pulse and direction signals are discussed in details in the "MAIN UNIT Product Specifications". Please note, that the /FBi outputs of the motion generators are wired to the drivers.

The booster command (/BSTi of the motion generators) can be directed to the pins c2 or c6 of the drivers by means of the jumper "BOOSTER/SHUT DOWN" on the mother board. In the booster position, the phase current increases by the selected amount if the /BST input is activated, sect. 4.2. To obtain automatic current boost during the ramps, the booster must be enable by the programme. The booster function works with the SDM 50 driver only.

If a shut-down function is required (0 motor current), set the correct jumper and disable the booster function; the /BST can then be used as a regular output.

## 4.2. Settings, SDM 50 Drivers

Three screw-driver actuated multiposition switches are intended to set the phase current, the boost factor and the stepping angle.

According to the manufacturer's data, the current in Table 4.2. is given a RMS value. Positions 8 to F of switch B provide automatic 50 % current reduction (economy) at zero stepping rate.

The table 4.2. gives the number of pulses required for a full motor revolution, assuming a standard hybrid motor with 200 full steps per revolution. Positions B to F have no practical significance.

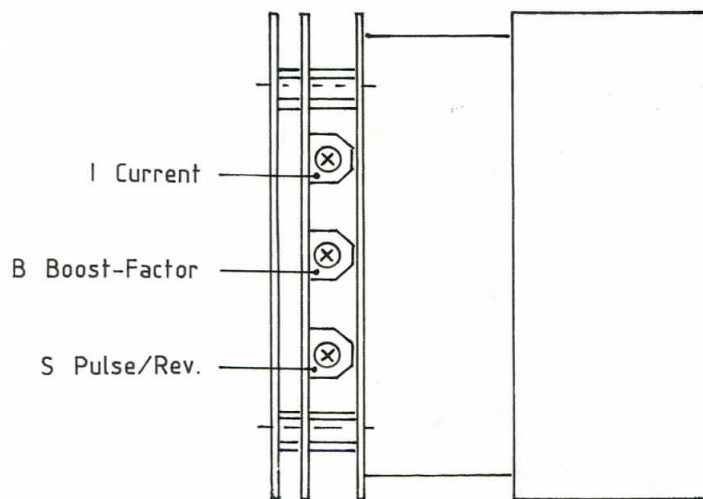


Figure 4.2.:  
SDM 50

Table 4.2.

Position	Switch I A rms	Switch B Boost Factor	Switch S Pulse/Rev.
0	0,5	1,0	N.A.
1	0,8	1,25	2000
2	1,1	1,5	1000
3	1,4	1,75	2000/3
4	1,7	2,0	500
5	2,0	2,25	400
6	2,3	2,5	1000/3
7	2,6	2,75	2000/7
8	2,9	1,0 E	250
9	3,2	1,25 E	2000/9
A	3,5	1,5 E	200
B	3,8	1,75 E	
C	4,1	2,0 E	
D	4,4	2,25 E	
E	4,7	2,5 E	
F	5,0	2,75 E = Economy	

### 4.3. Settings, SDM 51 Drivers

The SDM 51 driver has one 16-position switch to set the phase current and one to set the stepping angle, see 4.3. for more details. With the slide switch in the upper position, the current is reduced by 50 % at zero stepping rate.

Table 4.3.

Pos.	Switch I A rms	Switch S Pulse/Rev.
0	0,5	N.A.
1	0,8	2000
2	1,1	1000
3	1,4	2000/3
4	1,7	500
5	2,0	400
6	2,3	1000/3
7	2,6	2000/7
8	2,9	250
9	3,2	2000/9
A	3,5	200
B	3,8	
C	4,1	
D	4,4	
E	4,7	
F	5,0	

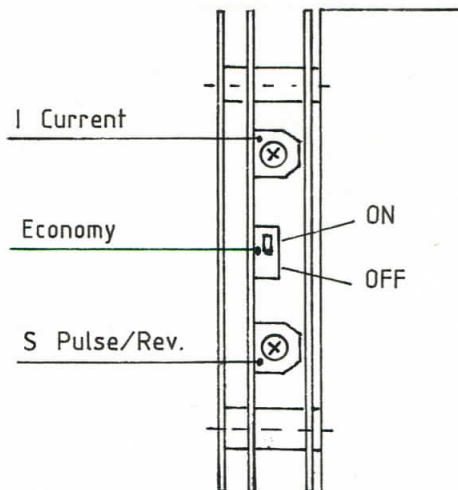


Figure 4.3.  
SDM 51

### 4.4. Fault Indication

SDM drivers have circuitry to detect short-circuit conditions at the motor terminals, over-voltage and over-temperature. The LED indicator is lit and the fault output is activated. The fault output is optically coupled and is available (all drivers of the crate ORed) at terminals 27 and 28 for the main crate E 521 and at terminals 29 and 30 for the additional crate E-521-3. Terminal 27 (or 29) is the collector of the output transistors and may be connected at + 24 V; terminal 28 (or 30) is the emitter and may be connected to any input of the system.

### 4.5. Supply and Motor Wiring

The motor supply wiring is straight forward, see Drawing Nb 330. The supply voltage range is 18..60 V for the SDM 50 and 18 ..40 V for the SDM 51. The motor supply must be wired to the UM terminals with the return at the 0 V terminals. For convenience, the supply rails of the drivers can be tied together on the mother board, just solder wire bridges, see Drawing 330.

The E-523 Power Supply can be used to power SDM 50 and SDM 51 in any mixed configurations.

The motor windings are designated A1, A4 and B1, B4. The direction of rotation may be changed by exchanging A1 and A4 (or B1 and B4.) When using SDM 51 unipolar drives, the center-tap of the motor windings must be connected to A23 and B23 according to Drawing 330.

The required wire gage for the motor depends upon the current and the length of the line: 1 to 1.5 mm<sup>2</sup> is generally sufficient. Twisted pairs are strongly recommended for each phase.

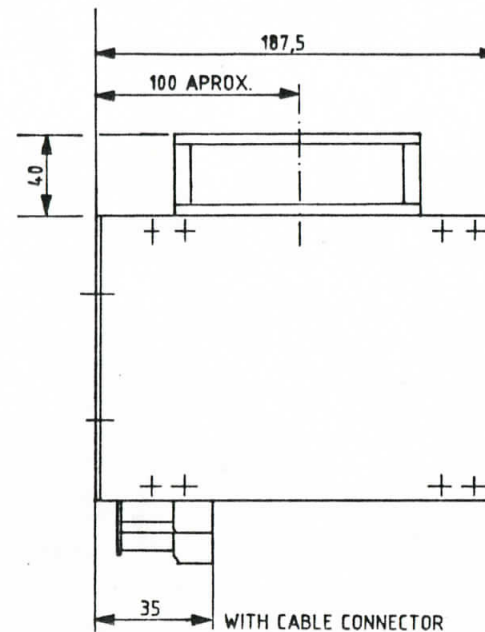
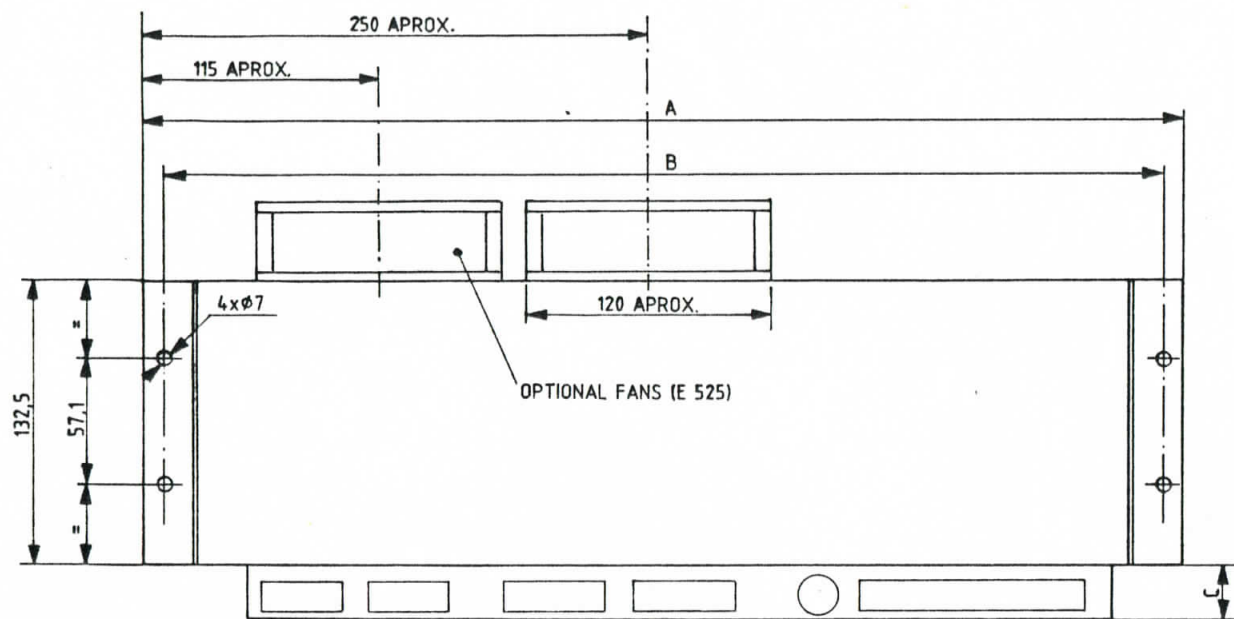
## 5. USING THE ADDITIONAL CRATE E-521-3

The additional crate is connected to the main mother board by a single cable delivered with the E-521-3. Please, specify the length of the cable when ordering.

The motor and supply wiring are very similar to the wiring discussed above. Please, refer to Drawing Nb 361.

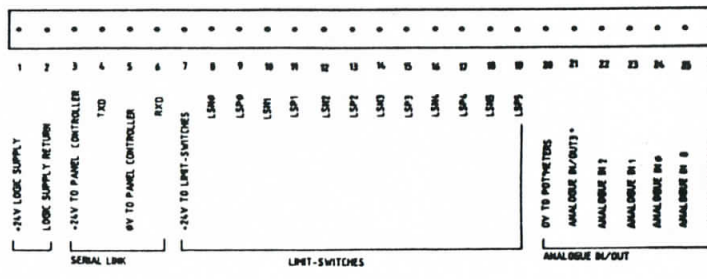
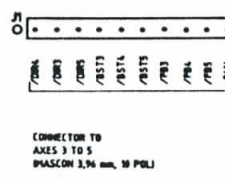
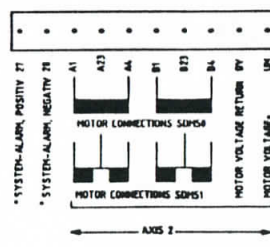
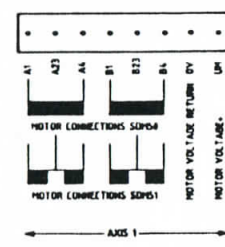
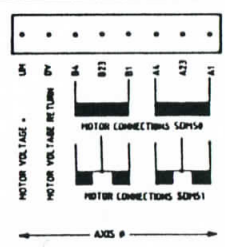
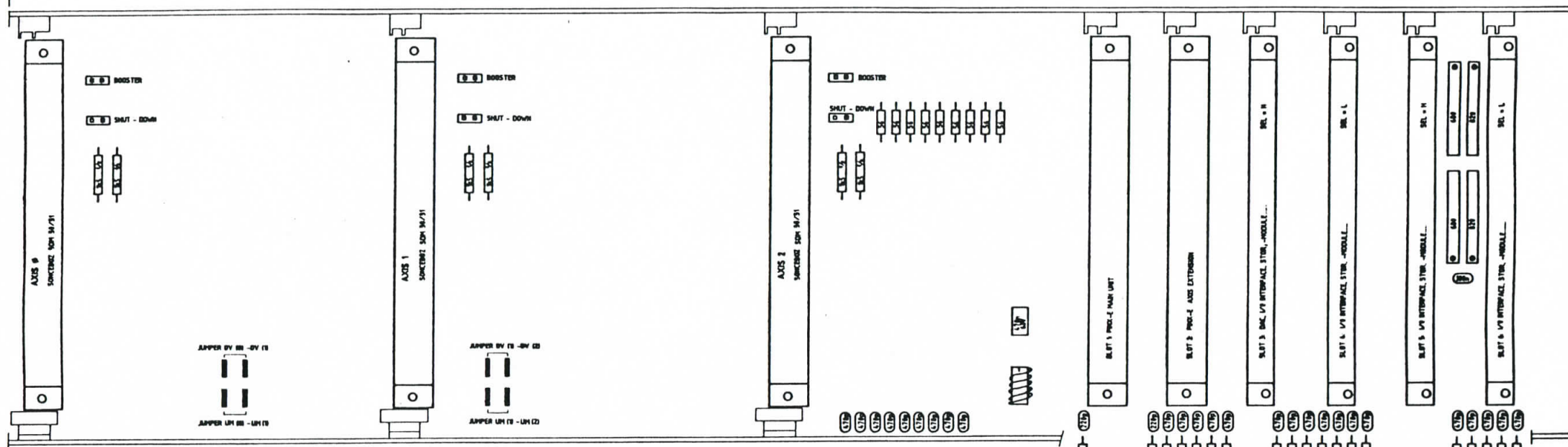
The fault detection output, terminals 29 and 30, is usually wired with the fault output of the main crate; 29 connected to 27 and 30 to 28.





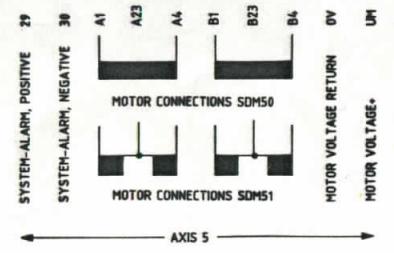
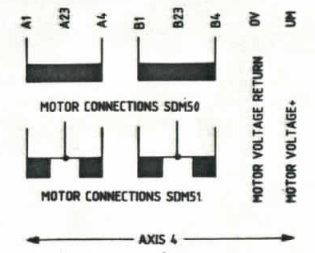
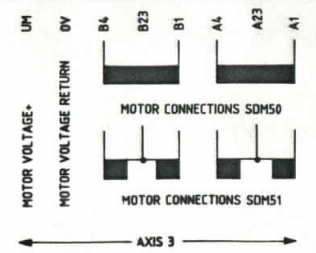
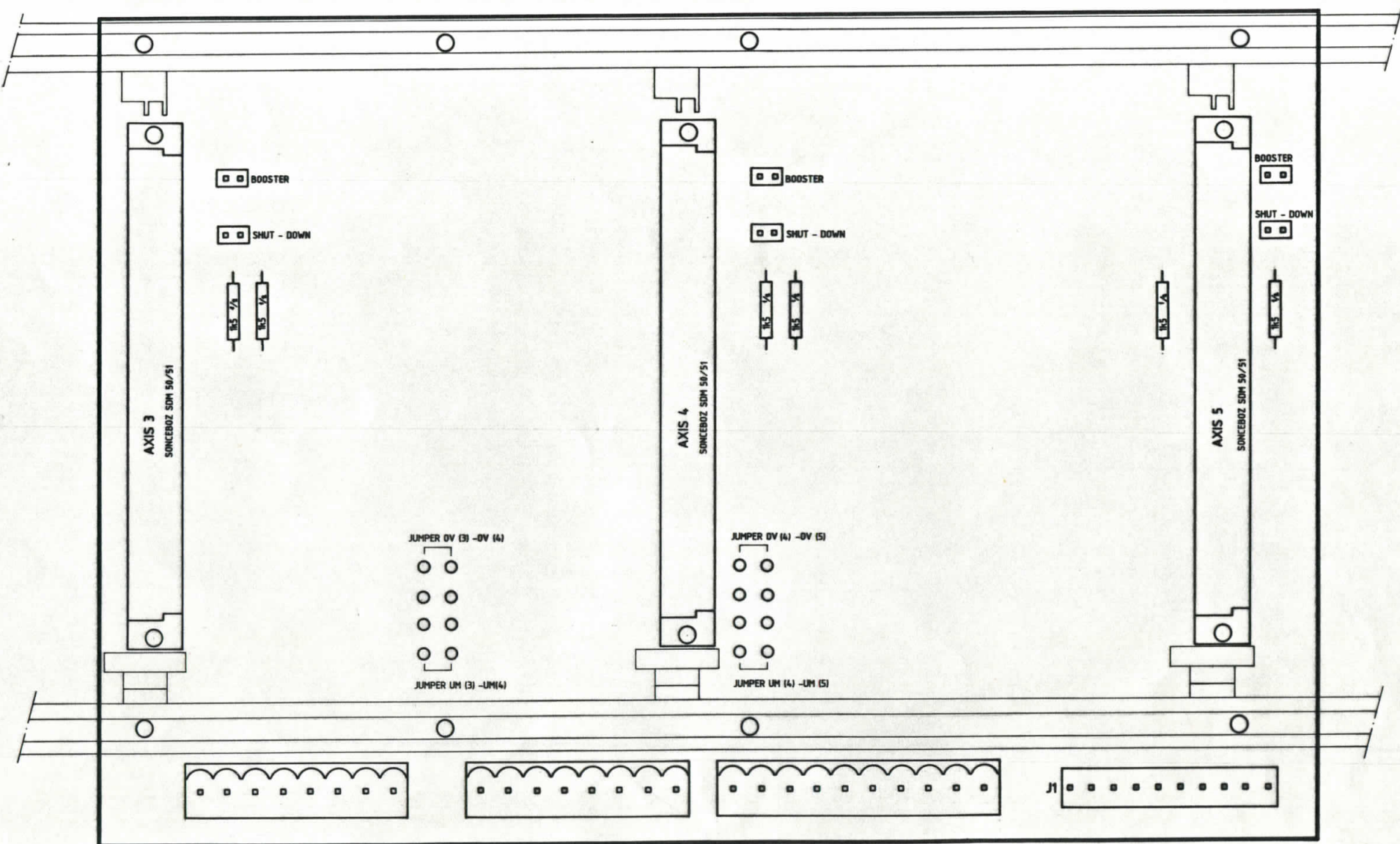
MODEL and DRIVERS	A	B	C
E520, Crate for 4 Zebotronic	482	465	18
E520-2, Add. Crate for 2 Zebo.	197.5	180.5	18
E521, Crate for 3 SDM 50/51	482	465	18
E521-3, Add. Crate for 3 SDM 50/51	339.5	322.5	18
E522, Crate for 4 Berger Drivers	482	465	28
E522-2, Add. Crate for 2 Berger	197.5	180.5	28





\*AXES 0 TO 2 WIRE-DRIVE

\*1 M3 IS NOT AVAILABLE IF A DAC IS USED  
REFER TO GRATE DESCRIPTION



PINX - E, CRATE TYPE 521-3 (DRIVERS SDM 50/51) 361  
 PC BOARD E521-3 /8833  
 E.I.P. SA CH - 1667 ENNEY