

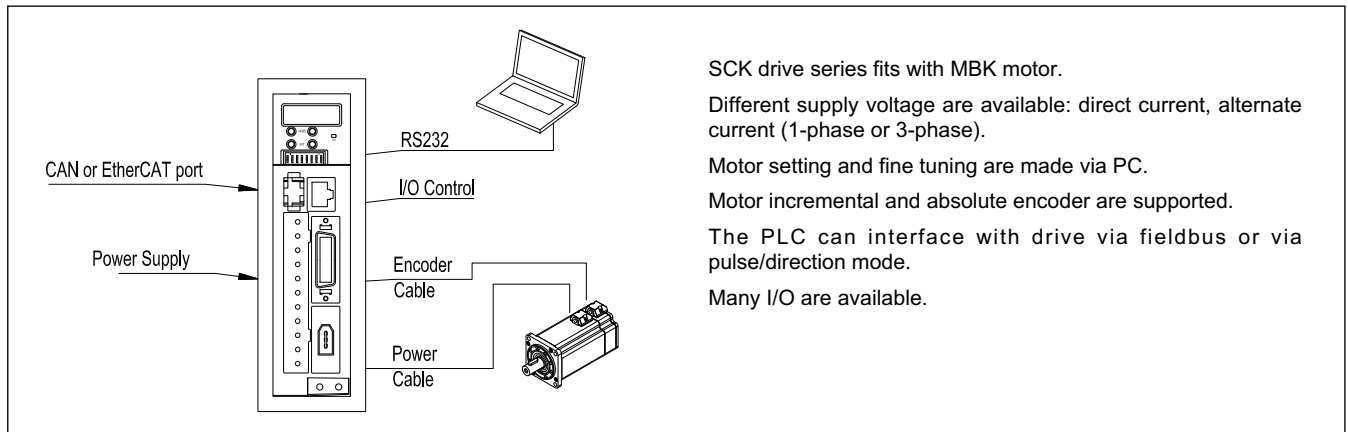


SCK*

SERVO CONTROLLERS FOR BRUSHLESS MOTORS

SERIES 10

DESCRIPTION



TECHNICAL CHARACTERISTICS

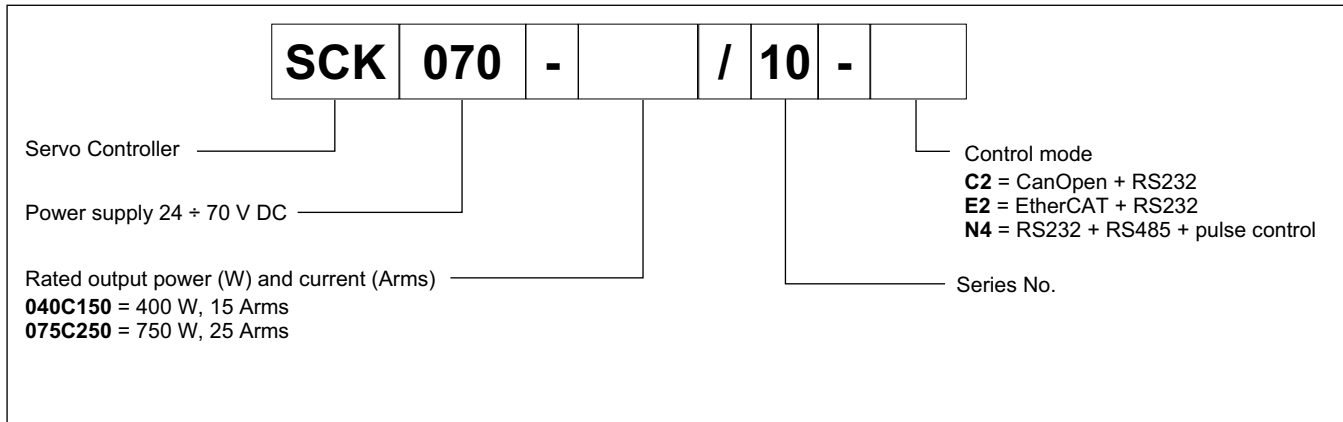
| | | SCK070-040 | SCK070-075 | SCK230-075 | SCK230-150 | SCK400-300 |
|-------------------------------------|------------|--|-----------------|---------------------------------------|-----------------------------------|---------------------|
| Main supply voltage | | 24 +70 V DC need fuse | | single-phase 230 V AC | 1-phase or 3-phase 230 V AC | 3-phase 400 V AC |
| Logic supply voltage | | 18 + 30 V DC, 1 A | | 200/240 VAC ±10% 50/60 ±3 Hz, 0,5A | 18 + 30 V DC, 1 A | |
| Output current: rated peak | A rms A | 12 (NOTE) 48 | 20 (NOTE) 80 | 3.9 15 | 11 27.5 | 7 25 |
| Feedback input (encoder) | | 5V incremental | | Multi-turn absolute | 5V incremental | |
| Brake chopper | | external | | | | |
| Control mode | | position, speed or torque | | | | |
| Interfaces | | RS232 plus RS485/Modbus, CANOpen, or Ethercat | | | | |
| Cooling method | | natural cooling | natural cooling | fan | fan | fan |
| Relative humidity | % | 5 +90 (Non-condensing) | | | | |
| Rated working altitude | m | Up to 1000. Above 1000: decreasing 1.5% per 100m rise. Max altitude 4000 | | | | |
| Electromagnetic compatibility (EMC) | | according to 2014/30/EU standards (?) | | | | |
| Operating temperature range | °C | 0 + 40 | | | | |
| Protection degree | | IP20 | | | | |
| Mass | kg | 0.3 | 0.6 | 0.8 | 2.4 | 2.4 |

NOTE: with auxiliary radiator: SCK*040 15 A; SCK075 25 A)



1 - SERVOCONTROLLERS FOR BRUSHLESS MOTOR DC

1.1 - Identification code

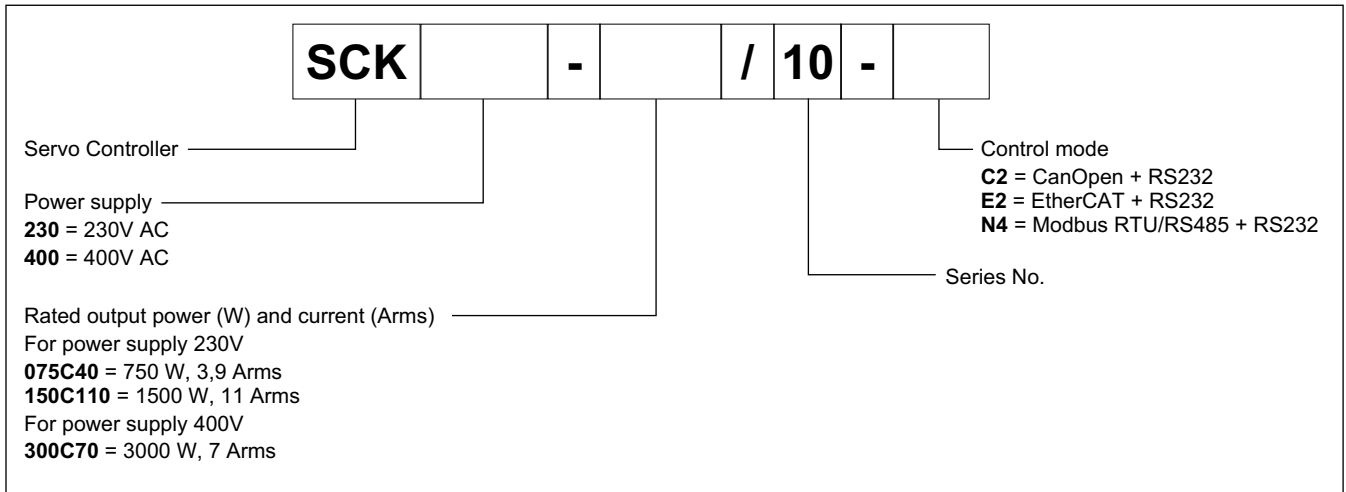


1.2 - Technical characteristics

| | | SCK070-040 | SCK070-075 |
|----------------------------------|------|--|------------|
| Main supply voltage | | 24 ÷ 70 V DC | |
| Brake chopper threshold | V DC | 73 ± 2 (Default value, adjustable via software) | |
| Over-voltage alarming threshold | V DC | 83 ± 2 | |
| Under-voltage alarming threshold | V | 18 ± 2 | |
| Digital input specification | | 4 digital inputs, common COM1 end, high level: 12.5 ÷ 30 V DC, low level: 0 ÷ 5V DC, max frequency: 1kHz; input impedance: 5 kohm (The brake motor driver is a 3 digital inputs) | |
| Digital input function | | Define freely according to requirement, supporting : driver enable, driver fault reset, driver mode control, speed loop proportional control, positive limit, negative limit, homing signal, reverse command, internal speed section control, internal positive section control, quick stop, start homing, active command, switch electronic gear ratio, switch gain | |
| Digital output specification | | 2 digital outputs, brake motor driver is 1 digital signal output | |
| Impulsive control | | Pulse + direction, CCW+CW, phase A+phase B (5 ÷ 24V) Note: SCK*N4 only support this function. | |
| Digital output function | | Define freely according to requirement, supporting following functions: driver ready, driver fault, position reached, motor zero speed, motor brake, motor speed reached, Z signal, maximum speed obtained in torque mode, motor brake, position limiting, reference found. | |
| Protection functions | | Over-voltage protection, under-voltage protection, motor over-heat protection(I ² T), short-circuit protection, drive over-heat protection, etc. | |
| RS232 | | Default baudrate setting is 38400,the max. baudrate is 115.2 kHz, use the software to communicate with PC, or via free protocol to communicate with controller. | |
| Modbus/RS485 | | max. baudrate is 115.2KHz, use Modbus RTU protocol to communicate with controller | |
| Canopen | | Support maximum 1MHz baudrate. Communicate with controller via CANopen protocol | |
| EtherCAT | | Support CoE(CiA402 protocol) and CSP/CSV/PP/PV/PT/HM mode. Communication speed 100M | |
| Storage temperature | °C | -10 ÷ 70 | |
| Installation environment | | Installed in a dust-free, dry and lockable environment (such as in a electrical cabinet) | |
| Installation mode | | vertical | |
| Atmospheric pressure | kpa | 86 ÷ 106 | |

2 - SERVOCONTROLLERS FOR BRUSHLESS MOTOR AC

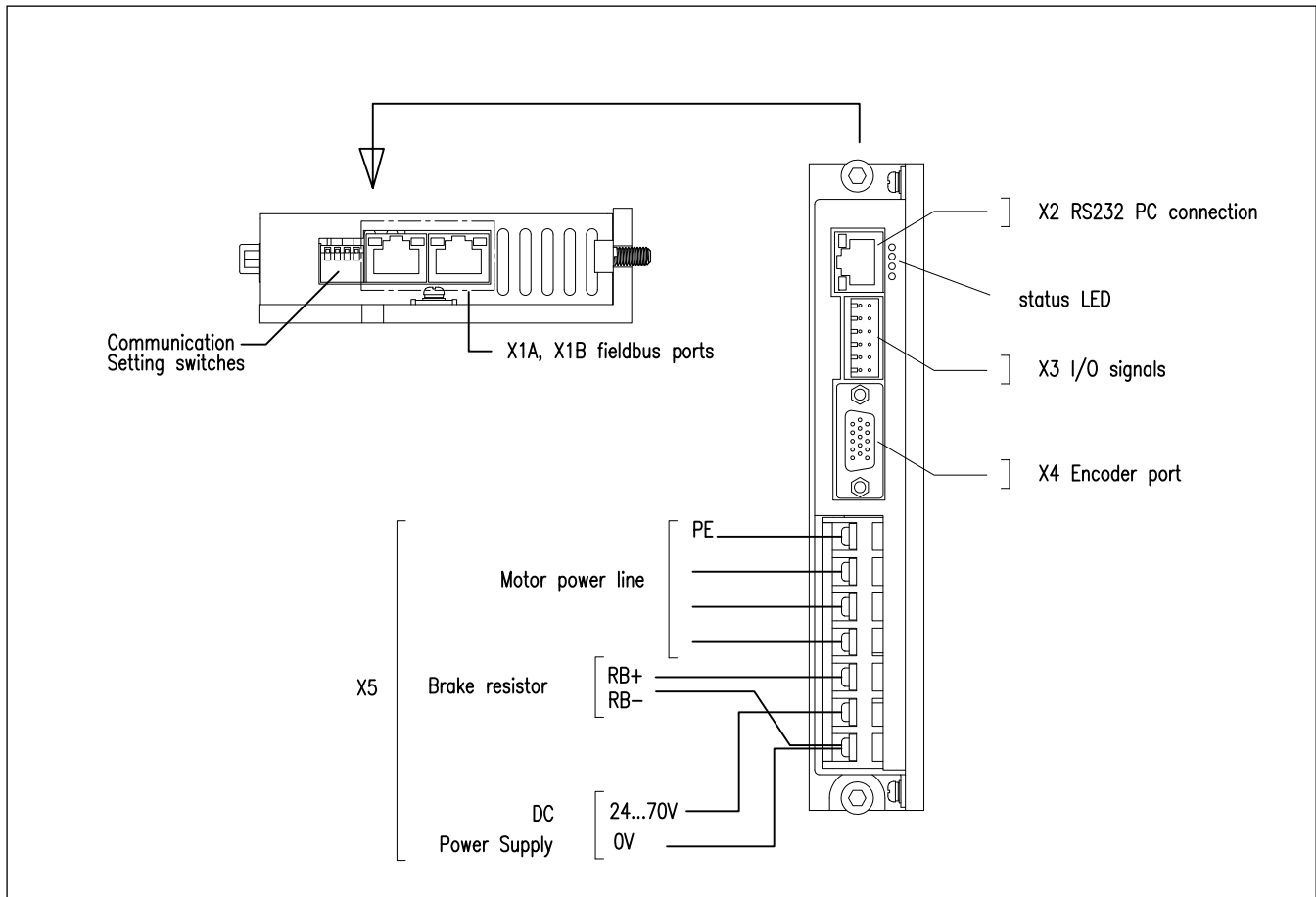
2.1 - Identification code



2.2 - Technical characteristics

| | | SCK230-075 | SCK230-150 | SCK400-300 |
|----------------------------------|------|---|--|---|
| Main supply voltage | | Single-phase, 200/240 V AC ±10% 50/60 ±3Hz, | 3-phase AC 220 V -20/+15% 47 ÷ 63 Hz | Single-phase or 3-phase AC 380 V -20/+15 % 47 ÷ 63 Hz |
| Control circuit voltage | | 200/240 V AC ±10%, 50/60Hz ± 3Hz, 0,5A | 18 ÷ 30V DC 1A | |
| Brake chopper threshold | V DC | 380 ±5 | | |
| Over-voltage alarming threshold | V DC | 400 ±5 | | |
| Under-voltage alarming threshold | V DC | 200 ±5 | | |
| Digital input specification | | 7 digital inputs, with COM1 terminal for PNP (high level valid 12.5V 30V) or NPN (low level valid) connection | | |
| Digital input function | | Define freely according to requirement, supporting: driver enable, driver fault reset, driver mode control, proportional control, positive limit, negative limit, homing signal, reverse command, internal speed section control, internal positive section control, quick stop, start homing, active command, switch electronic gear ratio, switch gain. SCKA230 only: position table function, clear pulse function. | | |
| Digital output specification | | 5 digital output, see pinout | | |
| Digital output function | | Define freely according to the requirement, supporting following functions: driver ready, driver fault, position reached, motor at zero speed, motor brake, motor speed reached, Z signal, maximum speed obtained in torque mode, motor lock, position limiting, reference found. | | |
| Analog input | | - | 2 analog inputs -10V ÷ 10V, for speed control and torque control | |
| Encoder signal output function | | Output 5V motor A, B and Z signals, frequency division output range 0 - 65536 for multi-axis synchronization, maximum output frequency 2 MHz. | Output encoder signal is optional, can be used in the multiple axes synchronization, the maximum output frequency is 2MHz. Motor A, B, Z signal, plus signal (PLS+DIR, CW/CCW, A+B) Do not support this function if the driver is matched with 16 bit multi-turn encoder or 20 bit single-turn encoder | |
| Protection functions | | Over-voltage protection, under-voltage protection, motor over-heat protection (I2T), short-circuit protection, drive over-heat protection, etc. | | |
| Storage temperature | °C | -10 ÷ 70 | | |
| Installation environment | | Installed in a dust-free, dry and lockable environment (such as in a electrical cabinet) | | |
| Installation mode | | Install vertically or horizontally | | |
| Atmospheric pressure | kpa | 86 ÷ 106 | | |

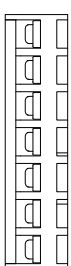
3 - WIRING DIAGRAM AND PIN TABLES FOR SCK070



3.1 - LED

| LED | Colour | Function |
|-----|--------|--|
| BUS | green | When message is transmitted on CAN bus, LED is blinking. Blinking frequency is related with transmission speed |
| PWR | red | Driver power on |
| RUN | green | When driver is ready, LED is blinking. Related with OUT3 |
| ERR | red | When driver is on error state, LED is blinking. Related with OUT4. |

3.2 - X5 Power and motor connection



| Pin | Values | Function |
|----------|------------|-------------------------------|
| PE | | Motor power line |
| W | | |
| V | | |
| U | | |
| RB - | | Brake resistor |
| DC- | 24-70 V DC | Main supply voltage/Brake ref |
| DC+ /RB+ | 0V | |

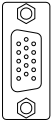
3.3 - X2 serial port line RS232: PC connection

PC software port for parameter setting and monitor status



| Pin | Values | Function |
|-----|--------|---------------|
| 1 | NC | Reserved |
| 2 | NC | |
| 3 | TX | Transmit data |
| 4 | GND | Signal ground |
| 5 | RX | Received data |
| 6 | NC | Reserved |
| 7 | NC | |
| 8 | NC | |

3.4 - X4 ENCODER port



| Pin | Values | Function |
|-----|--------|-----------------------------|
| 1 | 5V+ | Power Supply Voltage Output |
| 2 | GND | Encoder signal ground |
| 3 | NC | - |
| 4 | U | Encoder phase input signals |
| 5 | /U | |
| 6 | Z | |
| 7 | B | |

| Pin | Values | Function |
|-----|--------|-----------------------------|
| 8 | A | Encoder phase input signals |
| 9 | W | |
| 10 | V | |
| 11 | /Z | |
| 12 | /B | |
| 13 | /A | |
| 14 | /W | |
| 15 | /V | |

3.5 - X3 I/O DIGITAL SIGNALS port

Communication connection type C2 (CAN Open) and type E2 (EtherCat),



| Pin | Values | Function |
|-----|--------|-----------------------|
| 1 | 24V+ | Logic power supply |
| 2 | 24V- | |
| 3 | NC | - |
| 4 | NC | - |
| 5 | OUT1+ | Digital output signal |
| 6 | BR+ | Brake output |
| 7 | COMI | Input common terminal |
| 8 | IN1 | Digital input signals |
| 9 | IN2 | |
| 10 | IN3 | |
| 11 | BR- | Brake output |
| 12 | COM0 | Output common |

Communication connection type N4 (RS 485 + pulse control)

| Pin | Values | Function |
|-----|--------|--|
| 1 | PUL+ | Pulse input signals 3.3 + 24V Max freq.500 kHz |
| 2 | PUL- | |
| 3 | DIR+ | |
| 4 | DIR- | |
| 5 | OUT1+ | Digital output signal |
| 6 | BR+ | Brake output |
| 7 | COMI | Input common terminal |
| 8 | IN1 | Digital input signals |
| 9 | IN2 | |
| 10 | IN3 | |
| 11 | BR- | Brake output |
| 12 | COM0 | Output common |

3.6 - X1 FIELDBUS network communication ports

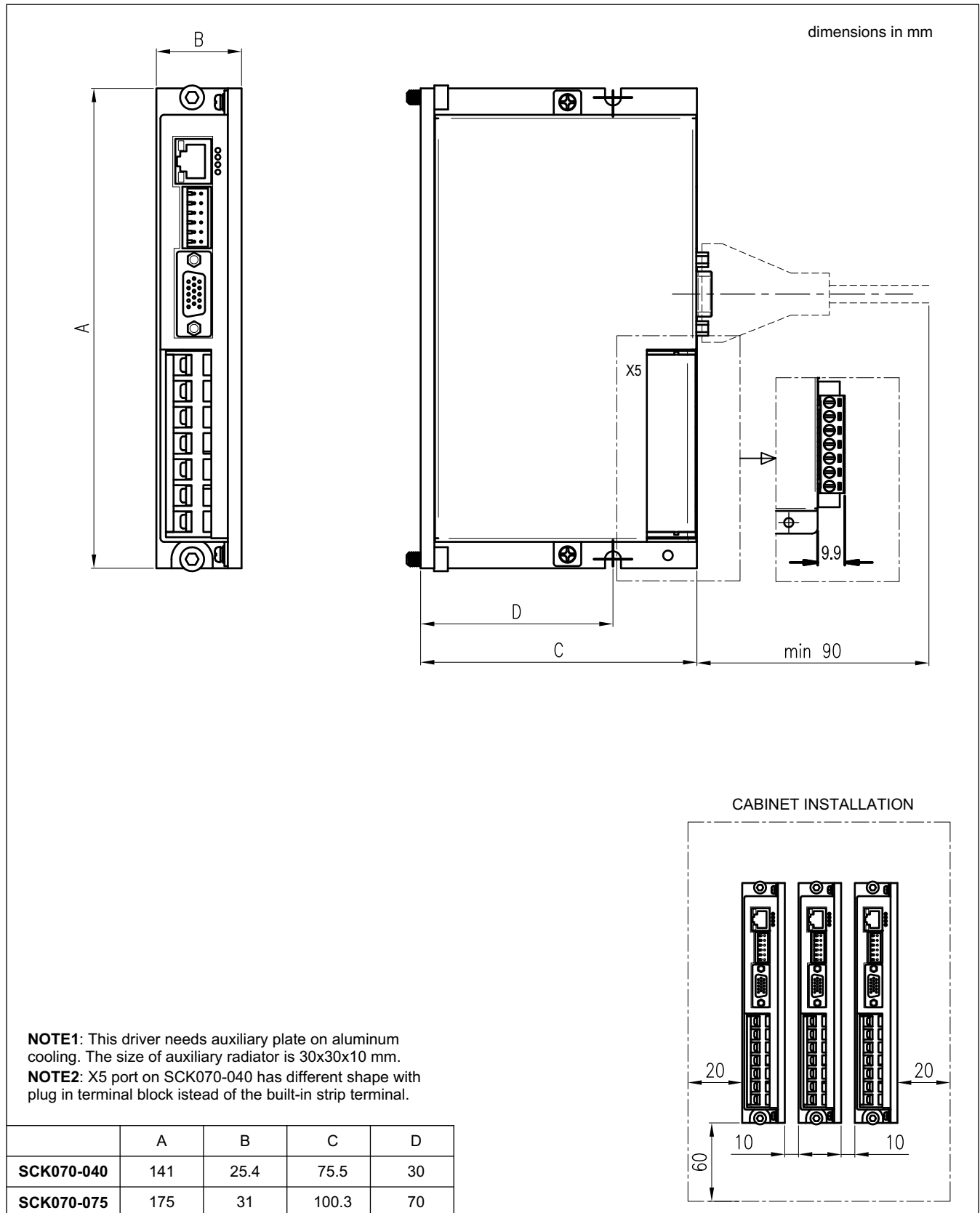
3.6.1 - for C2 (CAN Open) X1A (IN), X1B (OUT)

| Pin | Values | Function |
|-----|---------|---------------------------|
| 1 | CAN_H | Bus line (high) |
| 2 | CAN_L | Bus line (low) |
| 3 | CAN_GND | Signal zero for data line |
| 4 | NC | Do not connect |
| 5 | CAN_L | Bus line (low) |
| 6 | NC | Do not connect |
| 7 | NC | Do not connect |
| 8 | NC | Do not connect |

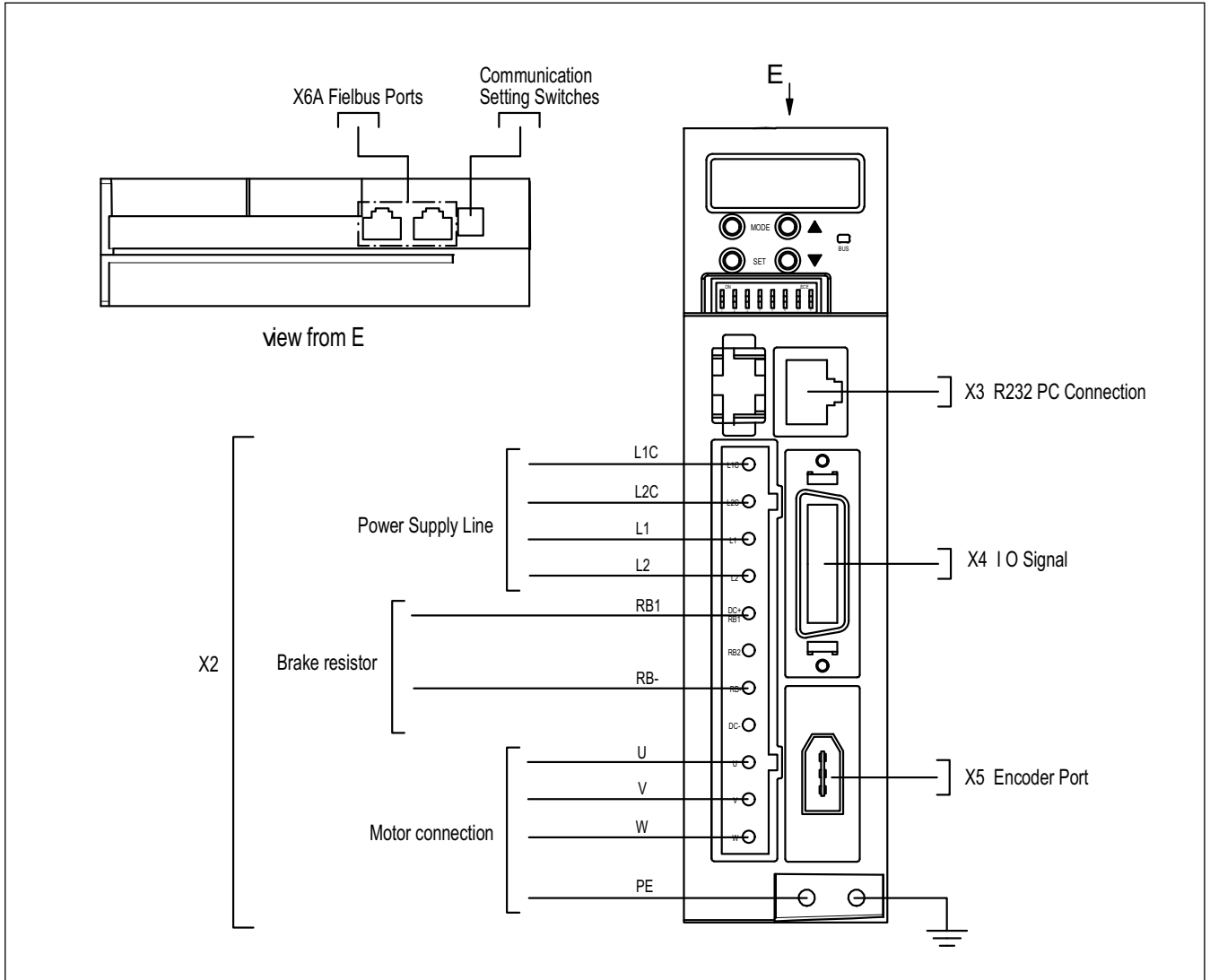
3.6.2 - for E2 (Ethercat) X1A (IN), X1B (OUT) RS485

| Pin | Values | Function |
|-----|--------|----------|
| 1 | TD+ | |
| 2 | TD- | |
| 3 | RD+ | |
| 4 | NC | |
| 5 | NC | |
| 6 | RD- | |
| 7 | NC | |
| 8 | NC | |

4 - SCK070 OVERALL AND MOUNTING DIMENSIONS



5 - WIRING DIAGRAM AND PIN TABLES FOR SCK230-075

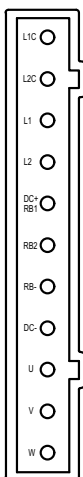


5.1 - X1 Reserved port

This port is not used, and is closed on some versions.

5.2 - X2 Power and motor connection

port type 11P 7.5 mm plugging terminal



| Pin | Values | Function |
|-----|----------|---|
| 1 | L1C | Control power input 200 – 240VAC ±10% 50 / 60Hz, 0.5A |
| 2 | L2C | |
| 3 | L1 | Main power supply input 200 – 240VAC ±10% 50 / 60Hz |
| 4 | L2 | |
| 5 | DC+ /RB1 | DC bus+ Brake resistor connection |
| 6 | RB2 | |
| 7 | RB- | |
| 8 | DC- | Motor connection |
| 9 | U | |
| 10 | V | |
| 11 | W | |

5.3 - X3 Serial port line RS232: PC connection

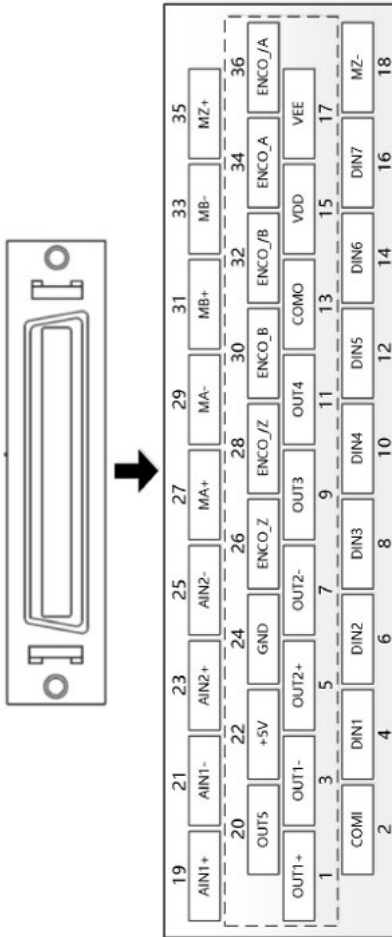
PC software port for parameter setting and monitor status.



| Pin | Values | Function |
|-----|--------|---------------|
| 1 | NC | Reserved |
| 2 | NC | |
| 3 | TX | Transmit data |
| 4 | GND | Signal ground |
| 5 | NC | Reserved |
| 6 | RX | Received data |
| 7 | NC | Reserved |
| 8 | NC | |

5.4 - X4 I/O interface

Port type: SCSI-36P-F



| Pin | Values | Function | |
|-----|-------------|---|---|
| 1 | OUT1+ | Differential output Max voltage 30V DC Maximum output current: 100mA | |
| 3 | OUT1- | | |
| 5 | OUT2+ | | |
| 7 | OUT2- | | |
| 9 | OUT3 | Digital signal output Max voltage 30V DC Maximum output current: 20mA | |
| 11 | OUT4 | | |
| 20 | OUT5 | | |
| 13 | COMO | Common pin of digital output OUT3, 4, 5 | |
| 15 | VDD | Internal 24 V DC power supply output Voltage range: 24VDC \pm 20%. Maximum current: 300 mA | |
| 17 | VEE | | |
| 2 | COMI | Common pin of digital input. Can be connected to power supply range 18+30 V DC | |
| 4 | DIN 1 | Digital signal input High level: 12.5 \pm 30 V DC, Low level: 0 \pm 5 V DC, Input frequency: <1 kHz | |
| 6 | DIN 2 | | |
| 8 | DIN 3 | | |
| 10 | DIN 4 | | |
| 12 | DIN 5 | | |
| 14 | DIN 6 | | |
| 16 | DIN 7 | | |
| 19 | AIN1+ (/MA) | Analogue input 1 and 2: \pm 10 V Resolution: 12 bit. Input resistance: 350 K Ω Analog bandwidth: 1kHz, input voltage range: -10V +10V | |
| 21 | AIN1- (/MB) | | |
| 23 | AIN2+ (/MZ) | | |
| 25 | AIN2- | | |
| 27 | MA+/(MA) | Pulse input Input voltage: 3.3-24 V DC Maximum frequency: 500 kHz | |
| 29 | MA- | | |
| 31 | MB+/(MB) | | |
| 33 | MB- | | |
| 35 | MZ+/(MZ) | | |
| 18 | MZ- | Internal 5 V DC power supply output Maximum current: 100 mA | |
| 22 | +5V | | |
| 24 | GND | | |
| 26 | ENCO_Z | | Encoder signal output Voltage: Voh = 3.4V, Vol = 0.2V Maximum current: \pm 20 mA Maximum frequency: 10 MHz |
| 28 | ENCO_Z | | |
| 30 | ENCO_B | | |
| 32 | ENCO_B | | |
| 34 | ENCO_A | | |
| 36 | ENCO_A | | |

5.5 - X5 motor encoder port



| Pin | Values | Function |
|-----|--------|-----------------------------|
| 1 | 5V+ | DC power supply for encoder |
| 2 | GND | Encoder signal ground |
| 3 | CLOCK+ | Clock data signal |
| 4 | CLOCK- | |
| 5 | SD | Serial data signal |
| 6 | /SD | |

5.6 - X10 FieldBus network communication ports

5.6.1 - for C2 (CAN Open) X6A (IN), X6B (OUT)



| Pin | Values |
|-----|---------|
| 1 | CAN_H |
| 2 | CAN_L |
| 3 | CAN_GND |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | NC |

5.6.2 - for E2 (Ethercat) X1A (IN), X1B (OUT)



| Pin | Values |
|-----|--------|
| 1 | TD+ |
| 2 | TD- |
| 3 | RD+ |
| 4 | NC |
| 5 | NC |
| 6 | RD- |
| 7 | NC |
| 8 | NC |

5.6.2 - for N4 (RS485) X1A (IN), X1B (OUT)

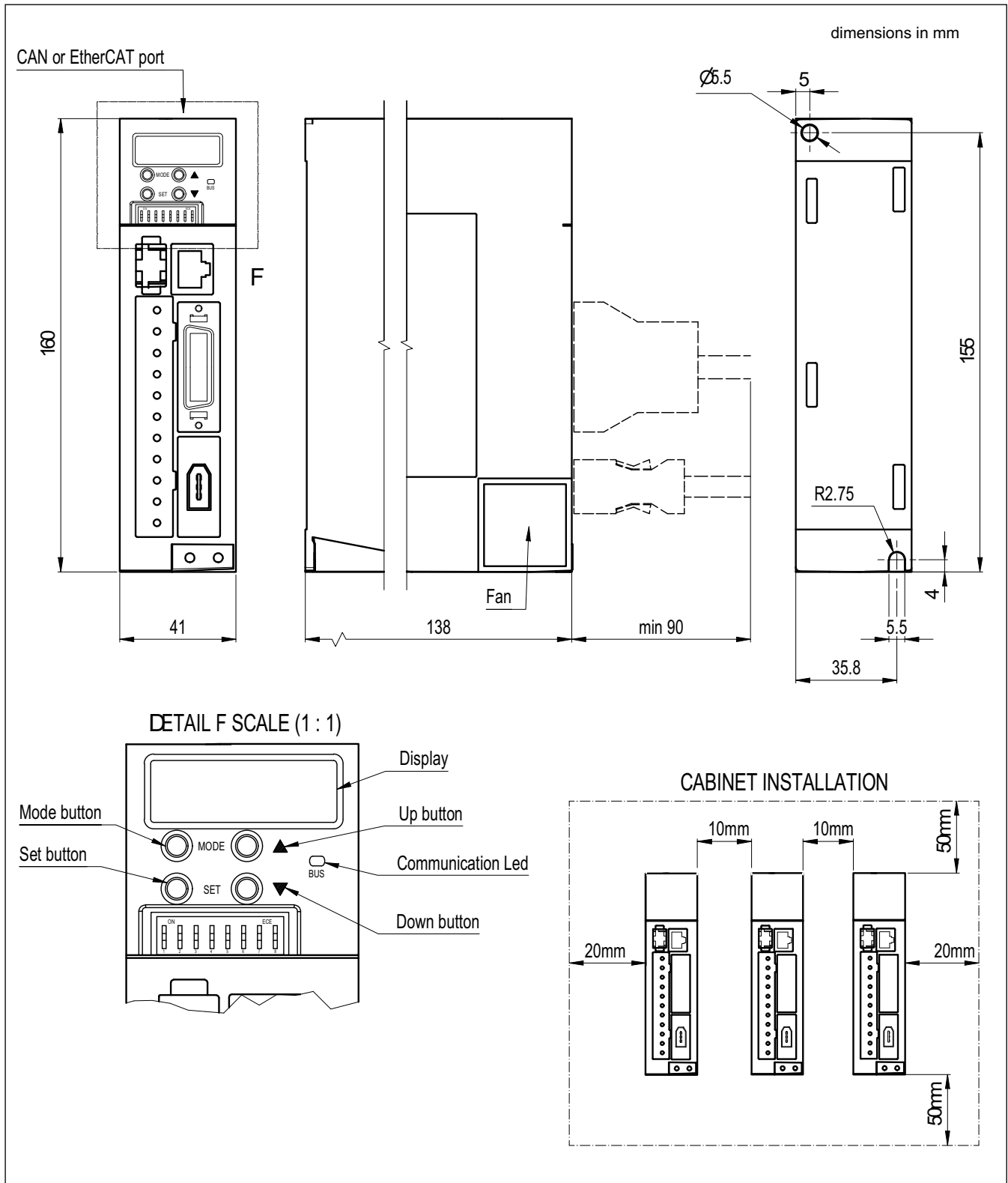


| Pin | Values |
|-----|--------|
| 1 | RX+ |
| 2 | RX- |
| 3 | NC |
| 4 | TX+ |
| 5 | TX- |
| 6 | NC- |
| 7 | +5V B |
| 8 | GND B |

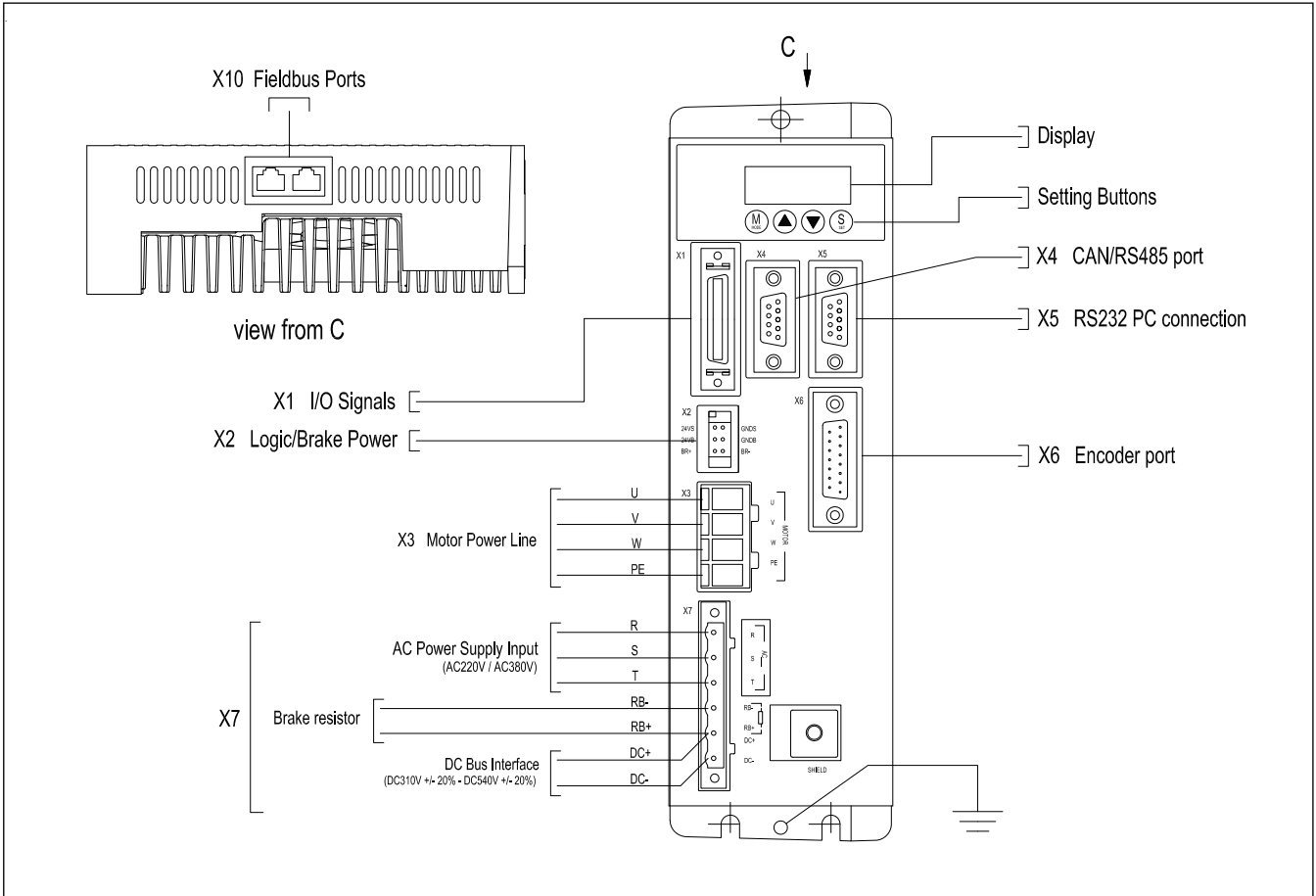
5.7 - Dip switch

| Pin | Values | Function |
|-----|-------------------|-----------------------------|
| SW1 | 8 dip switch | Communication ID dip switch |
| SW2 | On C2 drives only | Terminal resistance switch |

6 - SCK230-075 OVERALL AND MOUNTING DIMENSIONS



7 - WIRING DIAGRAM AND PIN TABLES FOR SCK230-150 AND SCK400-300



7.1 - Display

The LED panel allow access to these functions:

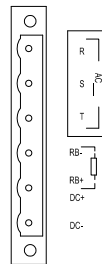
- Real time display of actual values at the LED display. Real Speed RPM is shown as default.
- Blinking display of error or warning information
- Display of controller parameters and their modification.
- Easy controller setup using special menu functions EASY and TUNE

Different functions and parameter groups are arranged in a menu structure. The 4 buttons can be used to navigate through that menu structure, select single parameters, modify values and access special functions.

7.2 - X3 Motor connection

| Pin | Function |
|-----|------------------|
| U | Motor power line |
| V | |
| W | |
| PE | |

7.3 - X7 Power connection



| Pin | Function |
|----------|--|
| R | AC power supply SCK230-150: 220 V AC SCK400-300: 380 V AC |
| S | |
| T | |
| RB | External brake resistor (NOTE) |
| DC- | DC bus power supply: (Alternative to R/S/T) SCK230: 310 V DC $\pm 20\%$ SCK400: 540 V DC $\pm 20\%$ |
| DC+ /RB+ | |

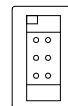
NOTE: Suggested brake resistor:

SCK230 = 39 ohm / 200 W

SCK400 = 5 ohm / 200 W.

The customer should choose the power of brake resistor according to the actual application.

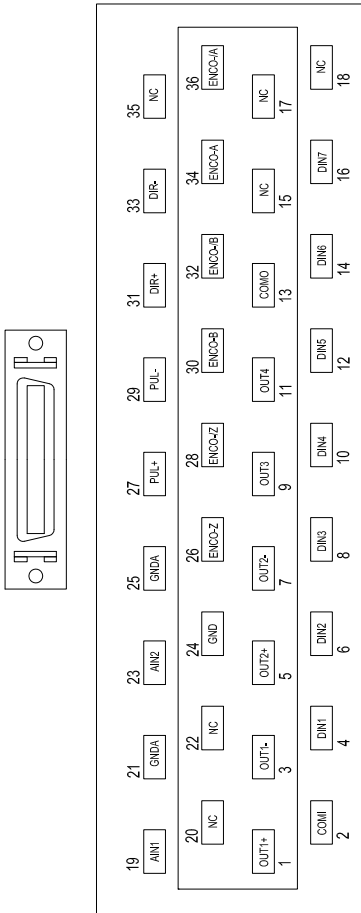
7.4 - X2 Logic / brake power



| Pin | Function |
|-------|------------------------|
| 24V S | 24V Logic power supply |
| GND S | |
| 24V B | 24V Brake power supply |
| GND B | |
| BR+ | Brake interface |
| BR- | |

7.5 - X1 I/O interface

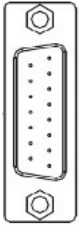
Port type: SCSI-36P-F



| Pin | Values | Function |
|-----|---------|--|
| 1 | OUT1+ | Differential output Max voltage 30V DC Maximum output current: 100 mA |
| 3 | OUT1- | |
| 5 | OUT2+ | |
| 7 | OUT2- | |
| 9 | OUT3 | Digital signal output Max voltage 30V DC Maximum output current: 20 mA |
| 11 | OUT4 | |
| 20 | NC | |
| 13 | COM0 | Common pin of digital output OUT |
| 15 | NC | |
| 17 | NC | |
| 2 | COM1 | Common pin of digital input. |
| 4 | DIN 1 | Digital signal input High level: 12.5 + 30 V DC, Low level: < 5 V DC |
| 6 | DIN 2 | |
| 8 | DIN 3 | |
| 10 | DIN 4 | |
| 12 | DIN 5 | |
| 14 | DIN 6 | |
| 16 | DIN 7 | |
| 19 | AIN1 | Analogue input 1 and 2 Input inpedance: 200 K Input frequency: 4 kHz |
| 21 | GNDA | |
| 23 | AIN2 | |
| 25 | GNDA | |
| 27 | PUL+ | Pulse or positive pulse interface Input voltage: 5 + 24 V DC |
| 29 | PUL- | |
| 31 | DIR+ | Direction or negative pulse interface Input voltage: 5 + 24 V DC |
| 33 | DIR- | |
| 35 | NC | |
| 18 | NC | |
| 22 | NC | |
| 24 | GND | Ground signal |
| 26 | ENCO_Z | Motor encoder signal output |
| 28 | ENCO_/Z | |
| 30 | ENCO_B | |
| 32 | ENCO_/B | |
| 34 | ENCO_A | |
| 36 | ENCO_/A | |

7.6 - X6 ENCODER port

port type 15 pin DB female



| Pin | Values | Function |
|-----|--------|-----------------------------|
| 1 | 5V+ | Power Supply Voltage Output |
| 2 | A | Phases of encoder input |
| 3 | B | |
| 4 | Z | |
| 5 | U | |
| 6 | V | |
| 7 | W | |

| Pin | Values | Function |
|-----|--------|--------------------------|
| 8 | PTC_IN | PTC of motor input |
| 9 | GND | Encoder signal ground 0V |
| 10 | /A | Phases of encoder input |
| 11 | /B | |
| 12 | /Z | |
| 13 | /U | |
| 14 | /V | |
| 15 | /W | |

7.7 - FIELDBUS network communication ports

7.7.1 - for C2 (CAN Open)

X4 : port type 9 pin DB



| Pin | Values |
|-----|---------|
| 1 | NC |
| 2 | CAN_L |
| 3 | CAN_GND |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | CAN_H |
| 8 | NC |
| 9 | NC |

7.7.2 - for E2 (Ethercat)

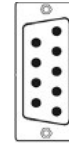
X10A (IN), X10B (OUT)



| Pin | Values |
|-----|--------|
| 1 | TD+ |
| 2 | TD- |
| 3 | RD+ |
| 4 | NC |
| 5 | NC |
| 6 | RD- |
| 7 | NC |
| 8 | NC |

7.7.3 - for N4 (Modbus RTU/RS485)

X4 : port type 9 pin DB

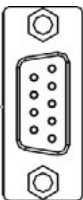


| Pin | Values |
|-----|--------|
| 1 | NC |
| 2 | RX+ |
| 3 | TX+ |
| 4 | NC |
| 5 | GND |
| 6 | + 5V |
| 7 | RX- |
| 8 | TX- |
| 9 | NC |

7.8 - X5 - RS232: PC connection

port type 9 pin DB female

PC software port for parameter setting and monitor status.



| Pin | Values | Function |
|-----|--------|---------------|
| 1 | NC | Reserved |
| 2 | TX | Transmit data |
| 3 | RX | Received data |
| 4 | NC | Reserved |
| 5 | GND | Signal ground |
| 6 | NC | Reserved |
| 7 | NC | |
| 8 | NC | |
| 9 | NC | |

8 - SCK230-075 AND SCK400-300 OVERALL AND MOUNTING DIMENSIONS

