



Smart solutions.  
Strong relationships.

# Dynamic drives for small AC motors

Emotron VSU

0.75 kW to 18.5 kW / 1 Hp to 25 Hp

IP20

Designed for higher overloads and 50°C ambient



**SC Industrial Syndicate**

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*We put all our energy  
into saving yours!*



# Save energy with AC drives Energy savings upto 50%



## Small drive - big functionality

Speed control with Emotron VSU drives can give significant energy savings in your application.

### Our Expertise

CG Drives & Automation has developed, manufactured and delivered efficient and reliable motor control equipment for 35 years. We offer standard products and complete drive solutions that ensure the safe and cost-efficient operation of demanding industrial applications. We provide smart solutions to users, operators, system integrators and OEMs around the world. Wherever there are demanding applications.

Our drives are reliable and productive with exceptional motor performance as you would expect from Emotron series drives.

# Clever and easy to use

## Prepared for the real world

The Emotron VSU is a dynamic drive for use in all industrial application where simplicity, reliability and productivity are required.

- Standard rated for 50 degrees C @ 8kHz switching frequency.
- Heavy duty drive for various applications.
- Robust drives with conformal coated boards enable application in hot and humid climate.
- Detachable cooling fan for easy cleaning or replacement.

## Simple to commission and use

Emotron VSU is an easy drive – easy to connect, easy to configure and easy to install.

- All connectors are generously sized and clearly labeled.
- The keypad is user-friendly with max LEDs to display status and minimum keys for ease of configuration.

## Excellent control performance

- Up to 180% torque @ 0.25Hz (sensorless vector)
- <10 ms torque response
- Speed control range up to 1:200 (sensorless vector)
- Speed control accuracy up to 0.2% (sensorless vector)
- Online autotuning of motor parameters



## Special Features

- Built in brake chopper
- Modbus RS485 as default
- Detachable keypad with parameter copy function
- Parameter backup
- Common DC bus
- Free switchover between two motors' parameters
- Flexible parameter displayed
- Various master & auxiliary command and switchover
- Speed search start
- Variety of accel/decel curves optional
- Automatic correction of analog, contracting brake
- 16-step speed control programmable (2-step speed supports flexible frequency command)
- Wobble frequency control
- Fixed length control
- Count function
- Three faults recorded
- Over excitation brake
- Over voltage stall protection
- Under voltage stall protection
- Restart upon power loss
- Skip frequency
- Frequency binding
- Four kinds of accel/decel time
- Motor thermal protection
- Flexible fan control
- Process PID control
- Multi-functional key programmable
- Droop control
- Parameter identification
- Field-weakening control
- High-precision
- Torque restraint
- V/f separated control
- Vector control

# Emotron series VSU Ordering Codes

## Emotron VSU – 3 phase, 380–480V

| Model           | Normal duty<br>(120% , 1 min, every 10 min) |               |         | Heavy duty O/L<br>(150% , 1 min, every 10 min) |               |                    | High Overload ability  |                          |
|-----------------|---|---------------|---------|--|---------------|--------------------|------------------------|--------------------------|
|                 | Power                                       | Rated Current | Max out | Power  | Rated current | Max output current | Max output (180%, 10s) | Max Current (200%, 0.5s) |
|                 | kW  | A             | A       | kW   | AMP           | A                  | A                      | A                        |
| VSU48-003-20CNB | 1.5   | 3.8           | 4.5     | 0.75   | 2.5           | 3.8                | 4.5                    | 5                        |
| VSU48-004-20CNB | 2.2   | 4.8           | 5.8     | 1.5  | 3.8           | 5.7                | 6.84                   | 7.6                      |
| VSU48-006-20CNB | 3.7   | 8             | 9.6     | 2.2  | 5.5           | 8.3                | 9.9                    | 11                       |
| VSU48-009-20CNB | 5.5   | 11            | 13.2    | 3.7  | 9             | 13.5               | 16.2                   | 18                       |
| VSU48-013-20CNB | 7.5   | 16            | 19.2    | 5.5  | 13            | 19.5               | 23.4                   | 26                       |
| VSU48-017-20CNB | 11  | 21            | 25.2    | 7.5  | 17            | 25.5               | 30.6                   | 34                       |
| VSU48-024-20CNB | 15  | 30            | 36.0    | 11   | 24            | 36.0               | 43.2                   | 48                       |
| VSU48-030-20CNB | 18.5  | 36            | 43.2    | 15   | 30            | 45.0               | 54                     | 60                       |

|             |  |
|-------------|--|
| Max current | Maximum current for 60 sec, in every 600 Sec   |
| Normal duty | Applications with variable torque like Pump, Fan, Blower   |
| Heavy duty  | Applications with constant torque like Crane, Hoists, Lifts, Mills, Crushers, Conveyors, Feeders, Press, Textile, Agitators, Mixers, CNC, Centrifuge, Packaging etc. |

### Optional Accessories (One slot available for following accessories)

|                 |  |
|-----------------|--|
| Expansion board | Remark   |
| EPC-CM1         | Supports expanded 232 communication. Applicable for standard VSU and VSX.  |
| EPC-CM2         | PROFIBUS-DP communication board. Applicable for EMOTRON VSU and VSX.   |
| EPC-IM1         | Supports two current/voltage analog inputs. Current input: 0A-1A, Voltage input: 0V-24V (for injection molding machine application)  |
| EPC-VD2         | For flying start (speed search) function, and b1-05 should be set to 3. With this card, flying start will be accurate and smooth; While without this card (b1-05=2), flying start may be failed, or not accurate/smooth. |
| EPC-TM1         | Supports one analog input, one digital input, one analog output and one relay output.  |
| EPC-RT1         | Supports real-time clock input, one analog input, and one relay output. Applicable for customized EMOTRON VSU and VSX if this function is requested.   |



# Technical Data

## POWER INPUT (L1, L2, L3)

|                               |  |
|-------------------------------|--|
| Voltage                       | 3-phase<br>AC380V/AC400V/AC415V/AC440V/<br>AC460V/AC480V |
| Continuous voltage variation* | ±21%. Short variation of -27%                            |
| Voltage imbalance             | Less than 3%. As per IEC618000-2                         |
| Frequency                     | 50/60 Hz. Tolerance + -5%                                |
| Power Factor                  | 0.97   |

## POWER OUTPUT (U, V, W)

|                        |  |
|------------------------|--|
| Voltage                | 3-phase: 0~ rated input voltage,<br>error <±3% |
| Output frequency range | 0 to 600 Hz                                    |
| Frequency resolution   | 0.01 Hz  |

## OVERLOAD CAPACITY

|                 |   |
|-----------------|---|
| Normal duty     | 120% 60 Sec / 600 Sec   |
| Heavy duty      | 150% 60 Sec / 600 Sec   |
| High overload   | 180% 10 Sec, 200% 0.5 Sec   |
| Starting torque | 0.5 Hz: 180% (V/f, vector control 1)<br>0.25 Hz 180% (vector control 2) |

## CONTROL CHARACTERISTICS

|                           |   |
|---------------------------|---|
| Acceleration time setting | 0 to 6000 seconds   |
| Deceleration time setting | 0 to 6000 seconds   |
| Switching frequency       | 0.7 kHz~16 kHz  |
| Control method            | V/f control<br>Sensor-less vector control 1<br>Sensor-less vector control 2 |
| Range of speed regulation | 1: 100 (V/f, vector control 1)<br>1: 200 (vector control 2)                 |
| Speed accuracy            | ±0.5% (V/f control)<br>±0.2% (vector control 1 & 2)                         |

## BASIC FUNCTIONS

|                           |  |
|---------------------------|--|
| Frequency setting sources | Digital setting + keypad<br>Digital setting + terminal UP/DOWN<br>Communication<br>Analog setting (AI1/AI2/EAI)  |
| Motor started methods     | Started from starting frequency<br>Terminal Pulse Setting<br>DC braking and then started<br>Speed search started |
| Motor stopped methods     | Ramp to stop, Coast to stop,<br>Ramp stop + DC brake   |
| Dynamic braking unit      | Inbuilt  |
| DC braking capacity       | DC braking start frequency:<br>0.00~600.00 Hz<br>DC braking current: 0.0~100.0%<br>DC braking time: 0.0~30.00s   |

\* at 440 V

## DIGITAL INPUTS (6 Nos)

|                        |                                    |
|------------------------|------------------------------------|
| Programmable DI        | 5                                  |
| Logic                  | PNP or NPN                         |
| Voltage                | 24 VDC. Range: 10 V~30 V, 0-200 Hz |
| Digital / Pulse Inputs | 1                                  |
| Voltage                | 10 V - 30 V                        |
| Frequency              | 0.1 Hz~50 kHz                      |

## DIGITAL OUTPUTS (3 Nos)

|                                |                         |
|--------------------------------|-------------------------|
| Open collector DO              | 1                       |
| Voltage Range                  | 0-24 V                  |
| Current Range                  | 0 - 50 mA               |
| Open collector DO or Pulse o/p | 1                       |
| Frequency                      | 0 - 50 Hz               |
| Relay Outputs                  | 1                       |
| Contact capacity               | 250 VAC/ 3A, 30 VDC/ 3A |

## ANALOGUE INPUTS (2 Nos)

|                       |                                  |
|-----------------------|----------------------------------|
| Voltage or Current AI | 1                                |
| Current Range         | 0~20 mA: input impedance - 500 Ω |
| Max current           | 25 mA                            |
| Voltage Range         | 0~10 V: input impedance - 100 Ω  |
| Max voltage           | 12.5 V                           |
| Only voltage AI       | 1                                |
| Voltage Range         | -10~10 V: input impedance - 25 Ω |
| Max Voltage           | Range; -12.5 V ~+12.5 V          |

## ANALOGUE OUTPUT (1 No)

|                       |                                      |
|-----------------------|--------------------------------------|
| Voltage or Current AO | 1                                    |
| Current Range         | 0~20 mA: input impedance - 200Ω-500Ω |
| Voltage Range         | 0~10 V: impedance ≥ 10kΩ             |

## ENVIRONMENT

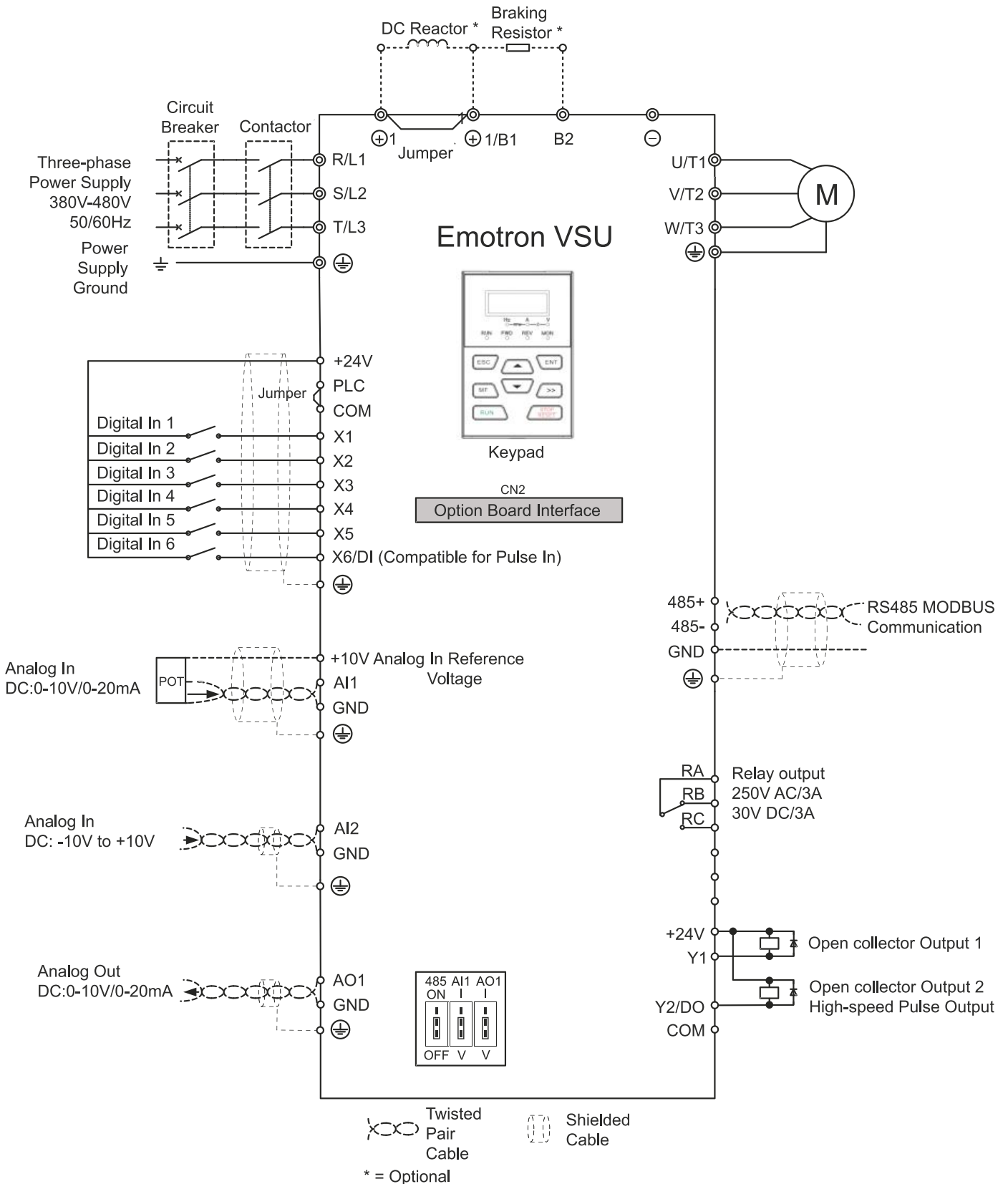
|                     |                                       |
|---------------------|---------------------------------------|
| Enclosure           | IP20                                  |
| Ambient temperature | -10°C ~50°C                           |
| Relative humidity   | 0-95%, no condensation                |
| Vibration           | Less than 5.9 m/s <sup>2</sup> (0.6g) |
| Storage temperature | -40°C ~+70°C                          |
| Altitude            | 0~2000 m. Deration above 1000 m       |

## COMMUNICATION INTERFACE

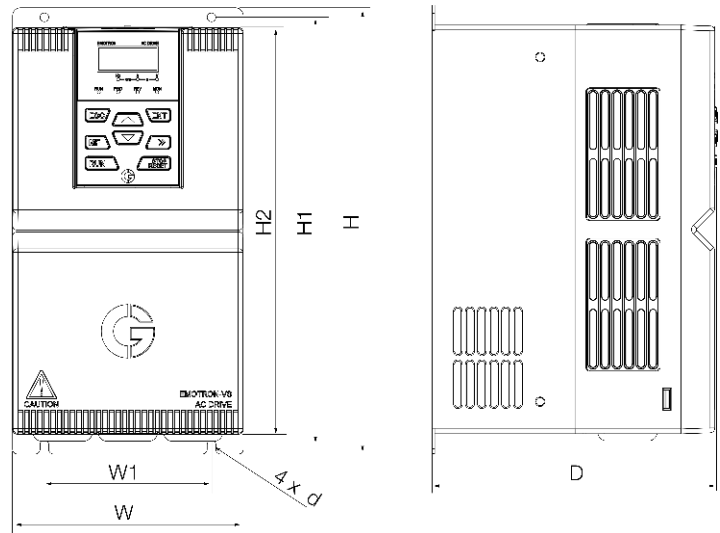
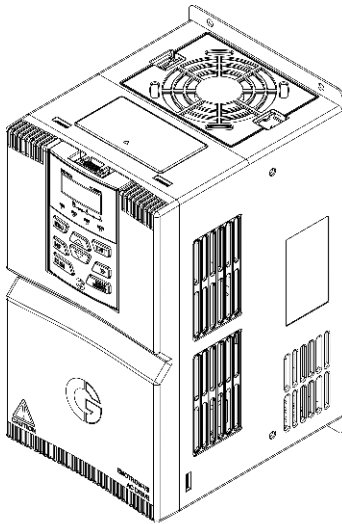
|                         |  |
|-------------------------|--|
| Default Interface       | Modbus 485                                     |
| 485 differential signal | 4800/ 9600/ 19200/ 38400/ 57600/<br>115200 bps |
| Max Distance            | 500 mts. Std network cable                     |
| Optional interface      | Profibus-DP                                    |



# Terminal and wiring details



# Dimensional details



| Model           | External and Installation dimensions (mm) |     |     |     |     |     |     | Weight<br>Kg |
|-----------------|---|-----|-----|-----|-----|-----|-----|--------------|
|                 | W   | H   | D   | W1  | H1  | H2  | d   |              |
| VSU48-003-20CNB | 93  | 190 | 152 | 70  | 180 | 170 | 4.5 | 1.8          |
| VSU48-004-20CNB | 120                                       | 245 | 169 | 80  | 233 | 220 | 5.5 | 2.6          |
| VSU48-006-20CNB | 120                                       | 245 | 169 | 80  | 233 | 220 | 5.5 | 2.6          |
| VSU48-009-20CNB | 120                                       | 245 | 169 | 80  | 233 | 220 | 5.5 | 2.6          |
| VSU48-013-20CNB | 145                                       | 280 | 179 | 105 | 268 | 255 | 5.5 | 3.9          |
| VSU48-017-20CNB | 145                                       | 280 | 179 | 105 | 268 | 255 | 5.5 | 3.9          |
| VSU48-024-20CNB | 190                                       | 365 | 187 | 120 | 353 | 335 | 6   | 5            |
| VSU48-030-20CNB | 190                                       | 365 | 187 | 120 | 353 | 335 | 6   | 5            |

