# Servo Drive Products

SCS Static Control Systems

Electronic Drives and Automation

## The Company

SCS Static Control Systems has been successfully operating in the industrial automation field since 1977. In the beginning, the company designed and manufactured static electrical controls for automated machines and systems and, starting in 1978, it began designing and manufacturing analog converters for DC-powered motors. Thanks to its technical expertise, in 1986 SCS was chosen by Mitsubishi Electric as the sole distributor for Italy. In 1994, the company began manufacturing analog drives for trapezoidal brushless motors and in 1997, it designed and manufactured the first family of digital drives for sinusoidal brushless motors. In just a few years, the sinusoidal vector converter became the company's leading product and in 2005, a new generation of brushless motor drives was launched to upgrade the control section of the motor. The recent release of third-generation brushless servo drives crowns the 10 years evolution of the product line.

SCS operates in Italy and abroad currently offering a wide services portfolio. From analog and digital systems design, based on the expertise of its R&D department, to system integration design and deliver, based on the experience and know-how of its Engineering Department. The corporate mission is focused on quality, flexibility and the ability to assist the customer through all phases of machine realisation. After-sales service and technical support have also always been a significant part of corporate policy and have become well-known and appreciated by all operators in the industry.

## The Research & Development Dept.

SCS' pride is its R&D team, which designs innovative solutions to support the most demanding performance requirements of the market. The company provides consulting and engineering services while continuously ensuring a complete product customization. Qualified engineers always up-to-date to the latest technologies concerning development platforms, design the hardware and software for our products while focusing on innovation and reliability. Digital solutions have been studied to facilitate the task of machine design engineers and the most advanced tools have been used to simulate, debug and test new-generation DSP and FPGA platforms. The daily exchange of information between the Technical Support and R&D department leads to continuous product evolution, which not only allows the customer to make the most suitable technical choices, but also guides our company to identify specifications for new product generations.

## The Engineering Dept.

The significant experience gained by designing systems based on all state-of-the-art products on the market, has allowed SCS' Engineering Department to ensure maximum reliability and expertise. Specifically, SCS is a SIEMENS Certified System Integrator, thanks to 30 years of experience using specific products for the industrial automation industry. Our Engineering Department's hardware and software design engineers look for increasingly innovative solutions to simplify the commissioning and the maintenance of the systems and to achieve increasingly high performance. Our technicians' significant design experience allows them to manage commissioning and start-up phases in a timely and safe manner.

## The production

Every internal phase including production, assembly and testing is performed by qualified personnel under the supervision of highly experienced managers. Thanks to close collaboration and co-design with our suppliers, the quality of our components is also constantly under control, thus guaranteeing maximum product reliability. In fact, SCS products undergo rigorous static and functional testing procedures, both for the Systems Division as well as for the Drives Division. Our personnel is continuously trained and this contributes to spread inside the company the mission concepts such as quality assurance, proactive testing and specific expertise regarding all production process phases. The R&D department provides technicians and testing operators, support regarding all requests for personalisation or to successfully pass the commissioning phase. These are just a few reasons why SCS is truly an ideal partner when it comes to positive, long-lasting collaboration based on significant technological value.

SCS has made its name in the sector over the years thanks to the excellent quality of its staff. Our staff has played an important role in this growth through constant updates and professional improvements in order to respond to increasingly strict quality standards, thereby making a vital contribution to the success of the company.

# INTRO

**SERVO DRIVES PRODUCTS** family offers to our customers deep reliability, maximum flexibility and highest performances in a wide range of motion control applications.

**SCS** has been designing and producing servo drives for more than 30 years, this is the base of our customers and partners trust in our deep knowledge and high service level.

**SCS** drives are designed to offer to our customers the maximum reliability, flexibility and customization: tailoring our product on your application is our first aim.

That's why **SCS** can

**Drive your Solutions to Success**.

If you need to ***drive easy and safe***, **SCS** is the right partner for you.

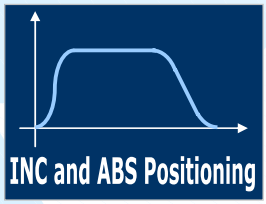
# SCS DIGITAL DRIVES

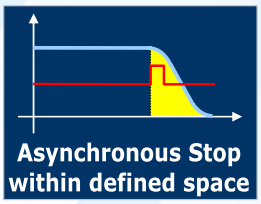
## MOTION CONTROL: OUR WAY

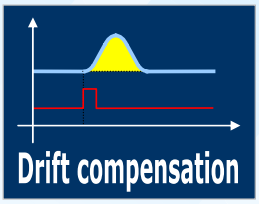
Digital Servo Drives represents the key point of SCS in customer oriented solutions.
The three main issues of the product family are flexibility, connectivity and technical support.
**Flexibility** means bringing to the machine designer the maximum degree of customization in terms of functionalities and product configuration.
**Connectivity** means allowing the possibility of integrating the product in any of the existing fieldbus network.
**Technical Support** means being a valuable help for our customers in design, startup and maintenance phases thanks to a professional and reliable service made of a thirty-years experience and know-how in industrial and process automation fields.

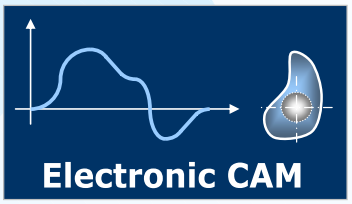
**SCS servo drives** allow you to easily realize any application in speed control, torque control or position tracking.
It is possible furthermore to customise the CVS thanks to a line of modules and technological options.
Expansion of I/O on board, dedicated application integrated from SCS into the drive, connection to main existing fieldbus and use of advanced positioning transducers (i.e. from absolute SSI encoder to sensorless mode) are available just for your purposes.

**WideLoop** control, designed by SCS, integrates in a single loop all of the typical servo drive control modes so that you can surf between them simply using the correspondent commands without modifying the drive parameters.





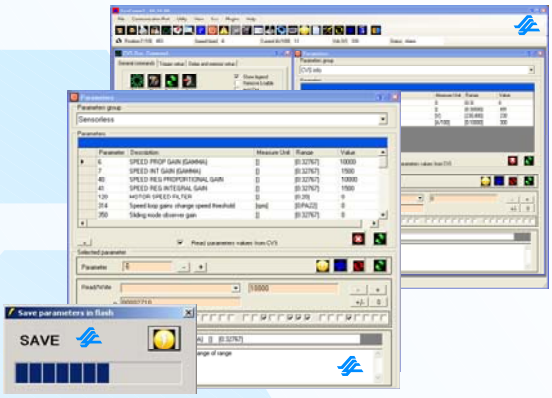

## SOLUTION ORIENTED FEATURES

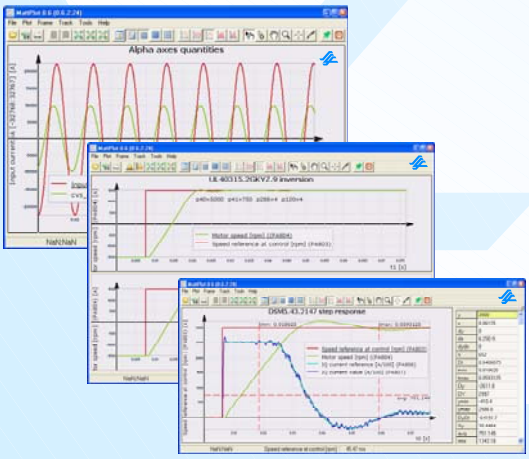
You can design positioning applications without any difficulty thanks to many integrated specific functions such as automatic homing, incremental or absolute positioning, even using an external encoder on your load as position feedback (for backlash or slip compensation).
**SCS servo drives** includes a set of functional features that allows to distribute the management of the application on the axes with a remarkable facilitation of the main control software of your machines.
The possibility of a separate power supply for logic and power sections allows to maintain an active control (I/O, position's counters, encoder simulator, communication) even in case of emergency or power supply's lack.
All of the available I/O can be indexed: it is possible to select and address the Inputs (commands) and the Output (monitors) and adapt them your applications needs.
You can store and select up to 4 parameters sets: you can change the drive configuration while passing trhough your application operation modes and you can simplify the spare parts management by inserting at the same time the configurations used in your machines for different axes.

***WideLoop*** will allow you to use the "Stop in the Space" function even while working in speed control mode or in electrical gearing mode. In such manner it is possible to easily design an assembling application with discontinuous input feed.
Furthermore is possible to move to a preset position an axes (absolute positioning) even while it is working in electrical gear control mode.
This is why you can quickly realize a simple "flying cut" application using **SCS** servo drives.
It is possible to download an updated or customised firmware for the drives so that you can manage your application maintenance or, thanks to SCS's support, leading an "on-site testing" activity in case of complex startup or commissioning issues.

## DRIVE CONFIGURATOR

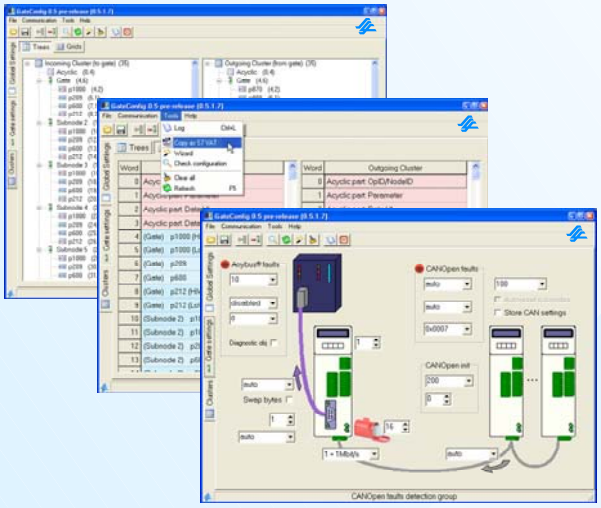
**SCS** developed **ScsComm**, a PC application to configure and manage all of the features of the servo drive product family.
The user can easily configure your drive changing a single parameter or loading, saving or restoring a complete set of parameters in order to satisfy your application needs.
The I/O configuration can also be performed in a very easy way using the I/O Mapping window.
The startup and maintenance of your application has never been so easy: you can read all the measures you need and you can monitor the speed, current, status and any of the monitors of the drive control, the motor and the environment of your application.
In addition both the status and the alarms can be read and analyzed so that the troubleshooting of your application is made easier than ever.
**ScsComm** includes dedicated plugins to expand your analysis and debugging power and to manage special features or custom applications.
In fact you can use the integrated digital oscilloscope to trace all of the monitors you need.
You can use the integrated **Cam Builder** in order to easily and quickly design, test and download to the drive the electronic cam that suits your machine synchronization cycle.
Configuring and testing your fieldbus node is also quick and easy thanks to the **Fieldbus Configurator**. You can shape the bus exchange memory as you like, selecting the monitors and commands that you need for your applications.




## DIGITAL OSCILLOSCOPE

The integrated digital oscilloscope developed by **SCS** can be fully customized in order to let you set the trigger functions and parameters, the acquisition memory size, the acquisition time steps, the traces source and characteristics.
You can choose to acquire and analyse any of the drive variables, grouping them in a single plot and using the scaling functions to let them fit the plotting window in order to easily compare their behaviour.
You can easily tune the drive gains in order to compensate speed ripple or position oscillations by tracing, changing and plotting the drive measures.
**ScsComm** digital oscilloscope can boost the timing of your startup and commissioning phases allowing you to install and tune the machine easily and quickly.
You can also use the integrated oscilloscope in order to efficiently troubleshoot your application by triggering on a specific alarm or monitor transition.



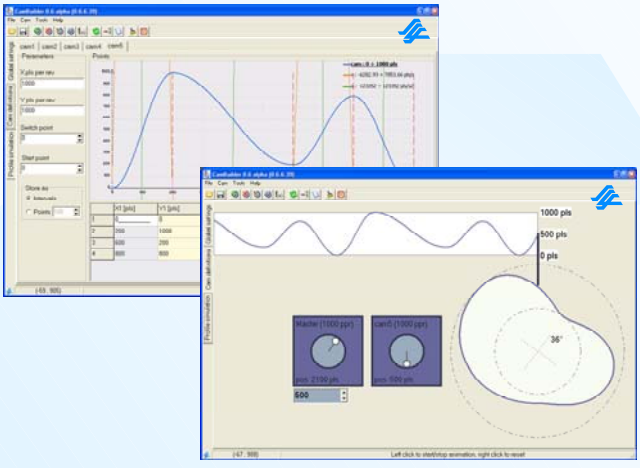
## FIELDBUS GATE CONFIGURATOR

In order to let the overall system be simpler and cheaper, SCS developed a special feature in its servo drives: the **fieldbus gate**.
You can connect an array of drives to your fieldbus using the first node as the main target.
This drive will take care of managing the communication between the main fieldbus and the CANopen subnet made of the others drives working as a gate.
This means you can use only one fieldbus option distributing the cost on al of the drives in your application, reducing the cost per axes of your system.
**SCS** developed an **ScsComm** plugin that provides a simple graphical interface to configure the Fieldbus Gate features.
Itt allows you to quickly set up the data exchange with fieldbus, mapping the incoming and outgoing buffers by means of choosing the read/write parameters and the destination drive (gate itself or subnode connected via CANOpen).
A step by step wizard guides the user to choose proper settings (ex. bus faults timeouts) in order to let the whole system be set up and properly configured for the specific application's needs.

## CAM BUILDER

SCS servo drives can be controlled in Electronic Cam mode, this means you can sinchronise your application cycle simply using a single tick time (i.e. a master encoder).
You can design your Electronic Cam in a very flexible way, by means of number of nodes, interpolation functions and relative strokes.
You can design and store multiple cams in your drive so that you can select or switch (even on-the-fly) from one to another in the different operational modes of your machine.
The shape and characteristics of each of your Electronic Cams is stored in a proper table that is kept in the drive flash memory.
In order to ease your job in designing and testing the cam shape **SCS** developed a special plugin inside the **ScsComm** PC application.

The **CAM Builder** plugin provides a design environment to build a set of cam profiles and directly download them into the drive.
Main features are speed and acceleration checking, automatic interval joints, cam simulation.



# SERVO DRIVES

**CVS$_{II}$**
DIGITAL SERVO BRUSHLESS DRIVE

**CVS$_{Nano}$**
COMPACT DIGITAL SERVO BRUSHLESS DRIVE

# $CVS_{II}$

## DIGITAL SERVO DRIVE FOR SINUSOIDAL BRUSHLESS MOTORS

### GENERAL DESCRIPTION

- Programmable I/O — all of the I/O are indexed
- WideLoop — the SCS design for total control
- Jog — manual control mode
- ABS e INC moves — integrated positioner
- Homing auto — automatic zero pos procedure
- Electronic Gear — multi-ratio on-the-fly change
- Position offset — on-the-fly shifting
- Electronic CAM — graphical design wizard

### CHARACTERISTICS

- Pulse train input — freq+dir/ quadrature/ CW-CCW
- Encoder Input — 5V line-driver
- Encoder Simulator — programmable resolution and zero
- Auxiliary Power Supply — optional +24V for control supply
- Operator keypad — optional and remotable (RS485)
- Digital I/O — 8IN / 4OUT optoisolated
- Analog I/O — 3 references / 3 outputs
- Digital I/O expansion — 14IN / 4OUT optoisolated

### CUSTOMIZATION

- Parameter Set — up to four parameter sets saved on FLASH
- Download FW — remote update of firmware/applications

**$CVS_{II}$ is the servo drive that makes your motion solutions flexible, integrated and reliable.**

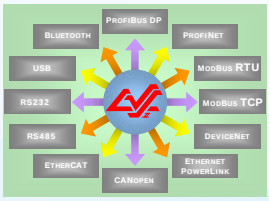
### MAIN FEATURES

***Standard***

- Diagnostic — last alarm memory
- 2nd Encoder Input — maximum precision on the load side
- Debug/Startup — integrated digital oscilloscope
- Protection — temporary password generation
- I/O Extension — put your I/O on CANopen, it's free!

***Optional***

- ProfiBus DP
- ModBus TCP
- DeviceNet
- Industrial Ethernet (PowerLink)
- EtherCAT
- ProfiNet




### COMMUNICATION

***Standard***

- RS232/RS485 — serial communication made easy
- ModBus RTU — standard HMI interface
- CANopen (DS301 v.4.0) — standard open fieldbus included

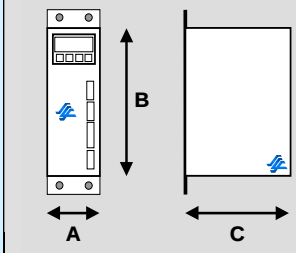
***Passive options***

- USB — no more need for serial converters
- BlueTooth — connection wire-less = limit-less

### USER APPLICATION LIBRARY

Put your most time-critical machine functions inside our drive!

**Dimensioni e Pesi**




| | | CVS23 | | | | CVS46 | | | | CVS46M | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 03 | 07 | 12 | 18 | 10 | 15 | 20 | 27 | 04 | 06 |
| Weitgh | [Kg] | 4 | 4 | 4.2 | 4.2 | 7.2 | 10.9 | 11.5 | 11.5 | 4.1 | 4.3 |
| **A** | [mm] | 70 | 70 | 70* | 70* | 106 | 156 | 156 | 156 | 70 | 70* |
| **B** | [mm] | 284 | 284 | 284 | 284 | 360 | 360 | 360 | 360 | 284 | 284 |
| **C** | [mm] | 255 | 255 | 255 | 255 | 300 | 300 | 300 | 300 | 255 | 255 |

***Note*** * +33mm fan version

| HW Specifications | | |
|---|---|---|
| Switching Frequency | | 8KHz centered (16KHz) |
| Temperature | | Nominal: 0° ÷ 40°C (S1 Service) MAX: 65°C (-1.3% per degree over 40°C) |
| Analog References | | Three inputs: ±10V @ 12bit (one of which differential) |
| Analog Output | | 3 x ±10V not isolated @ 12bit+sign |
| Digital I/O | | 8 input opto-isolated PNP (7mA) @ 24V<br>4 output opto- isolated PNP (50mA) |
| Position Sensor | | Resolver, Incremental Encoder ABZ, FA-Coder, Hall Sensors, Asbolute SSI Encoder |
| Emulated Encoder Output | | Programmable pulse/turn<br>Programmable offset for zero marker posizione<br>Output mirror of motor encoder signals |
| Comunicazione | | RS232 / RS485, ModBus RTU, CANopen |
| Options | FieldBus: | ModBus TCP, ProfiBus DP, DeviceNet, ProfiNet,<br>Industrial Ethernet (PowerLink), EtherCAT, ... |
| | Passive: | USB, BlueTooth<br>I/O Extention<br>Second encoder input |
| Control Modes | | Current, Speed, Position, Electrical Gear, Electrical Cam, ***WideLoop*** |
| Protection Level | | IP20 |
| European Standards | | EN 60146-1-1 |
| EMC | Emissions | EN 50071-2 |
| | Immunity | EN 50082-2 |

## Product Family

| CVS23 | CVS23-03 | CVS23-07 | CVS23-12 | CVS23-18 |
|---|---|---|---|---|
| Nominal Current [A] | 3 | 7 | 12 | 18 |
| Peak Current [A] | 6 | 14 | 24 | 36 |
| Power [KW] | 1.5 | 3 | 5 | 7.5 |
| OverCharge | 200% for 1s @ duty cycle 1/20 | | | |
| Power Supply | 3 x 220Vac÷230Vac (-30% ÷ +10%) @ 50Hz / 60Hz (±10%) | | | |
| Bus DC Voltage | 200V÷355V | | | |

| CVS46 | CVS46-10 | CVS46-15 | CVS46-20 | CVS46-27 |
|---|---|---|---|---|
| Nominal Current [A] | 10 | 15 | 20 | 27 |
| Peak Current [A] | 20 | 30 | 40 | 54 |
| Power [KW] | 5.0 | 8.0 | 11.0 | 15.0 |
| OverCharge | 200% per 1s @ duty cycle 1/20 | | | |
| Power Supply | 3 x 400Vac÷460Vac (-20% ÷ +10%) @ 50Hz / 60Hz (±10%) | | | |
| Bus DC Voltage | 400V÷715V | | | |

| CVS46M | CVS46M-04 | CVS46M-06 |
|---|---|---|
| Nominal Current [A] | 4 | 6 |
| Peak Current [A] | 8 | 12 |
| Power [KW] | 3 | 4.2 |
| OverCharge | 200% for 1s @ duty cycle 1/20 | |
| Power Supply | 3 x 400Vac÷460Vac (-20% ÷ +10%) @ 50Hz / 60Hz (±10%) | |
| Bus DC Voltage | 400V÷715V | |

**Ordering code:**

**CVS** **XX (M)** **YY** **SC**

- Family name
- Mains voltage (**23** for 230VAC, **46** for 400VAC)
  Note : **46M** for compact 400VAC family, see table
- Nominal current (23 from 03A to 18A)
  (46M from 02A to 06A)
  (46 from 10A to 27A)
- If present means “CAN option not included”

# CVS$_{Nano}$

## COMPACT DIGITAL SERVO DRIVE FOR SINUSOIDAL BRUSHLESS MOTORS

### ARCHITECTURE

| | |
|---|---|
| ▪ Programmable I/O | all of the I/O are indexed |
| ▪ WideLoop | the total control |
| ▪ Jog | manual control |
| ▪ Homing auto | automatic zero pos procedure |
| ▪ ABS e INC moves | integrated positioner |
| ▪ Electronic Gear | multi-ratio on-the-fly change |
| ▪ Position offset | on-the-fly shifting |

### CHARACTERISTICS

| | |
|---|---|
| ▪ Digital I/O | 4IN / 2OUT optoisolated |
| ▪ Analog I/O | 1 IN reference |
| ▪ Pulse train input | freq+dir/ quadrature |
| ▪ Encoder Input | 5V line-driver |
| ▪ Operator keypad | optional and remote (RS485) |
| ▪ Digital I/O expansion | 14IN / 4OUT optoisolated |

### CUSTOMIZATION

| | |
|---|---|
| ▪ Parameter Set | up to four parameter sets saved on FLASH |
| ▪ Download FW | remote update of firmware/applications |

**CVS$_{Nano}$ is the servo drive that makes your solutions compact, flexible and cheap.**

### MAIN FEATURES

***Standard***

| | |
|---|---|
| ▪ Protection | temporary password generation |
| ▪ Diagnostic | last alarm memory |
| ▪ 2nd Encoder Input | maximum precision on the load side |
| ▪ Debug/Startup | integrated digital oscilloscope |
| ▪ I/O Extension | put your I/O on CANopen, it's free! |

### COMMUNICATION

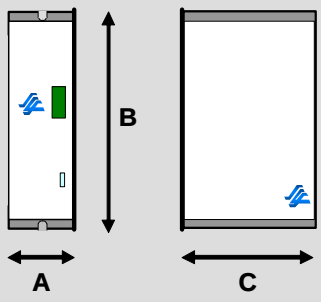
***Standard***

| | |
|---|---|
| ▪ RS485 | serial communication made easy |
| ▪ ModBus RTU | standard HMI interface |
| ▪ CANopen (DS301 v.4.0) | standard open fieldbus included |

### USER APPLICATION LIBRARY

Put your most time-critical machine functions inside our drive!

### Dimensioni e Pesi




| | | CVS13 | | |
|---|---|---|---|---|
| | | **01** | **03** | **04** |
| Weight | [Kg] | 1 | 1 | 1.2 |
| **A** | [mm] | 58 | 58 | 70* |
| **B** | [mm] | 155 | 155 | 155 |
| **C** | [mm] | 165 | 165 | 165 |

***Note*** * +10mm additional heat sink

| HW Specifications | | |
|---|---|---|
| Switching Frequency | | 8KHz centered (16KHz) |
| Temperature | | Nominal: 0° ÷ 40°C (S1 Service) MAX: 65°C (-1.3% per degree over 40°C) |
| Analog References | | One input: ±10V @ 12bit (differential) |
| Digital I/O | | 4 input opto-isolated PNP (7mA) @ 24V<br>2 output opto- isolated PNP (50mA) |
| Position Sensor | | Incremental Encoder ABZ, FA-Coder, Hall Sensors, Asbolute SSI Encoder |
| Comunicazione | | RS485, ModBus RTU, CANopen |
| Control Modes | | Current, Speed, Position, Electrical Gear, Electrical Cam, ***WideLoop*** |
| Protection Level | | IP20 |
| European Standards | | EN 60146-1-1 |
| EMC | Emissions | EN 50071-2 |
| | Immunity | EN 50082-2 |

| Product Family | | | |
|---|---|---|---|
| **CVS13** | **CVS13-01** | **CVS13-03** | **CVS13-04** |
| Nominal Current [A] | 1 | 3 | 4 |
| Peak Current [A] | 2 | 6 | 8 |
| Power [KW] | 0.5 | 1.5 | 2.0 |
| OverCharge | 200% for 10s @ duty cycle 1/20 | | |
| Power Supply* | 3 x 220Vac÷230Vac (-30% ÷ +10%) @ 50Hz / 60Hz (±10%) | | |
| Bus DC Voltage | 200V÷355V | | |

***Note:** Single-phase power supply is also supported

**Ordering code :**

**CVS** **13** **YY** **SC**

- Family name
- Note : **13** for $CVS_{Nano}$
- Nominal current (01 – 03 - 04)
- If present means “CAN port not included”

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