- MASTER CONTROLLERS
- BRUSHLESS DRIVES & MOTORS
- STEPLESS DRIVES & MOTORS
- PERIPHERALS
- HMI: INDUSTRIAL TOUCH PANELS
- SOLUTIONS

Solution in Motion

precision and control

harmony of movement

problem solving

CMZ SISTEMI ELETTRONICI

SD

Stepless drives and motors

Stepless is the term used to identify the CMZ closed loop control of a stepper motor. This technology allows you to control the stepper motor with modulated current, eliminating the problem of the loss of the step and reducing the temperature of the motor. Considering that stepless solution provides higher torque at low speed (for the same size of the motor) with respect to the brushless solution, it makes stepless servo motor very suitable for particular applications at low speeds.
The stepless solution is available as a stand-alone version composed by SVM, stepless servo drive, and by MM series, “motor encoder box”, or as integrated version ISD, both with the fieldbus CANopen, PROFIBUS, serial RS485 with MODBUS protocol or controlled in Step & Dir.
The fieldbus CANopen DS402 allows ISD and SVM to be used with both the controllers of FCT family and with different controllers and especially with controllers that use the environment CODESYS 3.5 with Softmotion where you can choose ISD and SVM between the drives made available from CODESYS.

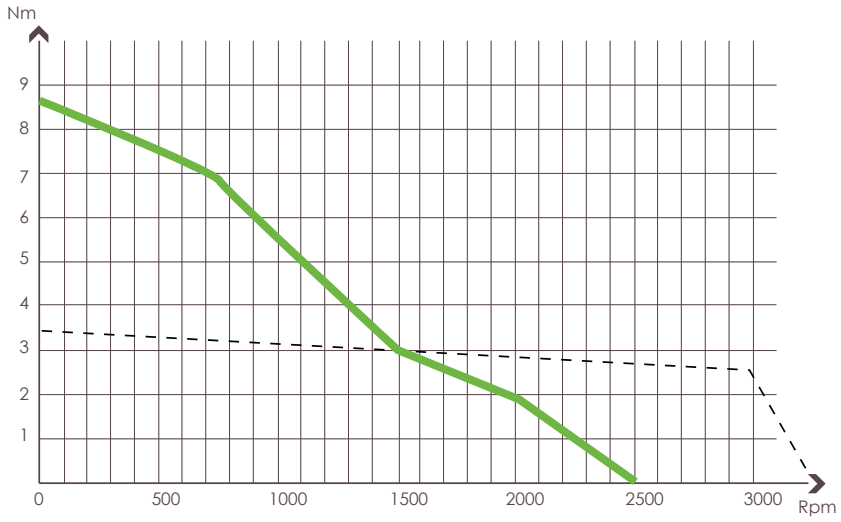
Stepless è il termine con cui CMZ identifica il controllo in catena chiusa di un motore stepper. Questa tecnologia permette di controllare il motore passo passo con corrente modulata, eliminando la problematica della perdita del passo e riducendo in modo importante la temperatura del motore. Considerando che soluzione stepless offre coppie superiori a bassi giri (a parità di dimensione del motore) rispetto alla soluzione brushless, ciò rende gli stepless servo motor molto adatti in particolari applicazioni a basse velocità.
La soluzione stepless è disponibile nella versione stand alone composta dal servo drive SVM e dai “motor encoder box” della serie MM o nella versione integrata ISD, entrambi con i bus di campo CANopen, PROFIBUS, serie RS485 con protocollo MODBUS o comandabili in Step&Dir.
Il bus di campo CANOpen con il profilo DS402 permette all’ISD e all’SVM di essere utilizzati sia con i controllori della serie FCT sia con controllori diversi e soprattutto con controllori che usano l’ambiente CODESYS 3.5 con Softmotion che permette di scegliere ISD e SVM tra i drives messi a disposizione da CODESYS.

• STEPLESS CONTROL

THE NEW GENERATION OF SERVODRIVE

• TORQUE CURVE COMPARISON: STEPLESS VERSUS BRUSHLESS

The ambition *to move* the limits

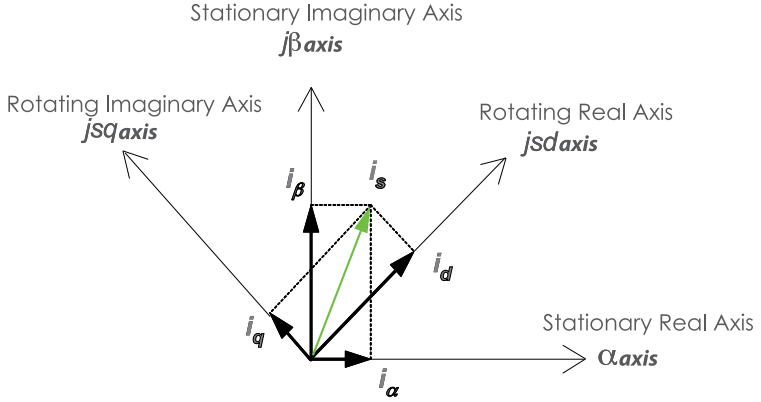


Torque curves considering S1 duty cycle

Stepless motor ——————
Stall torque 8,7Nm - 8A/phase - 120V
Overall dimensions: square flange 86mm, lenght 173mm

Brushless motor – – – – – – –
Stall torque 3,4Nm - 2,3A/phase - 400V
Overall dimensions: square flange 91mm, lenght 177mm

• VECTOR CONTROL CURRENT MODULATION



> Minimum speed and torque ripple
> Low vibration
> Low noise
> High torque density
> Low power consumption
> High stifness

• INTEGRATED STEPLESS DRIVE

HARDWARE FEATURES

Power supply
65-130Vdc [Nominal 120Vdc]

Logic supply
20-130Vdc

Current
Maximum current internally set
(depends on motor)

Feedback
Incremental encoder
Multiturn absolute encoder

Encoder output
Incremental encoder output (only APD version)

Digital input
N. 3 optoisolated PNP digital inputs
N. 2 differential (+24V or +5V/Line driver) digital inputs
(used as general purpose, encoder input or step-dir input).

Analog input
1 Analogue IN +/-10V

Digital output
2 optoisolated PNP digital outputs 24Vdc max 200mA,
(external 24Vdc required)

Digital bidiretional I/O
2 bidirectional optoisolated PNP digital IN/OUT

Interface
Profibus-DP slave
CANopen
RS232/485 (ModBus)

Available versions
Profibus-DP
CANopen (DS402),
ModBus RS485,
Step/dir, ±10V with encoder output

FUNCTIONAL FEATURES ISD

Integrated movement features:
device profile DS402, interpolated mode,
positioning, extended gearing function,
homing, capture

Stand alone programmability
according to the standard IEC61131,
ST language

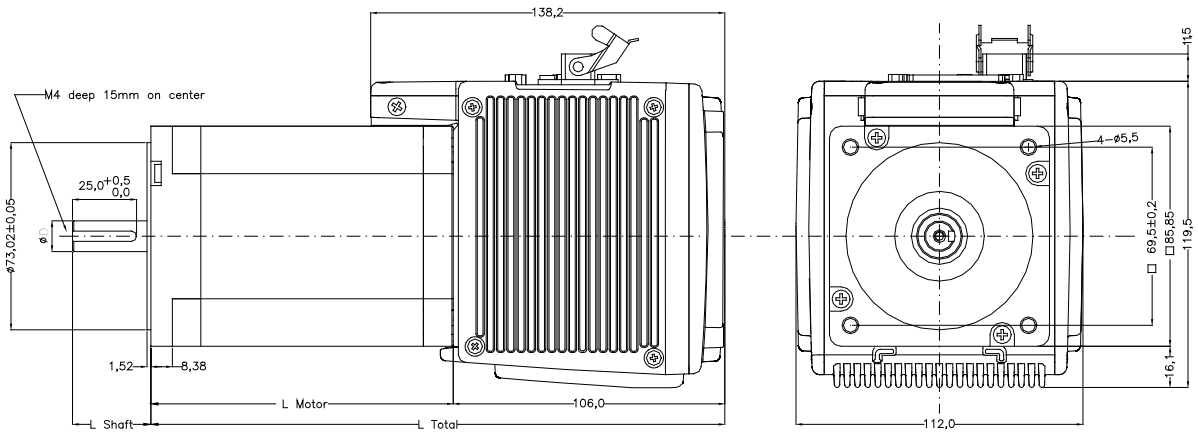
Capture input

PC parametrization tool

ISD

Stepless drives
& motors

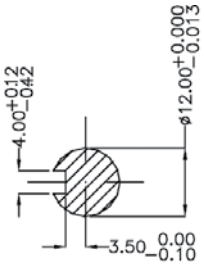
• OVERALL DIMENSIONS



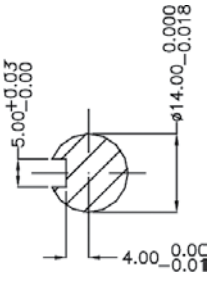
Drive	Holding torque (Nm)	Lenght (mm)		Shaft		Shaft section
		L motor	L total	L Shaft	D Diameter	
ISD 1281	4,6	80	186	30,6	12	Type 0 Keyed shaft
ISD 1271	8,7	118	224	30,6	12 or 14	Type 0 or 3 Keyed shaft
ISD 1261	12,0	156	262	30,6	14	Type 3 Keyed shaft

• SHAFT SECTION TYPES

TYPE 0



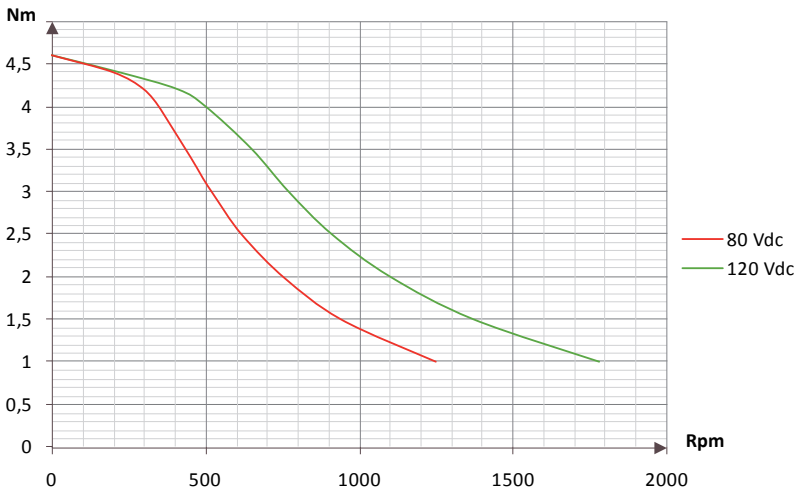
TYPE 3



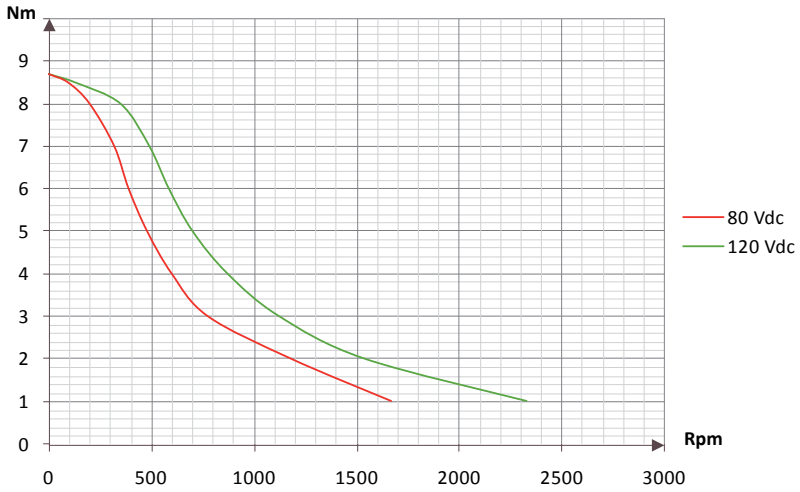
• TECHNICAL FEATURES

Drive	Holding torque (Nm)	Phase Current (A)	Rotor Inertia (gcm²)	Phase inductance (mH)	Weight (kg)
ISD 1281	4,6	5,5	1400	4,0	3,3
ISD 1271	8,7	8,0	2700	2,9	5,1
ISD 1261	12,0	9,9	4000	2,9	6,6

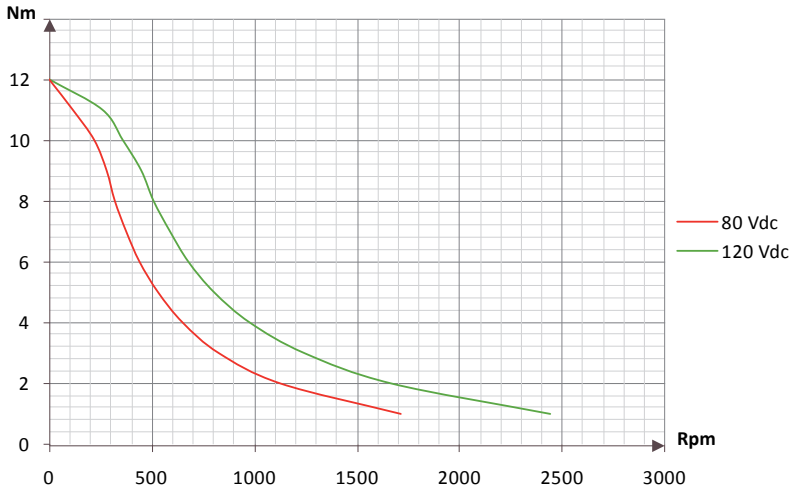
• TORQUE CURVES



ISD 1281 - 4,6 Nm



ISD 1271 - 8,7Nm



ISD 1261 - 12Nm

• ISD ORDERING CODE

Ordering code with optionals:					ISD12xy/a.bcd	
Type	Holding torque	Encoder	Com. (a)	Conn. (b)	Shaft type (c)	Option (d)
12=120V	x	y	a	b	c	d
ISD12xy	8				0	
ISD12xy	7				0 or 3	
ISD12xy	6				3	

Options		
x	8	4,6Nm
	7	8,7Nm
	6	12Nm
y	1	Incremental encoder 2000 pulse/turn
	2	Multiturn absolute encoder 2048 pulse/turn - 4096 turns
a	CAN	CAN Communication
	APD	Analog Pulse Direction
	SER	RS485 Communication
	PRO	PROFIBUS Communication
b	1	n.3 DSUB connectors + n.1 power supply 3 poles (ONLY FOR CAN, APD)
	2	Cicular connectors IP67 (ONLY FOR CAN, SER)
	3	n.3 DSUB + n.1 power supply with 4 poles (FOR CAN, SER, PRO, APD)
c (see the available optionals above)	0	Shaft diameter: 12 mm keyed shaft (ONLY FOR ISD1281 e ISD1271)
	3	Shaft diameter: 14 mm keyed shaft (ONLY FOR ISD1261 e ISD1271)
d	0	Old mechanics (no more available)
	1	Standard mechanics

		ISD12	7	1/	CAN	1	3	1
E.g	ISD1271/ CAN.100	ISD 12V	8,7Nm	Incremental encoder	Can interface	n.3 DSUB + n.1 power supply	14 mm keyed shaft	New mechanics

• SMART SERVODRIVE FOR 2 PHASES SYNCHRONOUS MOTOR

HARDWARE FEATURES

Power supply
65-180Vdc [Nominal 160Vdc]

Logic supply
20-180Vdc

Rated current
4Arms @40°C (8,5Arms with external ventilation)

Peak current
12Arms

Feedback
Incremental encoder, multiturn absolute encoder

Encoder output
Incremental line driver (differential output)

Digital input
7 configurable 24Vdc PNP optoisolated (e.g.: limit switch +/-, index, captures or general purpose)

Special digital input
2 configurable 24Vdc PNP or line driver optoisolated: settable as master encoder or step/dir or general purpose

Analog input
1 Analogue IN +/-10V

Digital output
4 optoisolated PNP digital outputs 24Vdc max 200mA
n. 1 24Vdc max 1,4A
for motor brake control or general purpose
(external power device required)

Interface
Profibus-DP slave
CANopen RS232/485 (ModBus) step/dir,
+/-10V with encoder output

CAN Speed/address selection
by switches or software settable

Available versions
Profibus-DP, CANopen, ModBus RS485, Step/dir, ±10V

Dimensions (mm)
W51xH196xD125

Weight (Kg) 0.8

FUNCTIONAL FEATURES SVM

Integrated movement features:
device profile DS402, interpolated mode, positioning, extended gearing function, homing, capture

Stand alone programmability
according to the standard IEC61131, ST language

Capture input

PC parametrization tool

Protection
I2t, Overload, Short circuit, Overtemperature, Overvoltage

• SVM ORDERING CODE

SVM 1608/a.bcd

Type	Power supply	Rated current	Interface /a	Motor temperature sensor management b		Reserved cd
SVM	16 (160V)	08 (8,5Arms)	CAN	0=no	1=yes	00
SVM	16 (160V)	08 (8,5Arms)	SER (RS485)	0=no	1=yes	00
SVM	16 (160V)	08 (8,5Arms)	PRO (Profibus)	0=no	1=yes	00

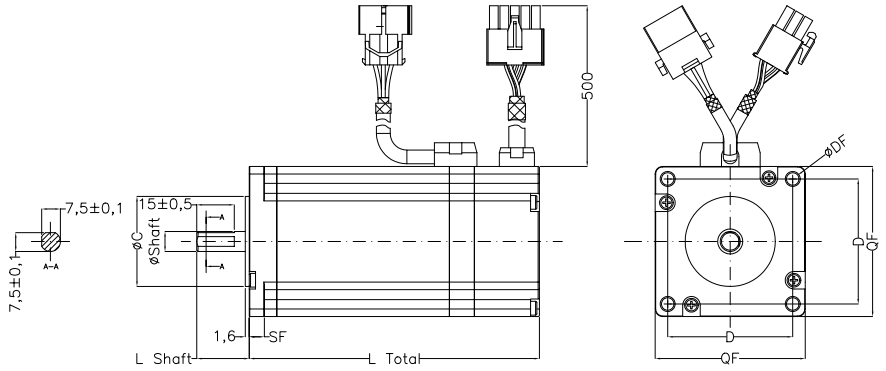
MM

Stepless drives
& motors

• OVERALL DIMENSIONS

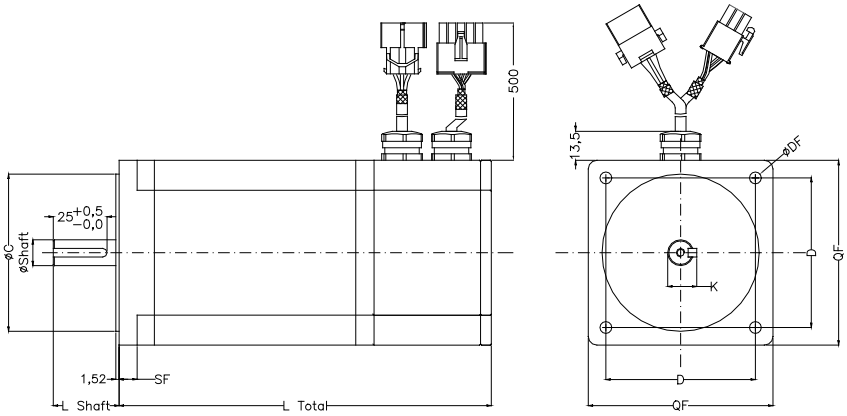
Motor type	Stall torque (Nm)	L total Lenght (mm)	QF Flange (mm)	C Centering (mm)	SF Thikness flange (mm)	D Holes distances (mm)	DF Fixing holes (mm)	Ø Shaft (mm)	K (mm)	L Shaft (mm)	Weight (kg)
MM609442	2,8	116	60	36,05	6,00	50,2	4-Ø5,5	8	-	21,0	1,5
MM868055	4,6	135	86	73,02	8,38	69,5	4-Ø5,5	12	13,5	30,6	2,8
MM8611880	8,7	173	86	73,02	8,38	69,5	4-Ø5,5	12/14	16,0	30,6	4,3
MM8615699	12	211	86	73,02	8,38	69,5	4-Ø5,5	14	16,0	30,6	5,8
MM11015065	21	205	110	55,52	12,5	89,00	4-Ø8,5	19	21,5	55,37	9

• OVERALL DIMENSIONS FLANGE 60

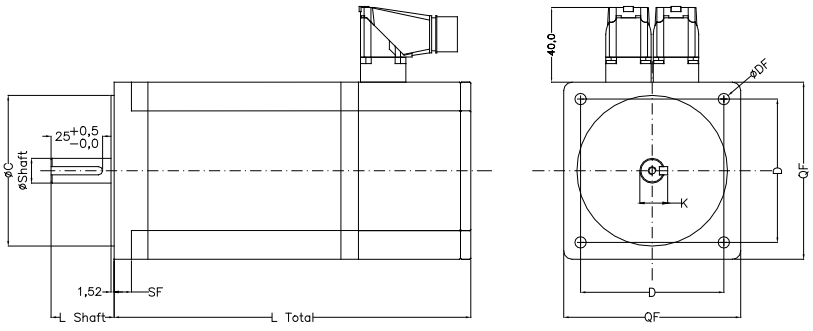


• AMP CONNECTORS

• OVERALL DIMENSIONS FLANGE 86 - 110

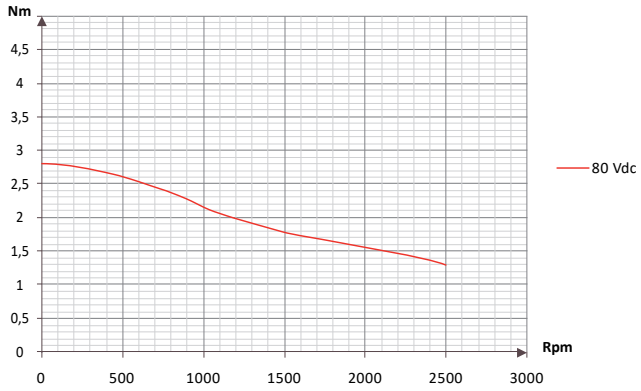


• AMP CONNECTORS

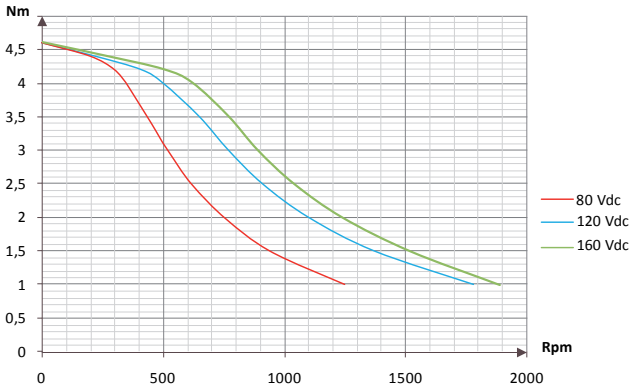


• CIRCULAR CONNECTORS

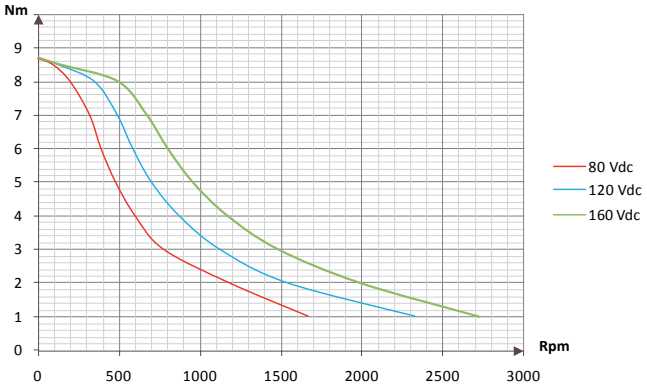
• TORQUE CURVES



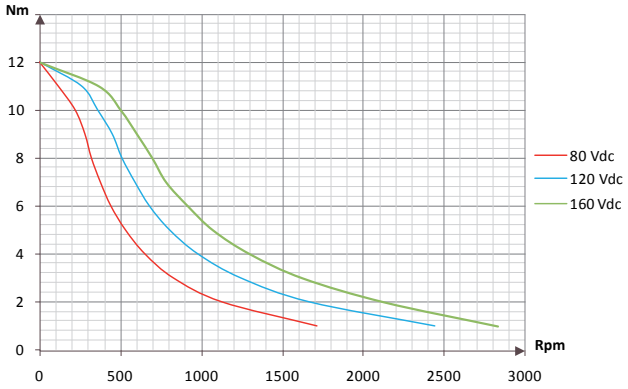
SVM - MM609442- 2,8 Nm



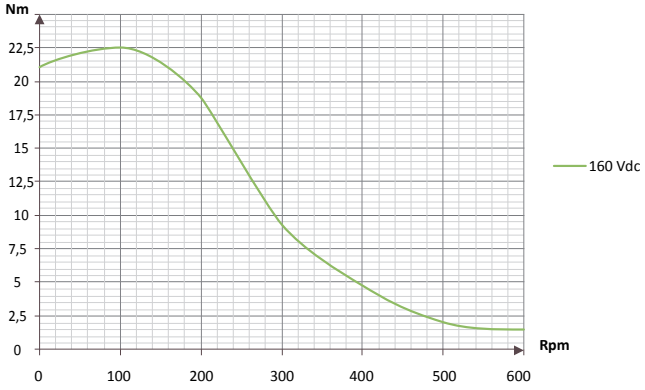
SVM - MM868055 - 4,6 Nm



SVM - MM8611880 - 8,7 Nm



SVM - MM8615699 - 12Nm



SVM - MM11015065 - 21Nm

MM
Ordering Code

Stepless drives
& motors

• MM MOTORS ORDERING CODE

Ordering code with Optionals:										
	x				a	b	c	d		
	MM	60	9442	.	3	6	1	0		
x	MM	60	9442		Holding torque 2,8 Nm	□ FL60 mm	780 gcm²	Ø 8mm	Inc enc 1000 pulse/turn	
	MM	86	8055		Holding torque 4,6 Nm	□ FL86 mm	1400 gcm²	Ø 12mm	Inc enc 2000 pulse/turn	
	MM	86	11880		Holding torque 8,7 Nm	□ FL86 mm	2700 gcm²	Ø 12 or 14mm	Inc enc 2000 pulse/turn	
	MM	86	15699		Holding torque 12 Nm	□ FL86 mm	4000 gcm²	Ø 14mm	Inc enc 2000 pulse/turn	
	MM	110	15065		Holding torque 21 Nm *	□ FL110 mm	10900 gcm²	Ø 19mm	Inc enc 2000 pulse/turn	
a	0				Shaft Diameter: 12 mm Keyed shaft (ONLY FOR 4,6 Nm and 8,7Nm)					
	1				Shaft Diameter: 14 mm Keyed shaft (ONLY FOR 8,7 Nm and 12Nm)					
	2				Shaft Diameter: 19 mm Keyed shaft (ONLY FOR 21Nm)					
	3				Shaft Diameter: 8 mm Keyed shaft (ONLY FOR 2,8 Nm)					
b	0				Incremental encoder 2000 pulse/turn (ONLY FOR MM86 and MM110)					
	3				Incremental encoder 2000 pulse/turn + Thermal sensor (ONLY FOR MM86 and MM110)					
	6				Incremental encoder 1000 pulse/turn (ONLY FOR MM60)					
c	1				AMP connectors with cable output 50cm					
	2				Circolar connector output 90°					
d	0				IP44					

* Usable only up to the speed of 500 rpm

• CABLES FOR STEPLESS MOTORS AND ORDERING CODE

Type	Description	Lenght (mt)
Cable with connector motor side and drive side for fixed installation		
CSMP.IIPS.PF6S.A.0500	Motor cable for motors cover box with AMP 6 poles	5
CSMP.IIPS.PF6S.A.0300	Motor cable for motors cover box with AMP 6 poles	3
CSEI.DMCS.PF9S.A.0500	Encoder cable for motors cover box with AMP 15 poles	5
CSEI.DMCS.PF9S.A.0300	Encoder cable for motors cover box with AMP 15 poles	3
CSMP.IIPS.CFCS.A.0500	Motor cable for motors cover box circular connector 7 poles	5
CSMP.IIPS.CFCS.A.0300	Motor cable for motors cover box circular connector 7 poles	3
CSEI.DMCS.CFCS.A.0500	Encoder cable for motors cover box circular connector 12 poles	5
CSEI.DMCS.CFCS.A.0300	Encoder cable for motors cover box circular connector 12 poles	3
CSIT.DMCS.CFCS.C.0500	Encoder cable for motor cover box with temperature sensor circular connector 12 poles	5
CSIT.DMCS.CFCS.C.0300	Encoder cable for motor cover box with temperature sensor circular connector 12 poles	3
Cable with connector motor side and drive side for flexing installation		
CSMP.IIPS.CFCS.B.0500	Motor cable for motors cover box circular connector 7 poles	5
CSMP.IIPS.CFCS.B.0300	Motor cable for motors cover box circular connector 7 poles	3
CSEI.DMCS.CFCS.C.0500	Encoder cable for motors cover box circular connector 12 poles	5
CSEI.DMCS.CFCS.C.0300	Encoder cable for motors cover box circular connector 12 poles	3
CSIT.DMCS.CFCS.D.0500	Encoder cable for motor cover box with temperature sensor circular connector 12 poles	5
CSIT.DMCS.CFCS.D.0300	Encoder cable for motor cover box with temperature sensor circular connector 12 poles	3

• POWER SUPPLY ORDERING CODE

Ordering code with optional : SDPOW0.xxx	
Auxiliary output 24Vdc 150mA	
SDPOW0.201	Power supply AC/DC 80Vdc-120Vdc
SDPOW0.211	Power supply AC/DC 80Vdc-120Vdc + DIN guide

Ordering code with optional : SDPOWR.xx	
Auxiliary output up to 50Vdc 1A	
SDPOWR.00	Power Supply AC/DC 80Vdc-170Vdc
SDPOWR.10	Power Supply AC/DC 80Vdc-170Vdc+START UP circuit - It is necessary with ISD

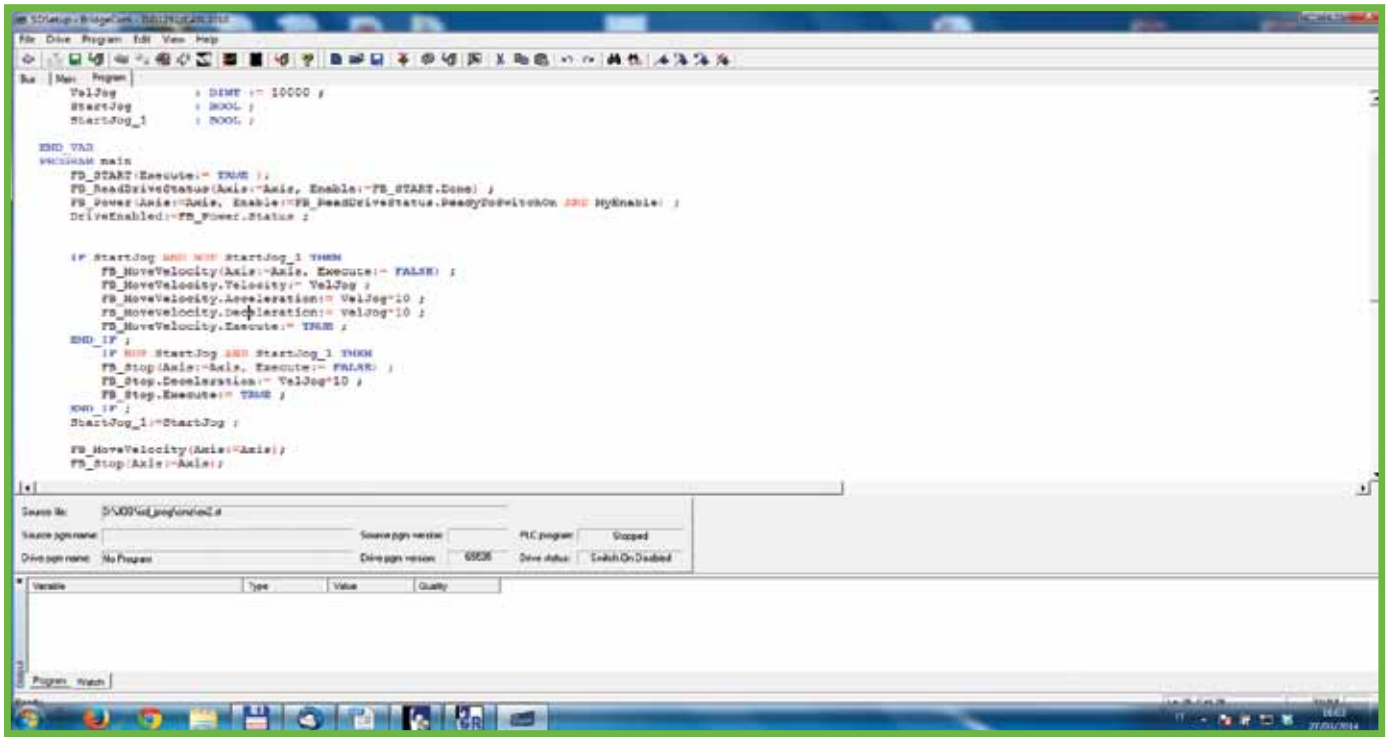
Ordering code with optional : SDPOWT.00	
SDPOWT.00	Power Supply AC/DC up to 160Vdc

SD SETUP

The environment

Stepless drives
& motors

• SD setup



SD setup is the development environment for the configuration, parameterization, tuning and programming of the drives ISD/SVM and IBD using the RS232 serial connection or a centralized connection through a fieldbus when the master controller is a controller of the FCT family. It is a software that combines various tools such as:

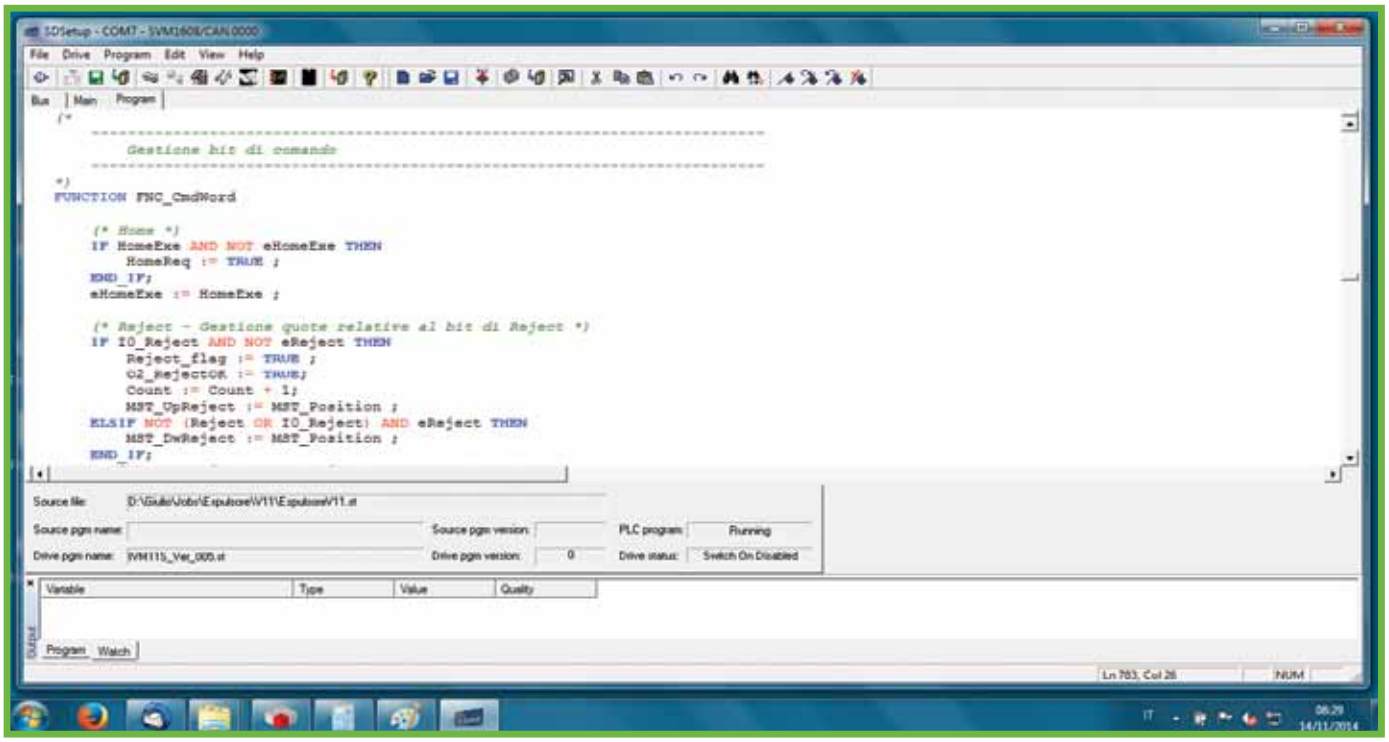
- Instant monitor of the main variables of the system, but also of all the secondary variables through an access to vocabulary.
- Configuration of the system (such as configuration of the digitals I/O modules and the maximum limits of speed/ acceleration).
- Updating of parameters and firmware.
- Auto-tuning and dedicated tuning of the current loops, speed and position, with help of procedures for self-esteem of the moment of inertia.
- Oscilloscope for the analysis of the variables.
- Tools for testing of basic movements (Function Generator).

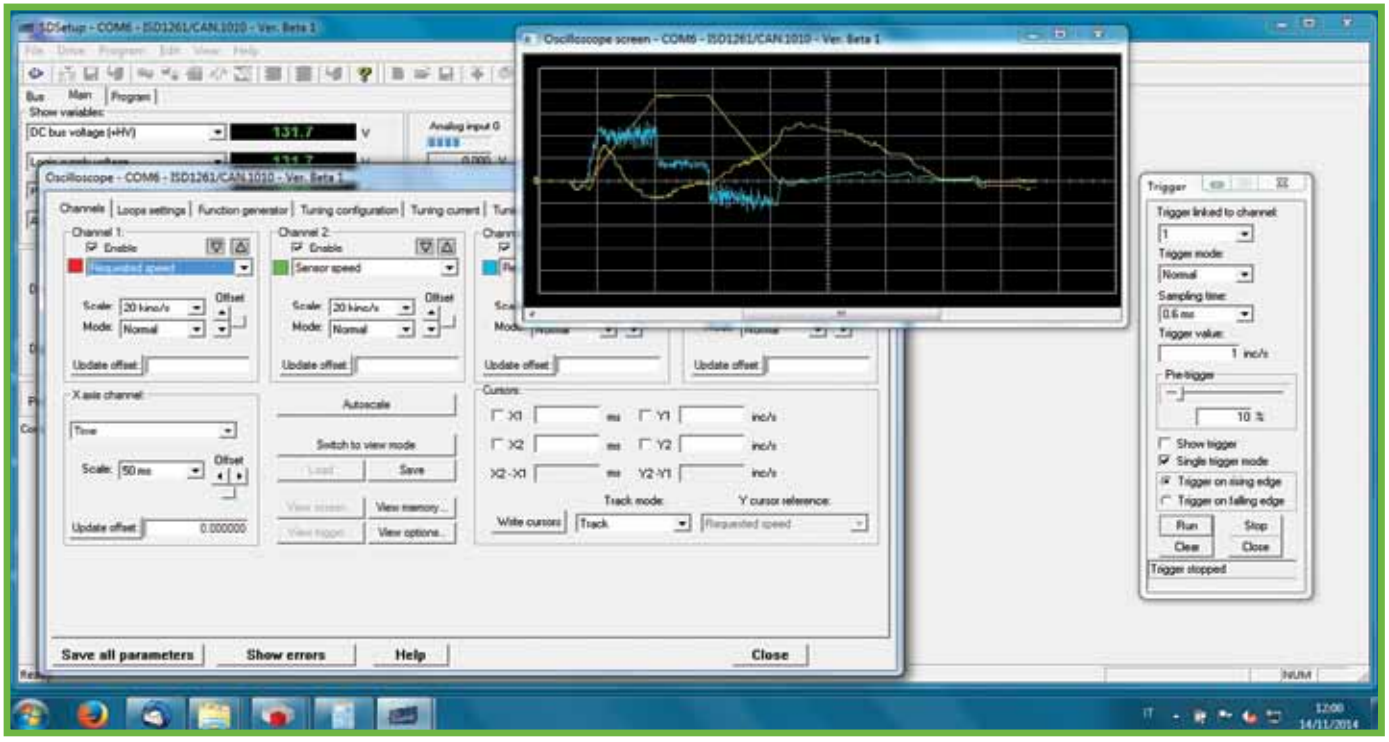
Finally, recalling that the systems are also programmable, SD setup is also proposed as a tool that allows editing and debugging programs written in IEC61131 type Structured Test.

SD setup è l'ambiente di sviluppo per la configurazione, parametrizzazione, programmazione e taratura degli azionamenti ISD/SVM e IBD utilizzando la seriale RS232 o un collegamento centralizzato tramite bus di campo quando il master controller è un controllore della famiglia FCT. Si tratta di un software che unisce diversi strumenti come:

- Monitor immediato delle principali variabili di sistema ma anche di tutte le variabili secondarie tramite un accesso a vocabolario.
- Configurazione del sistema (ad esempio degli I/O digitali, dei limiti massimi di velocità/accelerazione).
- Aggiornamento di parametri e firmware.
- Autotuning e taratura dedicata dei loop di corrente, velocità e posizione, con ausilio di procedure di autostima del momento di inerzia.
- Oscilloscopio per l'analisi delle varie grandezze.
- Strumenti per il test dei movimenti base (Function Generator).

Infine, ricordando che i sistemi sono anche programmabili, SD setup si propone anche come lo strumento che permette l'editazione e il debug dei programmi scritti in linguaggio IEC61131 di tipo Structured Test.


File Drive Program Edit View Help
Bus Main Program
(*
Gestione bit di comando
*)
FUNCTION FNC_CmdWord
(* Home *)
IF HomeExe AND NOT eHomeExe THEN
HomeReq := TRUE ;
END_IF;
eHomeExe := HomeExe ;
(* Reject - Gestione quote relative al bit di Reject *)
IF IO_Reject AND NOT eReject THEN
Reject_flag := TRUE ;
O2_RejectOK := TRUE;
Count := Count + 1;
MST_UpReject := MST_Position ;
ELSIF NOT (Reject OR IO_Reject) AND eReject THEN
MST_DwReject := MST_Position ;
END_IF;
Source file:
Source pgm name:
Source pgm version:
PLC program:
Running
Drive pgm name:
Drive pgm version:
Drive status:
Switch On Disabled
Variable
Type
Value
Quality
Program
Watch


Oscilloscope screen - COM6 - ISD1261/CAN1010 - Ver. Beta 1
Channels
Loops settings
Function generator
Tuning configuration
Tuning current
Channel 1:
Enable
Requested speed
Channel 2:
Sensor speed
Scale:
Mode:
Offset
Update offset
X axis channel:
Time
Autoscale
Switch to view mode
Load
Save
Cursors:
Track mode:
Y cursor reference:
Write cursors
Track
Requested speed
Trigger
Trigger linked to channel:
Trigger mode:
Normal
Sampling time:
Trigger value:
Pre-trigger
Show trigger
Single trigger mode
Trigger on rising edge
Trigger on falling edge
Run
Stop
Clear
Close
Trigger stopped
Save all parameters
Show errors
Help
Close

Solution in **Motion**

precision and control | harmony of movement | problem solving

CMZ SISTEMI ELETTRONICI Srl

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