1969/2019 50 YEARS IN THE ELECTRONIC WORLD

HDT

Motors & Digital Drives

EtherCAT

PROFINET

CANopen

Modbus

EtherNet/IP

DGFox60 Evo Servosystems

A little giant

DGFox60 EVO Servodrives

Power and intelligence in an unthinkable amount of space.
In thinking of the new DGFox60 servosystem we have taken into consideration all the elements to create a servodrive that is powerful and even more versatile than before, maintaining simplicity of use and compactness but expanding the possibilities of legible encoders and bringing the available fieldbuses to five.

Fieldbuses Options
- CanOpen CiA 402
- ModBus RTU
- EtherCat COE
- ProfiNet RT and IRT
- Ethernet IP

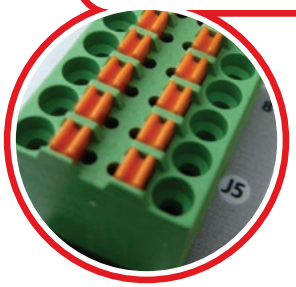
Firmware Functionalities
- Speed control with adjustable ramps with/without jerk
- Torque control with cogging compensation
- Torque limit control
- Multipositioner up to 64 indexes
- Electronic Gear
- Electronic Cam
- Tubolar, linear and rotative motor control
- Digital filters
- Pressure Control
- Hydraulic cylinder control

Control Mode
- Fieldbuses
- Pulses/Direction
- 12 Bit Analog

Feedbacks
- Sensorless
- Hall Signals at 120°
- Incremental Encoders 5V LD
- Inc. Enc. with Hall Sensors
- Absolute Encoders SSI, BISS, EnDat (32bit)

60VDC
0,9kW

Easy to wire terminals



Motor Brake
- Electronic brake management

Synchronous motors
- AC Brushless
- DC Brushless

Main Features

Easy Setting

CALIPER is the software tool designed to make the calibration of your servo drive and motor a simple procedure. In addition to saving and loading data, Caliper includes a powerful oscilloscope professional tools for Autophasing, automatic reduction of cogging, Fieldbus Analyzer and many other features to help you to better adjust your applications. Communication is via Micro USB port 2.0 (Windows OS only).

Caliper Software

Filtering Software

- Notch Filter
- Iq Filter
- Digital Input Filter
- Position Observer
- Measured Speed Filter

Alert Status

- via LED's
- via Fieldbuses

Feedback Output

- Encoder Repetition

Frame

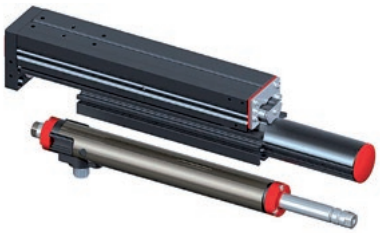
- Designed around a high efficiency heatsink. Requires no ventilation. More space in the electrical cabinet.
- Metal cover to minimize electrical disturbances.

DC servomotors

- Permanent Magnets with Incremental Encoder

Linear Motors

- Brushless linear motors control



Servodrive technical specifications

		DGFox60EVO				
SIZES	UfoM	2.5	5	8	10	13
Applied Voltage	V	60 VDC				
Min/Max power supply	V	20VDC ÷ 80VDC				
Rated current	A	2.5	5	8	10	13
Peak current for 2”	A	5	10	16	20	26
Max output power	KW	0.175	0.350	0.550	0.70	0.90
Max output power (DC brushed)	KW	0.125	0.250	0.40	0.50	0.65
Control method		IGBT/PWM, sinusoidal or trapezoidal for synchronous motors, for d.c. motors with permanent magnets.				
Logic power supply	VDC	+24VDC ±20%				
Integrated braking circuit		Not present				
External resistor (Optional)	VDC	Not Managed				
External EMC filter		Not required				
Feedback (5V)		Halls Sensors - Inc. Enc. 5V LD with, w/o Halls Sensors - Abs. Enc. 32bit: SSI (Bin), Biss (B-C), EnDat (2.1- 2.2) - Sensorless				
Type of motors controllable		Rotary, linear and tubolar AC/DC brushless motors DC brushed permanent magnets motorsi				
Optional fieldbus	CM	Modbus RTU/CanOpen CiA 402				
	EC	EtherCat CoE				
	PN	ProfiNet RT e IRT / Ethernet IP				
Analogue main reference		±10V Differential (12Bit)				
Analogue auxiliary reference		0/+10V Single ended (12Bit)				
Frequency Reference		Pulse/Direction - 5V Line Driver channels A/B - CW/CCW (2MHz)				
Auxiliary Reference		5V Line Driver channels A/B				
Digital Inputs and Outputs		6 inputi PNP - 2 output NPN/PNP				
Control modes		Speed - Adjustable ramps - Torque control - Multipositioner - Electronic gearbox - Electronic CAM - Pressure Control - Cylinder Control				
Limit switch management functions		Braking in torque limit in case of P-OT, N-OT				
Digital filters		Notch filter, Iq filter, Digital Input Filter, Position Observer, Measured Speed Filter				
Protections functions		Short-circuit - Over/undervolt. - Drive Overtemp.- Feedback break - Rated current limit				
Drive Signaling		3 LEDs for status and alarm				
Hardware Safety Functions		Not Available				
Software Safety Functions*		Emergency or Fault Reaction Stops: by Inertia - in Ramp - in Torque Limit Torque limit braking in the case of Limit Switch				
Brake Management		Integrated. Immediate or ramp stop				
Drive setting		Through sofware Caliper via MicroUSB 2.0 port				
Approximative weight	Kg	0.39				

*: Not certified

Position transducers

The servodrives are equipped with several inputs for the reading of position transducers. A standard main input that allows to read incremental and absolute SSI, BISS, EnDat encoders. A second input dedicated to the reading of a second external incremental encoder or for a frequency-direction signal from PLC.The transducers mounted on the motor gives to the servodrive the information to control exactly the motion of the motor. The drives can control both rotary and linear motors and are therefore capable to read both transducers for rotary and linear motors of various types.

The drives also allow to control sensorless rotary motors, but this use is limited to "motion control" applications that don't need accurate positioning.
Most of "motion control" applications need an accurate control of the axis, and therefore they rely on position transducers with high precision, repeatability and robustness characteristics.

Incremental encoder with Hall sensors

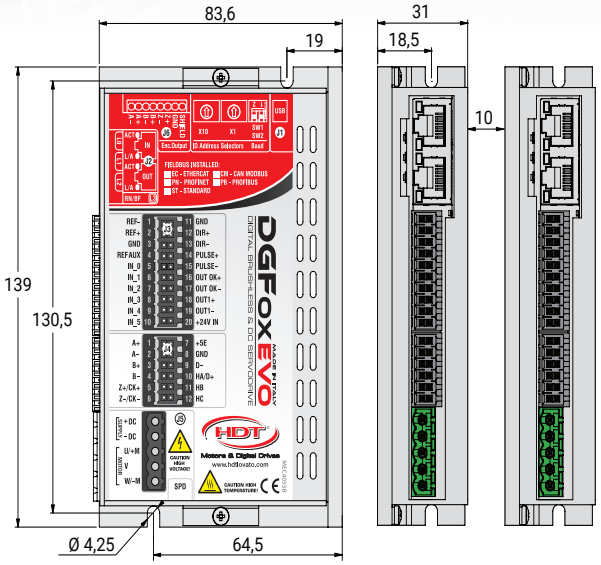
The servodrives in their standard configuration allow reading Incremental Encoders with or without Hall sensors. The Incremental Encoder is an optoelectronic device applied to the motor's rotor that develops square-wave signals proportional to the angular shift of its rotary axis that is given back to the drive to manage both the motor and the application. The encoder provides an information of relative position, not absolute, and therefore is always necessary an "homing" procedure to define an absolute position of the system. The signal generated is sent to the drive that performs the count and extrapolates, according to frequency, space, speed and acceleration data needed to control the motor. The resolution depends on the sensor and is measured in PPR, that is "pulses per round". Usually, HDT motors use incremental encoders with 1024 or 2500ppr.

Absolute encoder BiSS - SSI - Endat

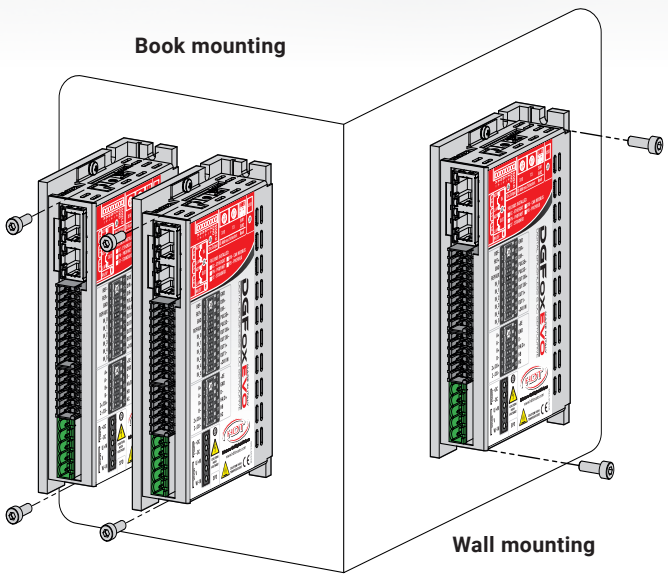
The absolute encoder is designes to provide an information of absolute position on the single turn or on the multi-turn; mechanically, the working principle is similar to an incremental encoder, which have a univocal code written on a disk that allows to identify every angular position of the axis.
Therefore it is always possible to know exactly the position of the axis even when stationary, without the necessity to perform an "homing" procedure to define the absolute position. The digital signal sent to the drive or to CNC is a serial protocol. SSI, BiSS and EnDat (2.1 - 2.2) are the three serial protocols handled by HDT servodrives with a resolution of 32bit on single turn and 16bit on multiturn.
The encoder for a multi-turns information can use a mechanical system or it can memorize the number of turns on a battery powered memory or a Wiegand effect system
HDT installs on its motors an absolute mechanical encoder type BiSS with 22bits of resolution on the single turn and 12 bits on the multi-turn or a Wiegand effect with 17Bits on the single turn and 16Bits on the multiturn.

Drive Dimensions

DGFox60 EVO



Drive Mounting



Advanced Communication

The new EVO series drives, thanks to a new CPU, are not simply faster, but they are also more advanced in comunication.

Produced in four versions:

- **ST** - Standard - Analog and frequency control mode
- **EC** - Ethercat CoE fieldbus in addition to Standard
- **PN** - Profinet RT, IRT and Ethernet IP fieldbus in addition to Standard
- **CM** - ModBus RTU and CanOpen CiA 402 fieldbuses in addition to Standard

ST

STANDARD

STANDARD VERSION

Analogue and pulses train
Speed control
Torque control
Electronic gear
Multipositioner
Electronic cam
Servopump
Servocylinder

EC

EtherCAT

ETHERCAT CoE
CiA 402 Protocol

Position Mode
Velocity Mode
Profile Velocity Mode
Profile Torque Mode
Homing Mode
Interpolated Position Mode
Cyclic Sync Position Mode
Cyclic Sync Velocity Mode
Cyclic Sync Torque Mode
Touch Probe
Electronic Gear
Servopump
Servocylinder

PN

PROFINET

PROFINET RT & IRT (CC-C)
Profidrive Protocol

Speed control (AC1-AC4). Telegr. 1,3,20,120
Positioner in Program Mode (AC3). Telegr. 7,120
Manual positioner (AC3). Telegr. 9,120
Isochronous Position Control (AC4). Telegr. 5,6,105,106
Electronic Gear*
Servopump. Telegr. 121
Servocylinder. Telegr. 122

CM

EtherNet/IP

Ethernet IP
CIP Protocol

Speed control
Torque control
Electronic gear
Multipositioner
Electronic cam
Servopump
Servocylinder

CANopen

CANOPEN
CiA 402 Protocol

Position Mode
Velocity Mode
Profile Velocity Mode
Profile Torque Mode
Homing Mode
Interpolated Position Mode
Cyclic Sync Position Mode
Cyclic Sync Velocity Mode
Cyclic Sync Torque Mode
Touch Probe
Electronic Gear
Pressure Control
Hydrulic Actuator
Servopump
Servocylinder

Modbus

MODBUS
RTU Protocol

Speed control
Torque control
Electronic gear
Multipositioner
Electronic cam
Servopump
Servocylinder

*= Under development - contact HDT for availability

Software interface: Caliper

CALIPER is the software tool designed to simplify the calibration of your servodrive and motor with Microsoft Windows operating systems. A specific grafic interface extremely intuitive speeds up and make it even more simple to access the full range of functions of all the HDT servodrives. In addition to selecting the applications, save and load data, Caliper includes a powerful professional oscilloscope, autophasing tools, automatic cogging reduction, observer for vibrations, fieldbus analizer and many other applications to help you tune your applications at best. The communication is via USB 2.0 port, and therefore it doesn't need special cables or serial converters.

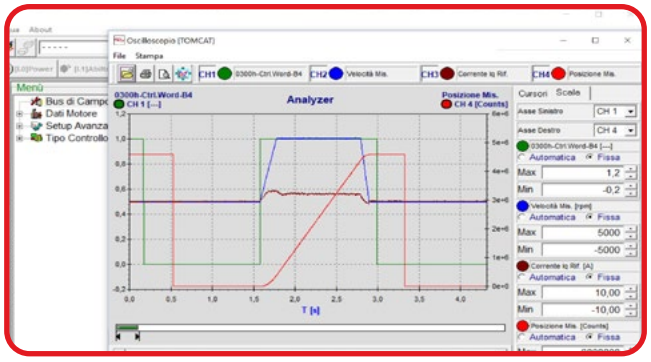
MAIN FEATURES:

- Drive configuration
- Reading, loading and saving of drive parameters
- Possibility to connect via USB Hub different drives and to control them simultaneously from Caliper selecting the specific drive.
- Oscilloscope with 4 configurable channels with the possibility register, save and print the measures taken
- Motor autotuning and autophasing
- Filters
- Display Alarms
- Selection and configuration of operative mode:
  - Torque control
  - Torque limit control
  - Speed and positioning control
  - Multi-positioning
  - Electronic Axis
  - Electronic Cam
  - Pressure Control (hydraulic press)
  - Hydraulic Actuator Control

Micro USB 2.0 port

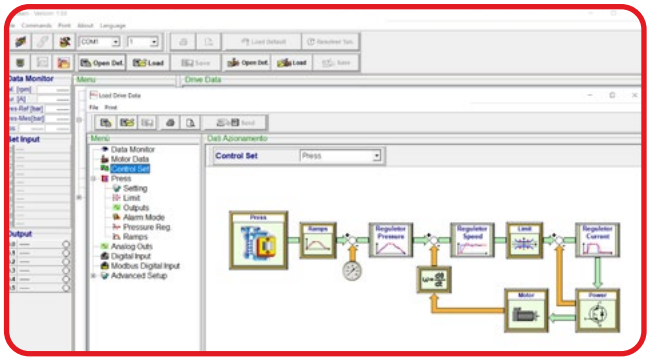
4-channel digital real time oscilloscope

Flagship of Caliper software from the beginning, the new 4 channels oscilloscope allows to sample signals at 100µs via the fast USB2 port. All channels are selectable, recordable, savable also as picture or PDF format.
A convenient wave function generator feature is available, useful to perform the tuning of control loop without having to phisically remove the axes. Data gathered during observation can be saved and printed in order to be shared or stored.



Easy parameterization.

Rationalization of the parameters, the use of block diagrams and the graphical representation of the applications simplify the paratremization of the drive. Ability to save and load axis calibration data and motor data.



Intuitive Interface.

Clear and logic interface, off-line data input, multi-language mode (english, italian, french, turkish and chinese), simplify the navigation in menus and commands. Important parameters accessible only with password. "Operator enable" security function to avoid accidental manumissions.

Position Control: Multi-positioner

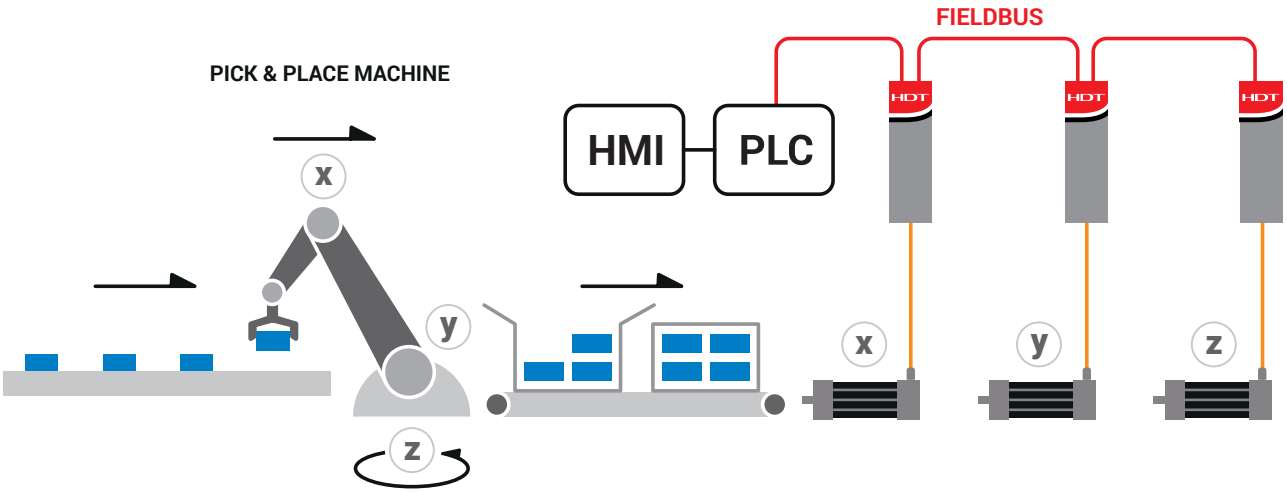
The servodrives integrate a "multi-positioner" operating mode with 4 selectable modes.
The positioner application generates a speed profile to reproduce a motion trajectory with controlled acceleration and jerk, allowing accurate positioning. The profile calculation is performed in real time allowing to modify on-the-fly the position target with time lower than 1 millisecond. This allows to manage in a fast way different motion profiles.
The positioner includes a functionality called "stop on marker" that allows to perform a controlled position stop when a sensor signal is detected by a digital input of the drive during the execution of the trajectory.

Single target positioner.
This mode can be activated both with digital/analog input and with all fieldbuses.
The drive configured in this way allows to generate a trajectory profile only for a target defined as position target, with speed, acceleration, deceleration and jerk. The positions can be absolute or relative.
Using the fieldbuses, all parameters can only be set on the fly by telegram; only the Modbus RTU allows to work with maximum flexibility using both modbus commands and digital/analog input commands.
In case a fieldbus is not available, position and speed can be set in analog mode via the respective input, while the other parameters can be set via Caliper software.

Positioner with table of targets.
This mode can be activated both with digital/analog inputs and with Modbus RTU and ProfiNet RT.
The positioner allows to manage a maximum of 64 targets. As with the single target, for each target it is possible to set position, speed, acceleration and jerk. The positions can be absolute or relative.
The targets are wrote in a table on the drive via Caliper or via fieldbus.
The targets can be executed individually or linked in different ways allowing to generate more complex profiles.
It is possible to cycle automatically the series of linked targets and to interpose a waiting time between one target and the other.

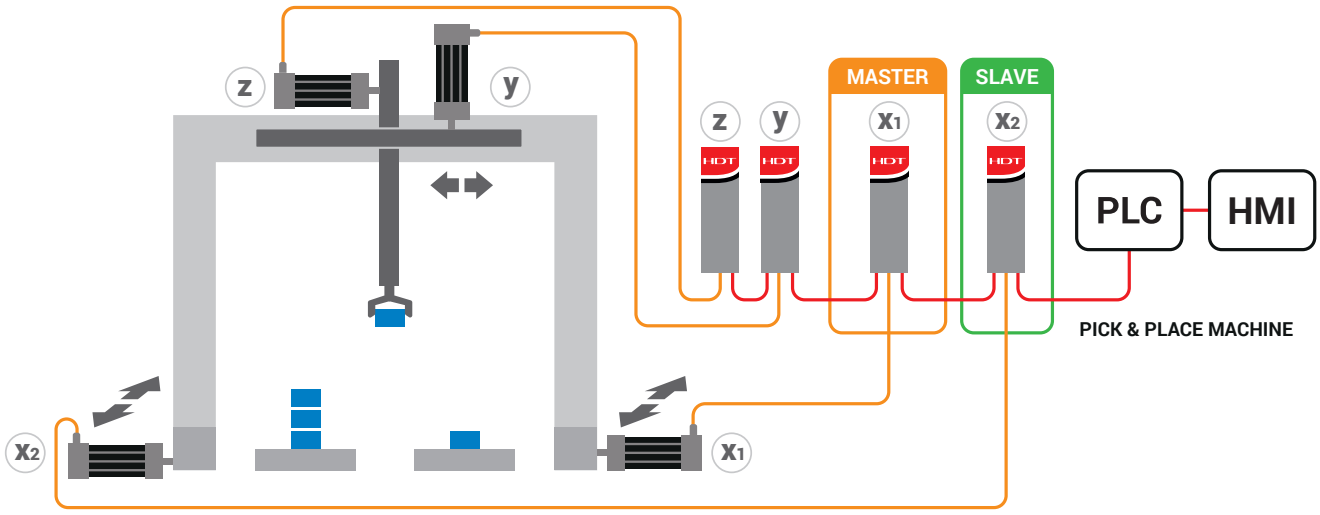
Cyclic positioner.
This mode is similar to the positioner with target from table, with the difference that the targets are strictly executed one after the other.
The targets can be activated manually via I/O or via Modbus RTU.
The option to make the sequence of set dimensions cyclical is provided.

"Input-start" positioner.
This mode allows to synchronize the starting of an axis with the reaching of the position of another axis, without the necessity to use a PLC. It is different from the previous one because the input that selects the target or the group of linked targets also becomes the start command of the target itself. The "reached position" signal can be activated on each of the digital output of the drive.
Therefore, connecting one of the output of reached target of a servodrive with the input of another servodrive, it allows the synchronized starting of the latter.
This mode only works with digital/analog inputs and with Modbus RTU fieldbus.



Position Control: Electronic Axis

The electronic axis (electronic gear) is a standard feature of the servodrives that allows to set a transmission ratio between one or more motors, where a slave axis, or "follower", follows a master axis according to a preset ratio. This ratio is set in the slave drive and can be modified at will.The movement of the master is measured with an encoder, which signal is sent to the input of the follower drive, that follows according the set ratio. The electronic axis replicates the mechanical transmission principle, in the same way that happens in a reducer, recirculating ball screw, a rack or a pulley and belt system. The transmission with mechanical reduction allows to change speed, to increse torque and helps to reach the match of inertia between motor and load. The electrical axis function, compared to mechanical reduction, only regulates the speed but with the advantage of allowing to change on will and to eliminate backlash and deterioration typical of mechanical systems. It is possible to connect different slave axes to a single master axis, with different electrial gear ratio. When managing the electrical axis, It is important to calibrate the parameters of slave axis, especially response times.



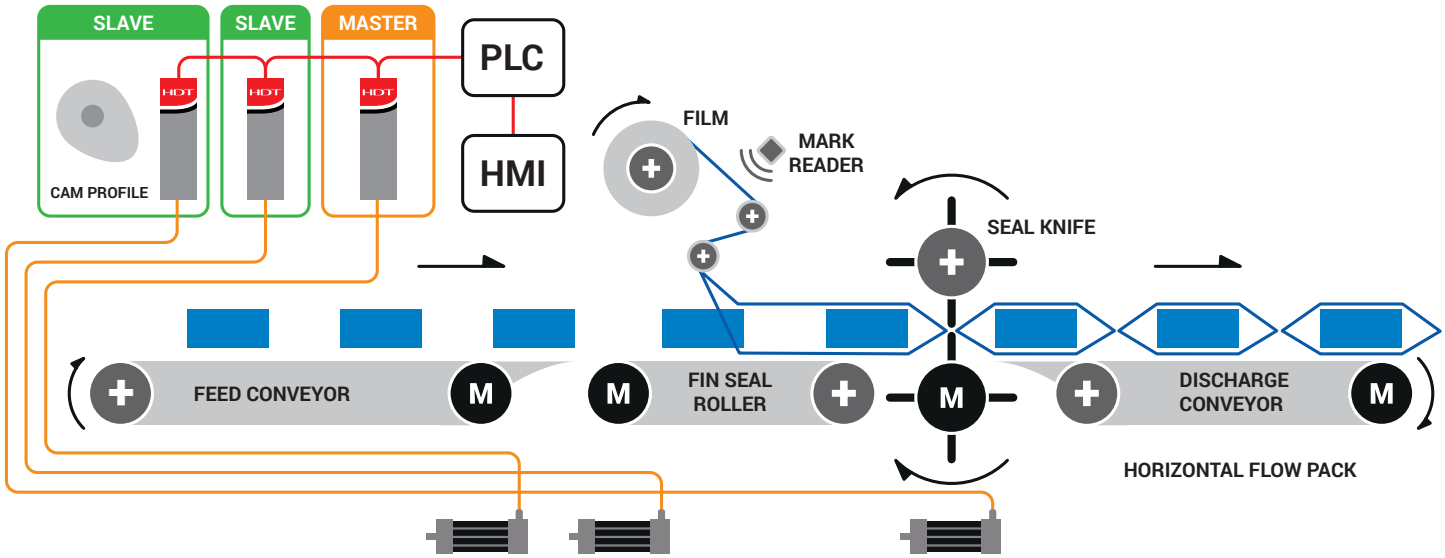
Electronic Cam Control

The electronic cam is a feature that replicates the concept of mechanical cam. The mechanical cam is an element with irregular shape (tipically ovoid) fixed to a rotating shaft of an axis and wihich moves another mechanical parts that follows and reproduces the profile.

In the electronic cam, the mechanical regulation is replased with electronic. A cam profile is defined via a X/Y table with a maximum of 576 interpolable points

Unlike the mechanical cam, where the cam profile is fixed to master axis, in the electronic cam the profile is inserted in the servodrive that drives the follower motor.
The "slave" axis receive the space reference of the "master" axis and replicate the profile described in the table of X/Y points, generating the resulting motion.
The signal of the master axis can come from an esternal encoder or from the signal of a simulated encoder of a servo axis.

The benefit of the electronic cam compared to the mechanical one is evident in the flexibility to manage more than one profile, to be able to modify the profile very easilyu in any moment and not least the reduction of mechanical backlash and the corresponding adjustments that follow.



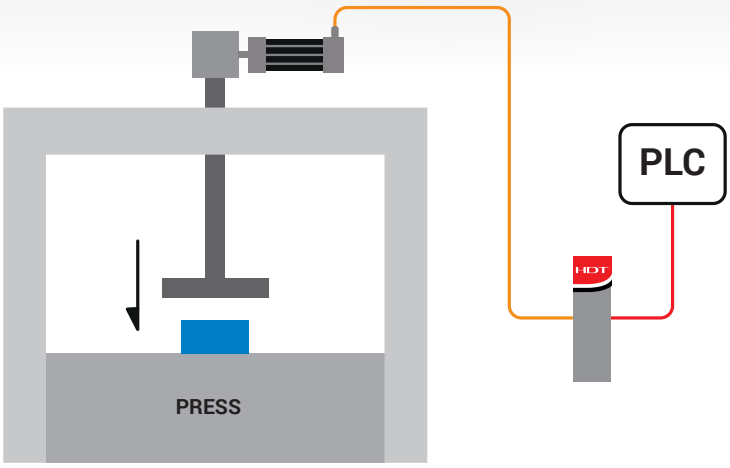
Torque Control

The torque control is an application that allows to control the torque provided by the motor thanks to a torque reference managed by an analog input or a command sent via ModBus, CanOpen, EtherCat, Profinet or Ethernet IP.

The torque reference that is provided is proportional to the rated torque of the motor.

According to the type of reference you work with, in Caliper software it is possible to set different parameters, for example:

- Full-scale of analog input
- Optimal PID controllers for the application
- The desired digital I/O.



Example of drive connected to an electric cylinder for torque control..

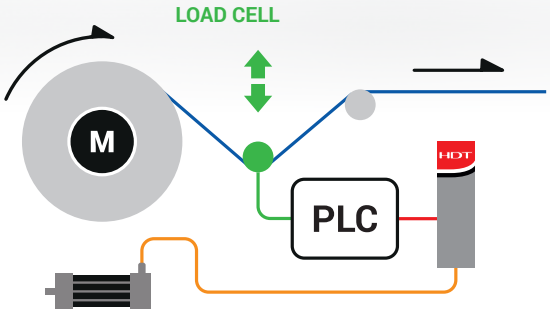
Speed control and torque limit

The speed control is a mode that allows to control the speed of the motor via a speed reference, managed by:

- An analog input
- A frequency input
- A fieldbus command

In I/O or Modbus mode it is possible to use an additional analog auxiliary speed reference or torque limit reference.

Therefore, it is possible to work in speed control mode, limiting the maximum torque output by imposing a limit threshold.



Example of drive connected to a mechanical dancer with load cell

Position control of hydraulic cylinders

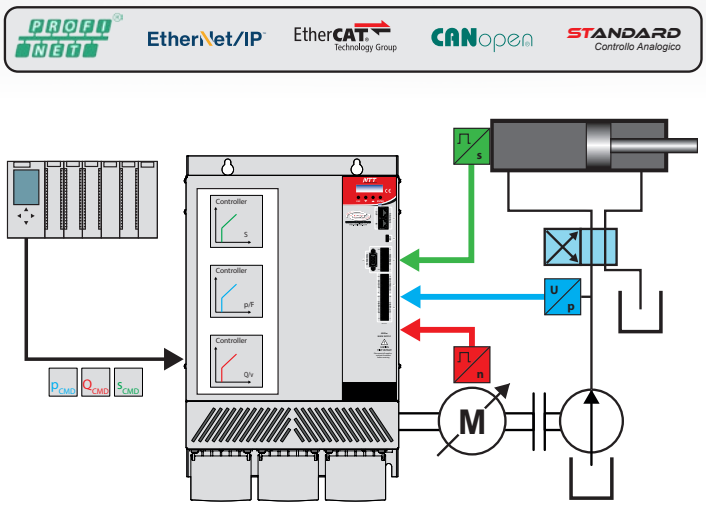
Application designed for the management of an hydraulic cylinder. By activating this mode, the servodrive regulates a servo pump in an hydraulic circuit by finely controlling the position of an hydraulic actuator or cylinder inserted in the circuit itself, whether it is equipped with a linear position transducer or without a sensor.

Open loop circuit

- Without linear encoder on the cylinder
- Positioning with precision> 10mm
- Without error compensation

Closed loop circuit

- With linear encoder on the cylinder
- Positioning with accuracy <1mm (0.2mm)
- with error compensation



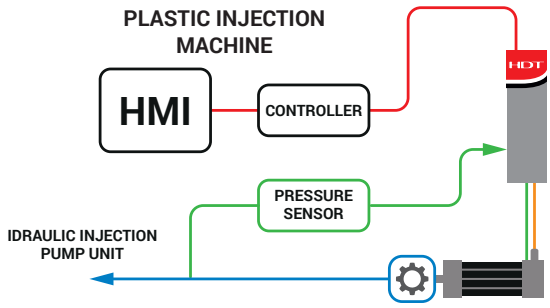
Example of a drive connected to an hydraulic cilinder in a closed loop circuit

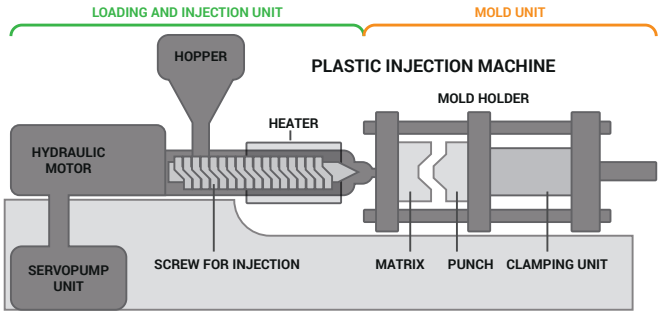
Control methods and applications

Pressure control for servopump systems

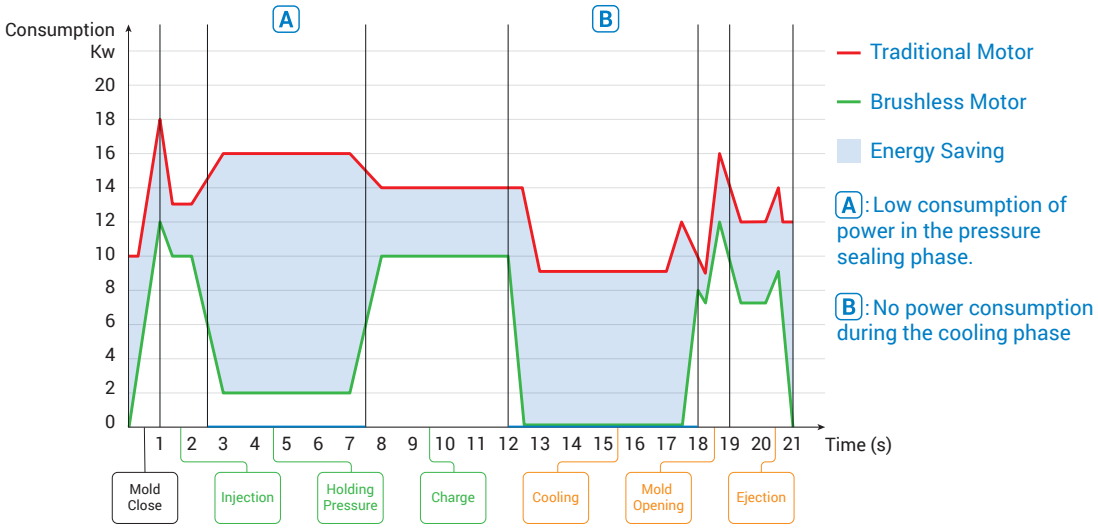
Application designed for operation in machines or applications that use a hydraulic circuit equipped with a closed loop servo pump in pressure control such as presses or injection machines.

By activating this mode, three inputs are enabled in the servodrive. A first input for the speed reference signal used to regulate the speed of a motor connected to a pump and therefore its flow rate.
A second input is enabled to receive the pressure reference signal while a third input is enabled for the pressure transducer signal (pressure feedback). The two pressure signals are compared and the servodrive exercises a speed control to keep the actual pressure equal to that of the reference.





Energy consumption table: operating cycle of a plastic injection molding machine



Operating Modes

TomCat servodrive	Drive Configuration					
Control Mode	Standard	RTU Modbus	Canopen CiA 402	Ethercat COE	Profinet RT & IRT	Ethernet/IP CIP
Speed	YES	YES	YES	YES	YES	YES
Torque	YES	YES	YES	YES	YES*	YES
Position	YES	YES	YES	YES	YES	YES
Electronic gearbox	YES	YES	YES	YES	YES*	YES
Electronic cam	YES	YES	NO	NO	NO	YES
Pressure control	YES	YES	YES	YES	YES	YES
Hydr. cilinder control	YES	YES	YES	YES	YES	YES
Touch probe	NO	NO	YES	YES	YES	NO

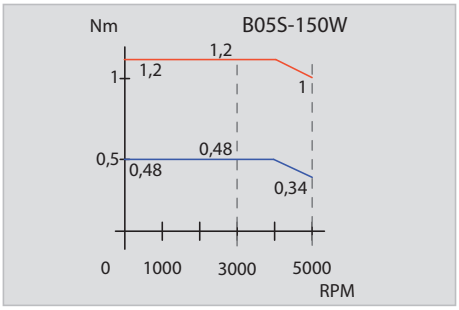
* Under development

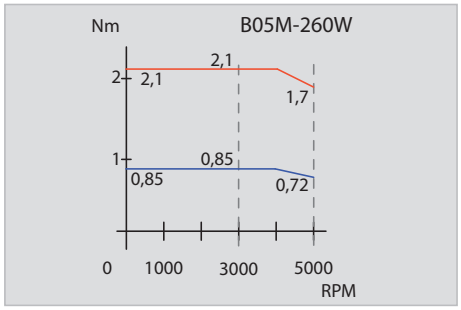
Servomotors Type B technical specs

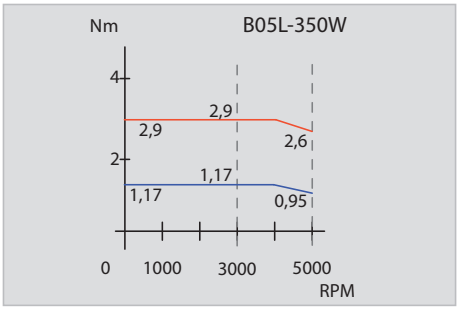
MOTOR TIPE			B05			B07		
Motor Size		**Meas.**	**S**	**M**	**L**	**S**	**M**	**L**
Drive Power Supply			**60VDC**					
Rated output Power	Pn	W	150	260	350	350	600	800
Poles count	PN	-	6					
Rated Speed	n	RPM	3000					
Torque at rated speed[1]	Tn	Nm	0,5	0,85	1,2	1,1	1,98	2,6
Peak Torque	Tpk	Nm	1,3	2,2	2,9	2,9	5,1	6,6
Rated current	In	A	2,3	4,1	5,6	5,3	9,4	12,4
Peak current	Ipk	A	7,6	11,6	15,5	17,4	30	31,6
Back EMF voltage constant	Ke	Vrms/ Krpm	12,7	12,7	12,7	12,7	12,7	12,7
Torque constant	Kt	Nm/ Arms	0,21	0,21	0,21	0,21	0,21	0,21
Rotor Inertia	Jm	gm^2	0,0126	0,0207	0,0287	0,0481	0,0843	0,1205
Rotor inertia with brake	Jmb	gm^2	0,0244	0,0324	0,0404	0,0788	0,115	0,151
Incr.Optical Encoder 1024ppr with Hall sensors	cod.	2	A			A		
Incr.Optical Encoder 2500ppr with Hall sensors	cod.	200	NA			A		
Incr.Magnetic Encoder 1024ppr with Hall sensors	cod.	280	A			A		
Magnetic Absolute Encoder single turn 1024ppr	cod.	480	A			A		
Absolute Enc. Multiturn BiSS 22Bit/ST - 12Bit/MT	cod.	512	NA			A		
Insulation Class			WINDING: H CLASS - MOTOR: F CLASS					
IP rating			IP65 (if equipped with optional oil seal)					

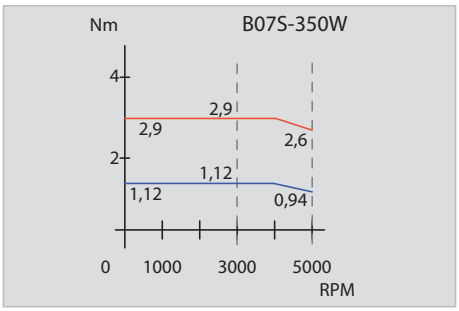
A = Available feedback option NA = Feedback option not available 1= in case of motor with brake, the rated torque has to be derated of 10%

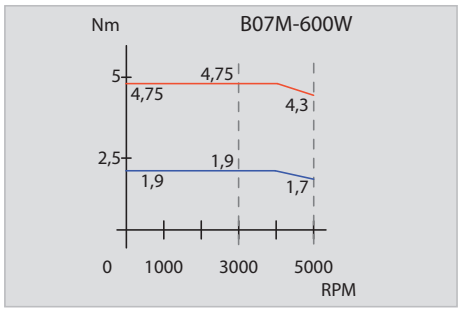
Characteristic torque curves

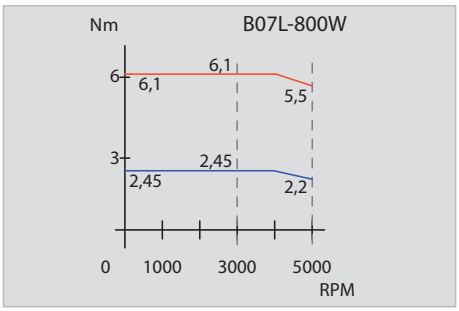






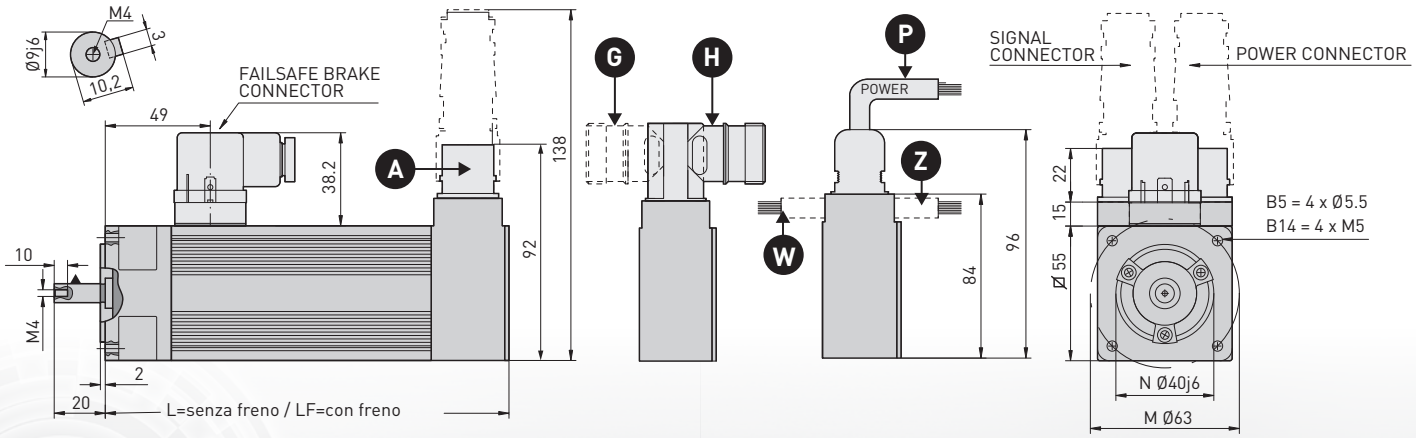




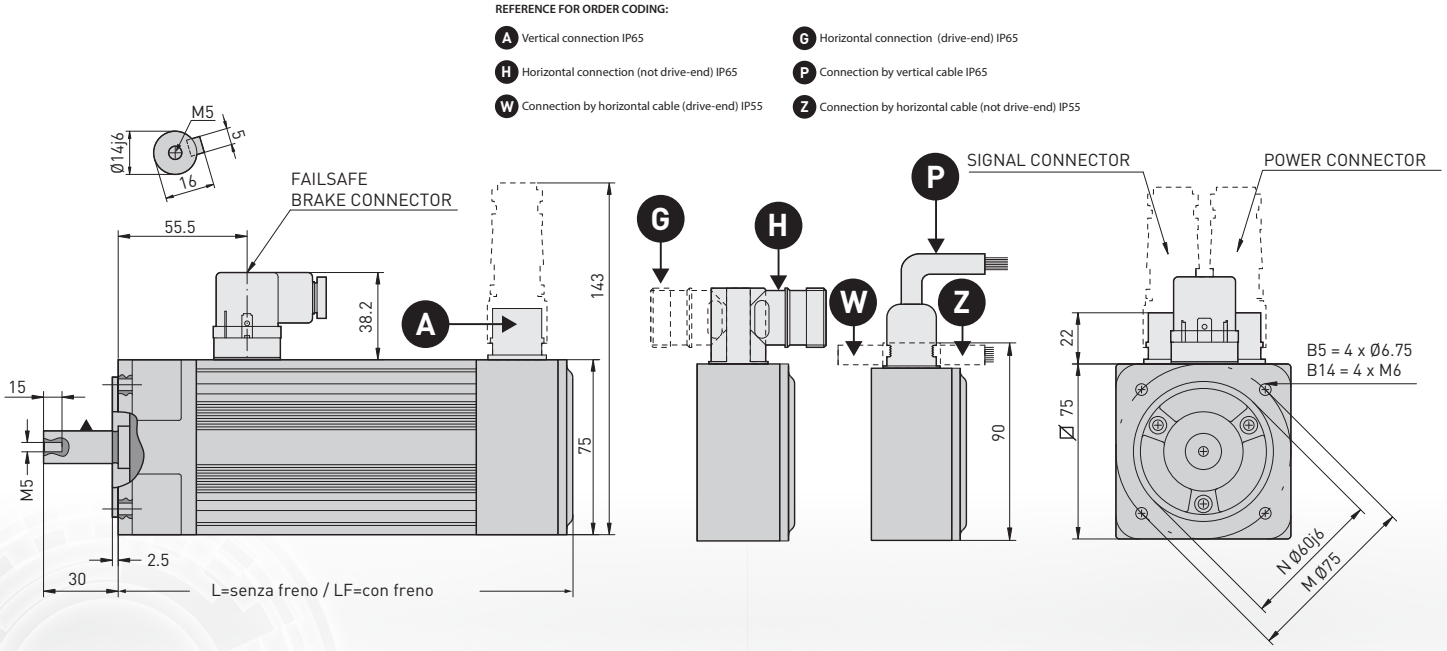


Dimensions

BØ5



BØ7



Parking brake data

Motor type	Brake type	Braking Torque	Power	Coupling time	Release time	Brake Voltage
B05S	03	2Nm@100°C	11W	2ms	25ms	24VDC
B05M	03	2Nm@100°C	11W	2ms	25ms	24VDC
B05L	03	2Nm@100°C	11W	2ms	25ms	24VDC
B07S	05	4.5Nm@100°C	12W	2ms	35ms	24VDC
B07M	05	4.5Nm@100°C	12W	2ms	35ms	24VDC
B07L	05	4.5Nm@100°C	12W	2ms	35ms	24VDC

Motor lengths and weights

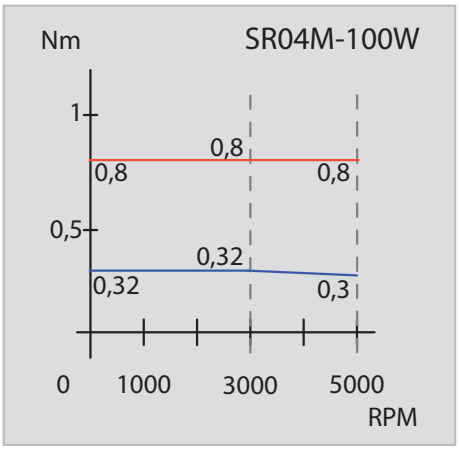
Motor type	L	LF	Weight (Kg)	Weight w/brake (Kg)
B05S	142	172	1.27	1.48
B05M	172	202	1.69	1.84
B05L	202	231	2.05	2.20
B07S	157.5	195	2.20	2.50
B07M	187.5	225	3.00	3.30
B07L	217.5	255	3.85	4.15

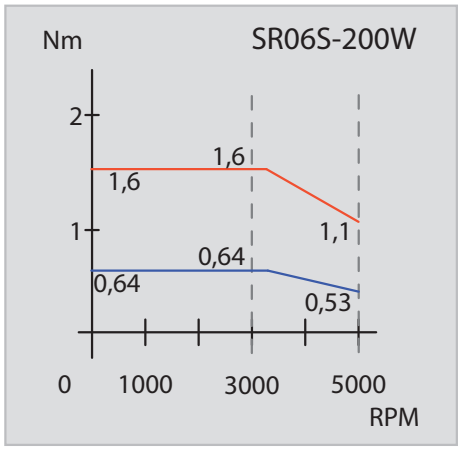
Type SR Servomotors technical specs

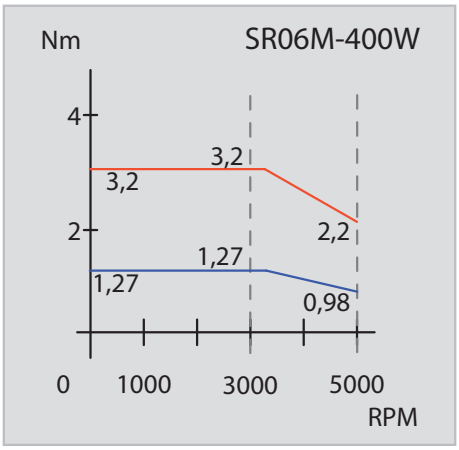
MOTOR TYPE			SR04		SR06	
Motor Size		Meas.	M		S[DR]	M
Drive power supply			24VDC	60VDC	60VDC	60VDC
Rated output Power	Pn	W	100		200	400
Poles count	PN	-	8			
Rated Speed	n	RPM	3000			
Torque at rated speed (1)	Tn	Nm	0,32		0,64	1,27
Peak Torque	Tpk	Nm	0,96		1,92	3,8
Rated current	In	A	7.5	2,7	4	7,7
Peak current	Ipk	A	22	8,1	12	23,1
Back EMF voltage constant	Ke	Vrms/ Krpm	3,2	29	10,1	9,56
Torque constant	Kt	Nm/ Arms	0,042	0,042	0,16	0,16
Rotor Inertia	Jm	gm^2	0,0035		0,0264	0,0407
Rotor inertia with brake	Jmb	gm^2	0,0036		0,0292	0,0435
Optical Incr. Enc. 2500ppr with Hall sensors	Code	200	DR	DR	DR	DR
Magnetic Incr. Enc. 2500ppr with Hall sensors	Code	210	D	D	D	D
Absolute Enc. Multiturn BiSS 17Bit/ST - 16Bit/MT	Code	570	ND	ND	D	D
Insulation class			Winding H class - Motor F class			
IP rating			IP65 (if equipped of shaft oil seal)			

NA = Not available A = Available DR = Contact HDT for availability 1 = in case of motor with brake, the rated torque has to be derated of 10%

Characteristic torque curves

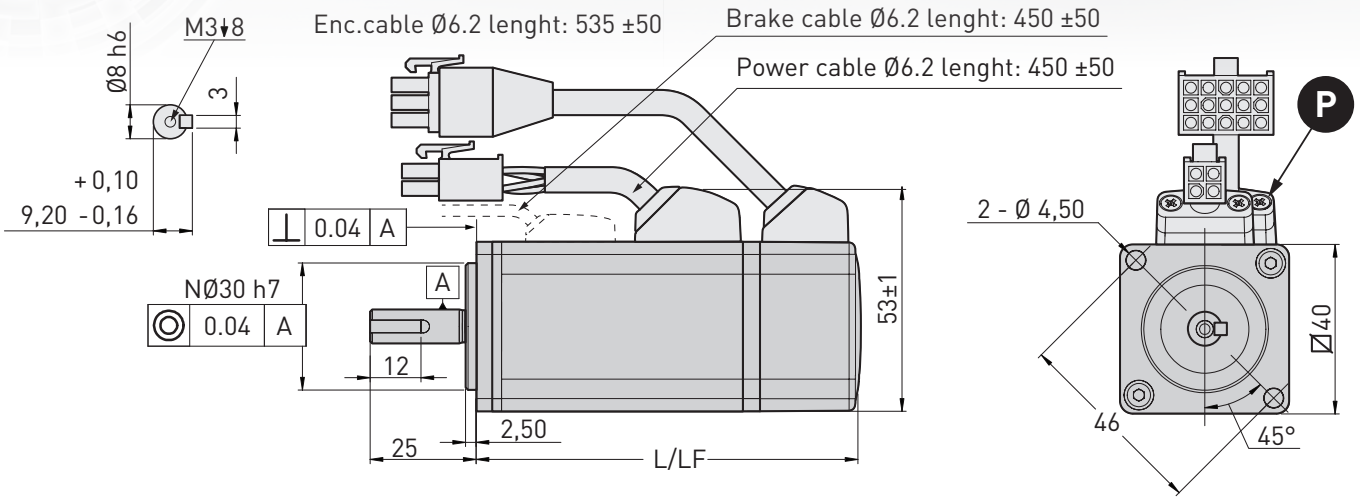




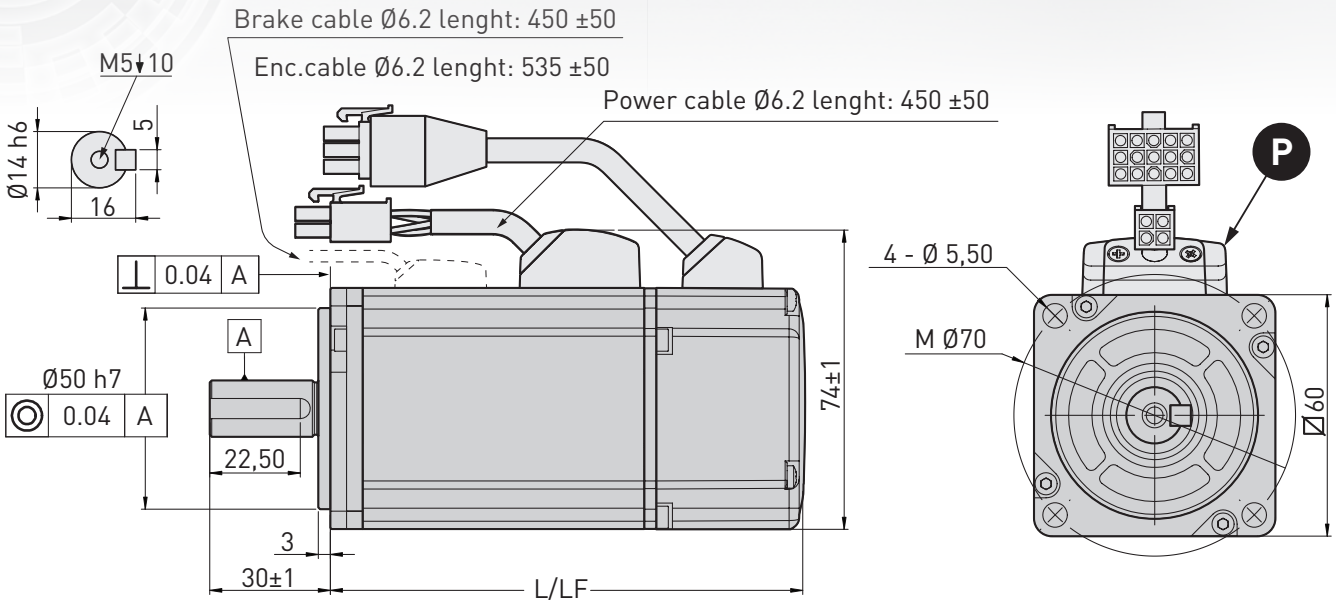


Dimensions

SRØ4



SRØ6



REFERENCE FOR ORDER CODING: P Connection by vertical cable IP65

Parking Brake Data

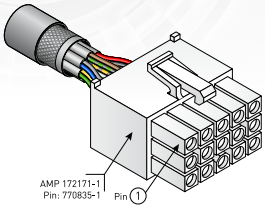
Motor type	Brake type	Braking Torque	Power	Engage time	Release Time	Voltage
SR04M	01	0.3Nm@100°C	6W	<35ms	<20ms	24VDC
SR06S	02	1.3Nm@100°C	7W	<50ms	<20ms	24VDC
SR06M	02	1.3Nm@100°C	7W	<50ms	<20ms	24VDC

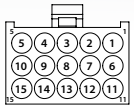
Motor lengths and weights

Motor type	Feedback	L	LF	Weight (Kg)	W. with brake(Kg)
SR04M	200	99	136	0.5	0.8
SR06S	200	114.9	156	1	1.6
SR06S	210	95.6	136.6	1	1.6
SR06M	200	143	184	1.4	1.9
SR06M	210	124	165	1.4	1.9
SR06M	570	143	184	1.4	1.9

Connections for SR motor

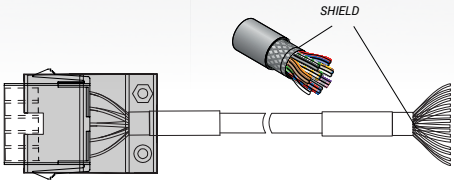
Signal connector



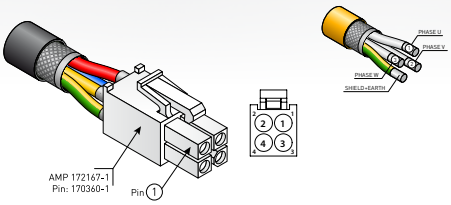


Pin numbering
Motor connector
Crimp side view

Extension cable



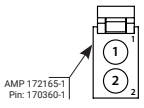
Power connector

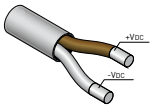


SIGNAL CONNECTIONS ON MOTOR SIDE ENCODER			EXTENSION CABLE
CONNECTOR	INCREMENTAL	ABSOLUTE	COLOUR
PIN	FUNCTION	FUNCTION	
1	DC+5V	DC+5V	RED
2	GND	GND	BLACK
3	Hall C+		GREY/PINK
4	Hall C-		BROWN/GREEN
5	Hall B+	CK+	VIOLET
6	Hall B-	CK-	WHITE/GREEN
7	Hall A+	D+	GREY
8	Hall A-	D-	RED/BLUE
9	A+		GREEN
10	A-		BROWN
11	B+		YELLOW
12	B-		ORANGE OR PINK
13	Z+		BLUE
14	Z-		WHITE
15	SHIELD	SHIELD	SHIELD

CONNECTOR	POWER CONNECTIONS
PIN	FUNCTIONS
1	U
2	V
3	W
4	PE

Brake Connector



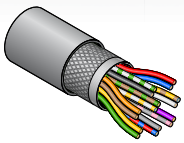


CONNECTOR	BRAKE CONNECTOR
PIN	FUNCTION
1	+VDC
2	-VDC

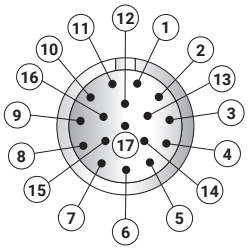
Connections for B motor

CABLE	ENCODER CONNECTOR		
COLOUR	INCREMENTAL	ABSOLUTE	PIN
SCREEN	SCREEN	SCREEN	1
YELLOW/BROWN	PTC[1]	PTC[1]	2
RED	+5V	+5V	3
BLACK	0V	0V	4
GREEN	CHA	-	5
BROWN	CHA-	-	6
YELLOW	CHB	-	7
ORANGE OR PINK	CHB-	-	8
BLUE	CHZ	-	9
WHITE	CHZ-	-	10
GREY	HALL A	D+	11
RED/BLUE	HALL A-	D-	12
WHITE/GREEN	HALL B-	CK-	13
PURPLE	HALL B	CK+	14
GREY/PINK	HALL C	-	15
BROWN/GREEN	HALL C-	-	16
WHITE/YELLOW	PTC*	PTC*	17

Encoder connector and cable



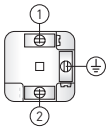
Motors
B05-B07



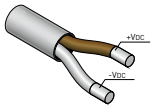
Flying connector
soldering side
View

BRAKE CONNECTIONS	
FUNCTION	PIN B05-B07
+VDC	1
-VDC	2
PE	NOT USED

Brake connector and cable



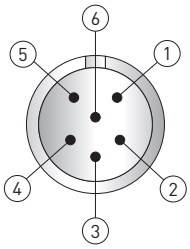
1 + VDC
2 - VDC
NOT USED

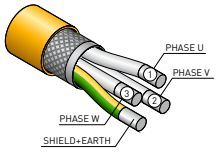


POWER CONNECTIONS	
FUNCTIONS	PIN B05-B07
U	1
V	3
W	5
PE	6

Power connector and cable

Motors
B05-B07

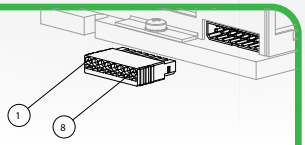


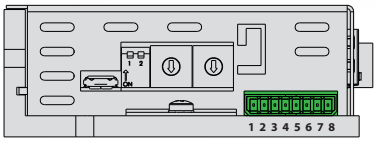


Flying connector
soldering side
View

Drive Connections

BUFFERED HARDWARE REPEAT 5V
OF INCREMENTAL CHANNELS AND ZERO NOTCH
COMING FROM THE INCREMENTAL ENCODER
OF THE MAIN FEEDBACK



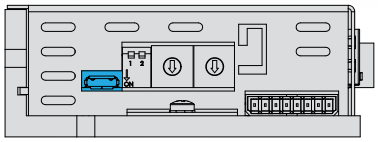


VIEW TOP SIDE

J6

FLYING CONNECTOR ENCODER REPEAT

MICRO USB 2.0 12Mbps
Drive programming with Caliper software
Firmware update



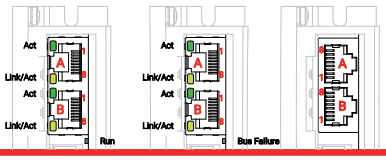
VIEW TOP SIDE

J1

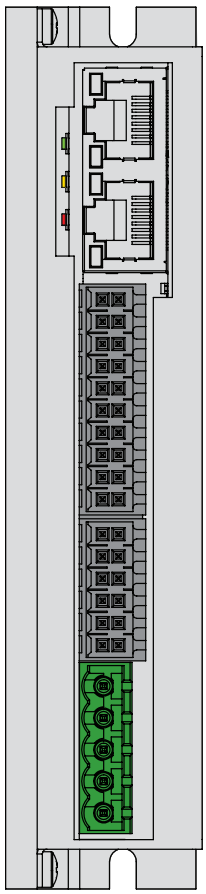
MICRO USB PORT FOR PROGRAMMING

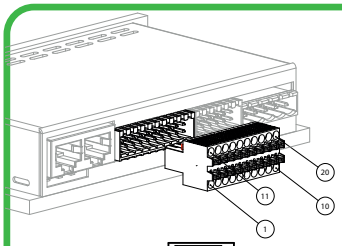
FIELD BUS COMMUNICATION PORT RJ45

ETHERCAT PROFINET CANOPEN/MODBUS



J2





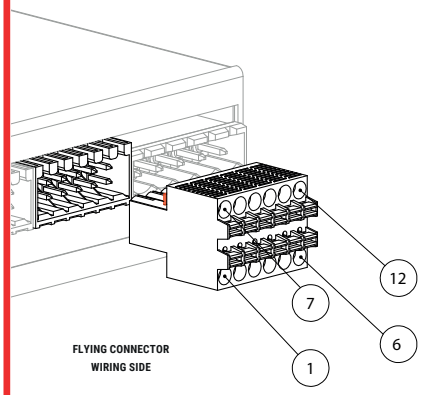
REF –	1.	.11	GND
REF+	2.	.12	DIR+
GND	3.	.13	DIR–
RIF AUX	4.	.14	PULSE+
IN_0	5.	.15	PULSE–
IN_1	6.	.16	OUT OK+
IN_2	7.	.17	OUT OK–
IN_3	8.	.18	OUT1+
IN_4	9.	.19	OUT1–
IN_5	10.	.20	+24V

J3

ANALOG AND DIGITAL I/O FLYING CONNECTOR

FLYING SIGNAL CONNECTOR

J4

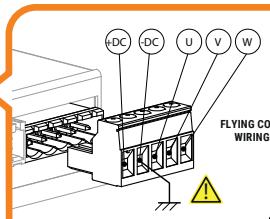


FLYING CONNECTOR
WIRING SIDE

INCREMENTAL ENCODER
- 5V LINE DRIVE
- OPEN COLLECTOR
- PUSH/PULL

ABSOLUTE ENCODER
-SSI
-BISS
-ENDAT

A+	1.	.7	+5E
A –	2.	.8	GND
B+	3.	.9	D –
B –	4.	.10	HA / D+
Z+ / CK+	5.	.11	HB
Z – / CK –	6.	.12	HC



FLYING CONNECTOR
WIRING SIDE

1.	+DC	
2.	– DC	
3.	U	
4.	V	
5.	W	

BRUSHLESS MOTOR
CONNECTIONS

J5

DRIVE POWER SUPPLY FLYING CONNECTOR

J4			
CONNECTOR	INCREMENTAL ENC.	ABSOLUTE ENC. (COD.480)	ABSOLUTE ENC.
PIN	FUNCTION	FUNCTION	FUNCTION
1	CH A+	CH A+	-
2	CH A-	CH A-	-
3	CH B+	CH B+	-
4	CH B-	CH B-	-
5	CH Z+	CK+	CK+
6	CH Z-	CK-	CK-
7	+VDC	+VDC	+VDC
8	GND	GND	GND
9	-	DATA-	DATA-
10	HALL A+	DATA+	DATA+
11	HALL B+	-	-
12	HALL C+	-	-

J5		
CONNECTOR	BRUSHLESS	DC MOTOR
PIN	FUNCTION	FUNCTION
1	U	M+
2	V	-
3	W	M-
4	PE	PE

Drive / Motors Matching

		DGFox EVO - sizes in current				
HDT Motors	Tn	2.5A	5A	8A	10A	13A
B05S	Nm	0,5	0,5			
B05M	Nm		0,9	0,9		
B05L	Nm			1,2	1,2	
B07S	Nm			1,2	1,2	
B07M	Nm				1,9	1,9
B07L	Nm					2,6
SR04M	Nm		0,32			
SR06M	Nm			1,27	1,27	1,27

The table shows the possible combinations between motors and drives.

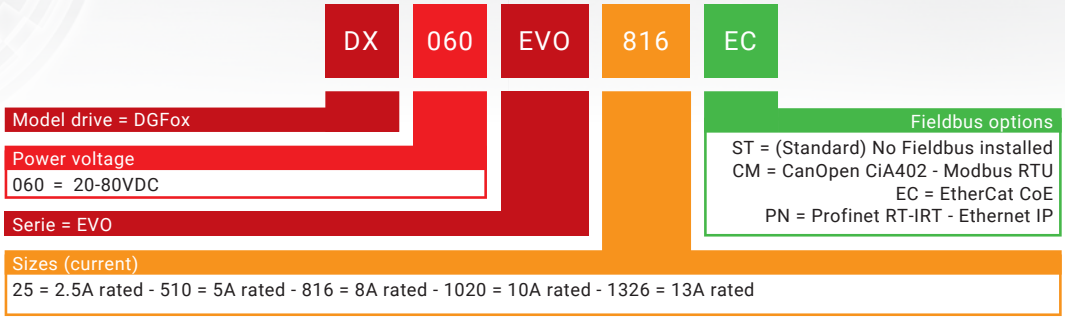
Depending on the application, a drive with a rated current slightly higher than the motor rated current is suggested.

A drive with insufficient current does not guarantee the motor torque, a drive with too high current compared to the motor could be more difficult to regulate due to a full scale with too different current resolution.

Cables and Extensions order code

CABLE CODE	FUNCTION	MOTORS PAIRINGS					
TYPE	DESCRIPTION	SR04	SR06	SR08	B05	B07	B10
CNTSRPWR-PF01-XXX	Fixed laying power cable for SR motor	✓	✓	✓	×	×	×
CNTSRPWR-PM01-XXX	Power cable for mobile laying for SR motor	✓	✓	✓	×	×	×
CNTSRENC-PF16-XXX	Encoder cable for fixed installation for SR motor	✓	✓	✓	×	×	×
CNTSRENC-PM16-XXX	Encoder cable for mobile laying for SR motor	✓	✓	✓	×	×	×
CNTSRBRK-XXX	Brake cable for SR motor	✓	✓	✓	×	×	×
CNT6PM23C-PF01-XXX	B05 / B07 power connector wired with 4x1 cable for fixed installation	×	×	×	✓	✓	×
CNT6PM23C-PM01-XXX	B05 / B07 power connector wired with 4x1 mobile laying cable	×	×	×	✓	×	×
CNT6PM23C-PM15-XXX	B05 / B07 power connector wired with 4x1.5 mobile laying cable	×	×	×	×	✓	×
CNT17PM23C-PF16-XXX	B05 / B07 / B10 encoder connector wired with cable for fixed installation	×	×	×	✓	✓	✓
CNT4PMILC-PM15-XXX	B10 / B14 power connector wired with 4x1.5 mobile laying cable	×	×	×	×	×	✓
CNT4PMIL90C-PM15-XXX	B10 90 ° power connector wired with 4x1.5 mobile laying cable	×	×	×	×	×	✓
CNTB10BRK-XXX	Brake connector for B05 / B07 / B10 / B14 motors	×	×	×	✓	✓	✓

DGFox060EVO Order code



EXAMPLE:	DX060EVO-8/16-EC	DGFox060 Evo - 60VDC power supply, 8A of rated current size additionale Ethercat Fieldbus option

SR Series Motors Order Code

SR	04	M	1	S	1	C	5	P	210	P	3	0	N

Model = SR

Frame Size
04 = ☐40mm
06 = ☐60mm
08 = ☐80mm

Length
S = 1st length
M = 2nd length
L = 3rd length
G = 4th length

Available combinations:

04	M	100W	0.32Nm
06	S	200W	0.64Nm
06	M	400W	1.27Nm
08	L	750W	2.45Nm
08	G	1kW	3.20Nm

Mechanical Configuration
1 = B5

Drive Voltage Supply
S = 230VAC
R = 400VAC

Available combinations:

S	SR04M SR06S/M SR08L/G
R	SR06M SR08L/G

Parking Brake
1 = without brake
6 = with 24 VDC

Shaft and Protection
C = With key
5 = without seal ring

Power connections
Cable output

Feedback system
200 = Inc.Enc 2500ppr, 5V Line Driver + Halls, Optical
210 = Inc.Enc. 2500ppr, 5V Line Driver + Halls, Magnetic
570 = Abs. Enc. BiSS 17bit + 16 Mturns without Battery

Available combinations:

04	M	200	-	-
06	S	200	210	570
06	M	200	210	570
08	L	-	210	570
08	G	-	210	570

Rated speed
30 = 3.000rpm

Signal Connection
Cable output

Cooling system
N = Natural air

EXAMPLE:	SR04M1W1C5P210P30N	SR - 40mm Frame, 2nd Lenght, B5 mechanical conf., 230VAC, without brake, with key, without seal ring, Inc. Enc. 2500ppr, Cable Output, 3000 rpm rated speed, natural air cooling.

B Series Motors Order Code

B	07	M	1	S	1	C	5	A	512	A	3	0	N				

Model = B

Frame
05 = ☐55mm
07 = ☐75mm

Size
S = 1st size
M = 2nd size
L = 3rd size

Available combinations:

B05	S	0.48Nm	
B05	M	0.81Nm	
B05	L	1.10Nm	
B07	S	1.10Nm	
B07	M	1.90Nm	
B07	L	2.48Nm	

Mechanical Configuration
1 = B5 2 = B14

Drive Voltage Supply
W = 60VDC

Parking Brake
1 = wihtout brake
3 = with 24 VDC Brake for B05
5 = with 24 VDC Brake for B07

Shaft and Protection
C = with key
5 = without oil seal

Power connections

Available combinations:

B05	A G H P
B07	A G H P

A = Vertical connector
G = Horiz. connector Shaft side
H = Horiz. connector Back side
P = Cable output

Feedback system
480 = Abs. Enc. Singleturn SSI
200 = Inc.Enc. 5V LD 2500ppr + Halls (optic)
280 = Inc.Enc. 5V LD 1024ppr + Halls (Inductive)
512 = Abs.Enc.Multiturn BISS (22bit/turn - 12bit/mturns)

Available combinations:

B05	S/M/L	1	200	480	280	-
B07	S/M/L	1	200	480	280	512

Rated Speed
30 = 3.000rpm

Cooling system
N = Natural Air

Special Versions

EXAMPLE:	B07M1W1C5A512A30N	B07 - 75mm Frame, Size M, Mechanical config. B5, 60VDC, without brake, with key, w/o seal ring, Abs.Enc. BiSS Mt 16/17, Vertical connector output, 3000rpm rated speed, natural cooling.

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Motors & Digital Drives

DGFOX202303UK

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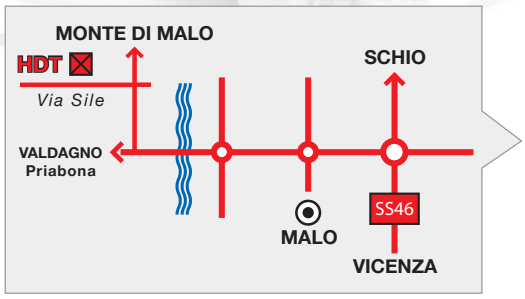

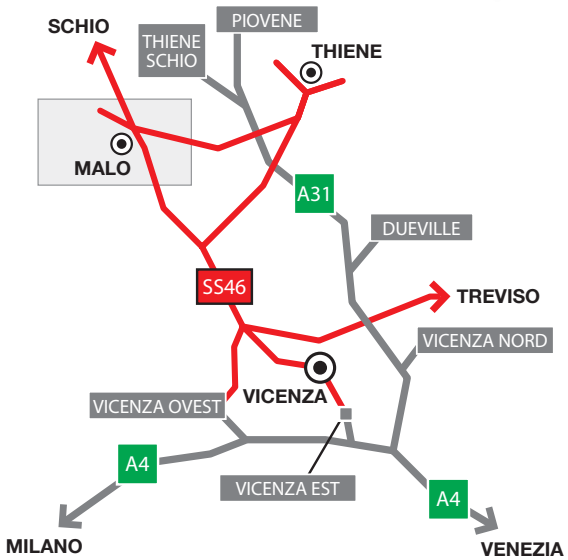

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