



TG drives

Compact drives



Rotary actuators



TG drives

Production and delivery of servodrives and control systems.

The Czech company TG Drives offers servodrives since 1995 for machines and equipments in industrial automation. The range of service of our technicians and programmers includes design, optimization including custom solutions, programming, configuring and start up. Servodrives and control systems from TG Drives are used in the cutting tables, CNC machines and machining centers, automotive, rubber, food, glass and construction industries.

Easy solution of every motion

1. Servomotors

- ◆ TGN, TGH, TGS and TGT synchronous servomotors with permanent magnets

2. Digital servoamplifiers

- ◆ AKD digital servoamplifiers
- ◆ TGA300 digital servoamplifiers
- ◆ S400, S600 and S700 digital servoamplifiers
- ◆ TGZ digital servoamplifiers

3. Precision mechanical systems

- ◆ EXLAR linear actuators
- ◆ HIGH precision rotary actuators
- ◆ TWINSPIN cycloidal reducers
- ◆ high precision planetary reducers

4. TG Motion control system

- ◆ Universal PC based control system
- ◆ Compact control system TGMmini

5. Industrial PCs and operator terminals

- ◆ ASEM panel and standard industrial PCs
- ◆ ASEM and ESA operator terminals

Our services

- ◆ Design and optimization of servodrives.
- ◆ Design of control system.
- ◆ Programming.
- ◆ Start up.
- ◆ Customer service.



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Compact rotary actuators

Compact actuators combine excellent properties of cycloidal reducers with AC synchronous servomotors with permanent magnets. This combination resolve problem of precise and backlash-free assembly of motor with reducer.

- ◆ compact design
- ◆ very low backlash
- ◆ excellent dynamic parametres
- ◆ high torsional and roll stiff ness
- ◆ small size, low weight
- ◆ easy installation
- ◆ radial-axial bearings for heavy load
- ◆ maintenance-free



Technical data

Actuators are produced for different DC-bus voltages and for different nominal speed. The catalogue includes actuators with parameters of standard types, on demand we can design a customized solution for other DC-bus or speed.

Thermal protection

The temperature of the winding is monitored by sensors in the stator windings. The temperature is then signaled via an electrically isolated contact (thermo contact or posistor). The sensors are set so that the winding temperature does not exceed 150 °C. The type of thermal protection should be specified.

Holding Brake

All servomotors can be delivered with or without a built-in electromagnetic holding brake. The brake is not intended for the positioning. The purpose of the brake is to lock the motor in zero speed.

- ◆ **Supply voltage:** 24 VDC -0 % +10 %

Applications:

- ◆ robotics, manipulators
- ◆ CNC machines and CNC cutting tables
- ◆ rotary tables
- ◆ bending machines
- ◆ medical equipment
- ◆ application in aviation
- ◆ simulators
- ◆ manufacture of semiconductors
- ◆ radar systems

Torque/speed curves

Torque/speed curves show the dependence of torque on speed of actuator (servomotor). Below is shown an overview of the basic variables, which is the dependence given by:

M_0 – Stall torque (Nm) is the maximum torque the motor is able to generate continuously with all phases equally sharing the load. The speed of the motor is higher than zero. The stall torque is temperature and cooling conditions dependent. The value is given for a coil temperature of 150 °C, an ambient temperature of 40 °C.

n_N – Nominal speed (min⁻¹) is the speed in the selected operating point, the motor produces rated torque M_N .

M_N – Nominal torque (Nm) is the torque (derived from the moment M_0) acting on the shaft of the motor indefinitely at rated speed n_N . Its value depends on the temperature and the total amount of dissipated power losses. The value is given for a coil temperature of 150 °C, an ambient temperature of 40 °C and defined cooling conditions. It is necessary to ensure sufficient heat dissipation – dimensions of flange for motor

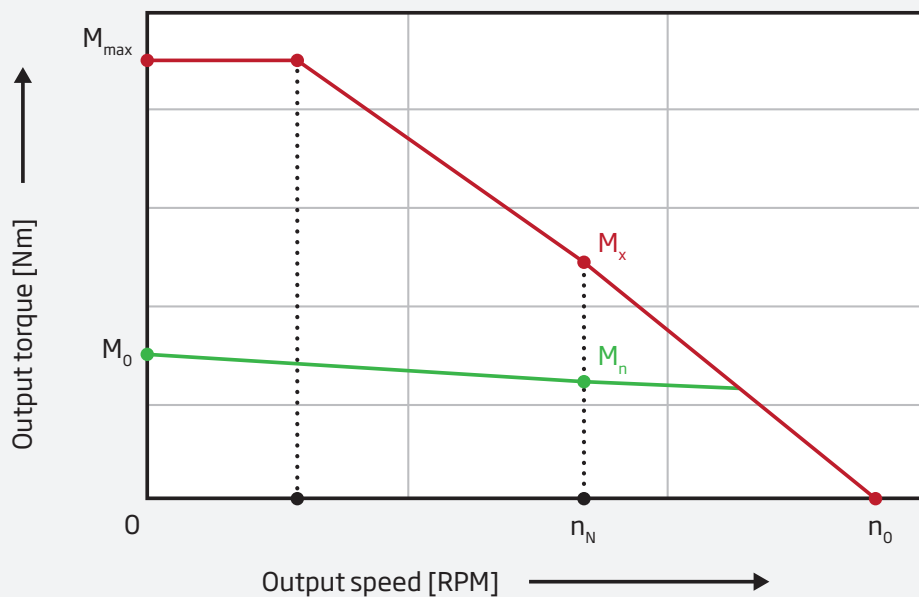
mounting must be at least 2,5-times the motor frame dimensions (3,5-times for motors size 2) or the surface temperature of this flange must be less than 65 °C.

n_0 – Max. speed (min⁻¹) is the maximum allowed speed of the rotor with no load.

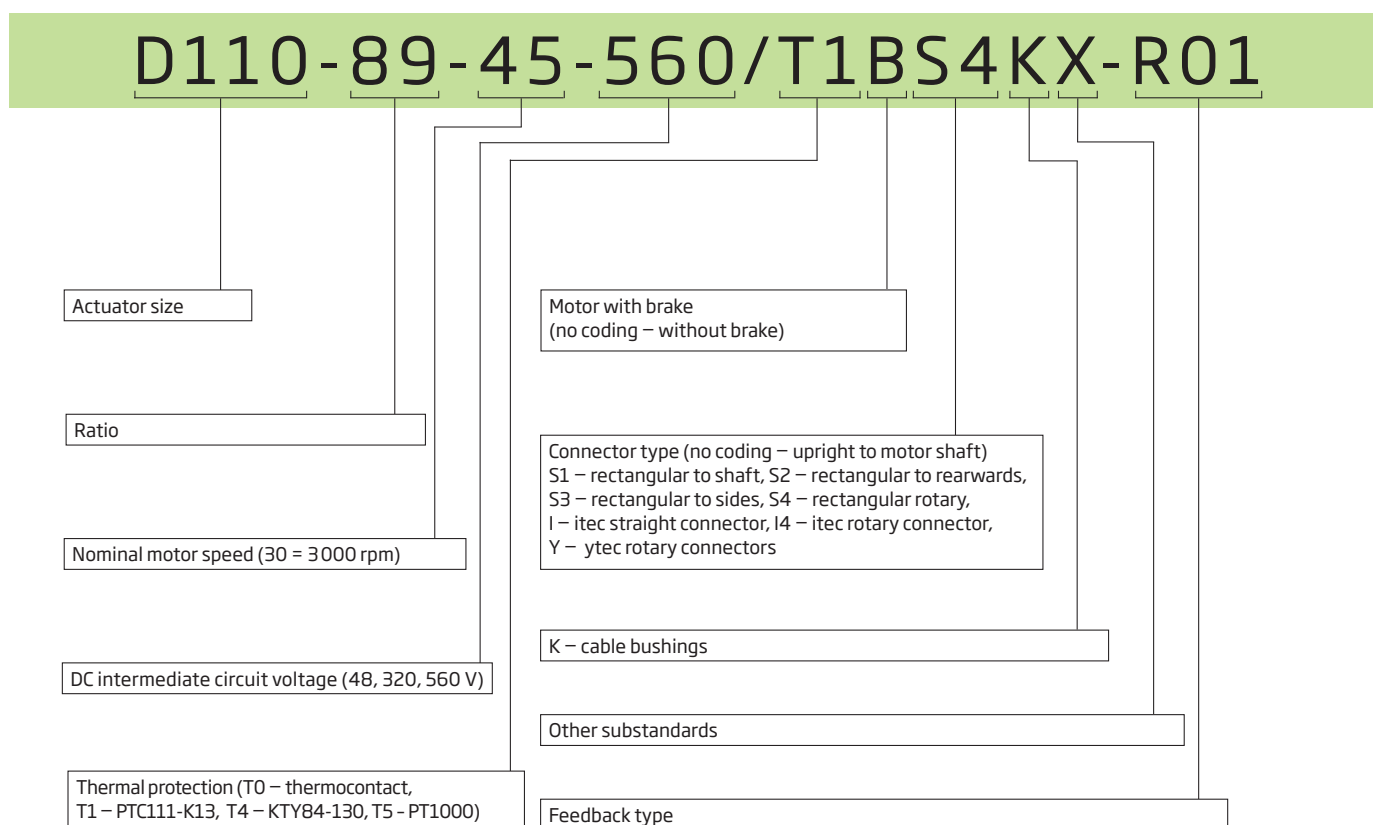
M_{max} – Peak torque (Nm) is the maximum torque the motor is able to generate. This torque is reached when the peak current I_{max} is applied to the motor. The value for I_{max} is provided at a temperature that ensures the magnets of the rotor will not become demagnetized. The maximum allowable time for application of the peak current will be dependent on the initial winding temperature. Typically this time does not exceed few seconds. The peak torque is given for a maximum magnet temperature of 80 °C (risk of demagnetization).

M_x – Peak torque at rated speed (Nm) is the maximum torque the motor is able to generate at rated speed n_N .

All the above values of voltages and currents, unless stated otherwise, their sizes correspond to effective values (RMS).



Coding example



Feedback types

The flexible design of actuators allows different feedback sensor mounting. The most frequent types are:

Resolver is a brushless electric appliance, used for rotor position measuring and for commutation angle derivation. Resolver is commonly used as a position and angle speed sensor in regulation circuits of servoamplifiers.

Hiperface DSL is digital version of encoder. The absolute position is sent, no analog signals are transmitted. Hiperface DSL sensors are available with resolution up to 20 bits per turn. This encoder type is intended for servodrives with one integrated connector.

Feedback sensors	
—	2-pole resolver size 15
S01	Sick EKS36 (HDSL), single-turn, 17 bits
S02	Sick EKM36 (HDSL), multi-turn, 17 bits
S23	Sick SKS36 (Hiperface), single-turn, 128 imp./rev.
S24	Sick SKM36 (Hiperface), multi-turn, 128 imp./rev.
H04	Heidenhain EQN1125 (EnDat 2.1), multi-turn, 13+12 bits
H15	Heidenhain EQI1131 (EnDat 2.2), multi-turn, 19+12 bits

Other types of feedback sensors on request.

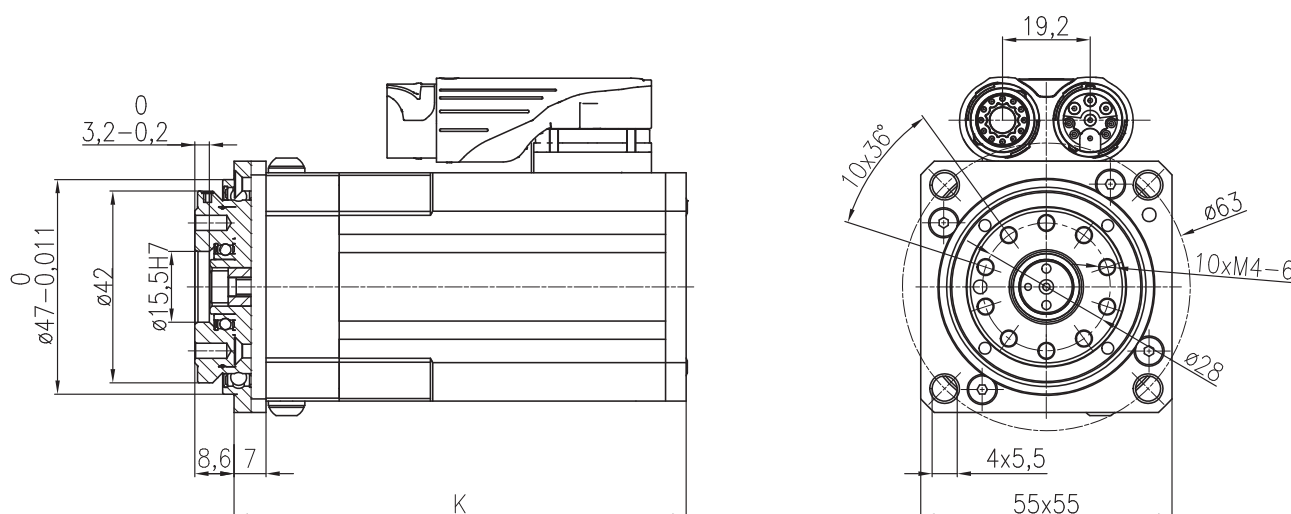
Hiperface is – like EnDat – a high resolution encoder with a data channel. The absolute position is sent through a fast serial interface. The sinus-cosine shape of the incremental signals (1 Vpp) provides highly accurate positioning (100 000 inc/rev). The sensor could be single-turn or multi-turn (4 096 turns).

EnDat is high resolution encoder with a data channel. The absolute position is sent through a fast serial interface. The sinus-cosine shape of the incremental signals (1 Vpp) provides highly accurate positioning (100 000 inc/rev). The EnDat sensor could be single-turn or multi-turn (4 096 turns).

EnDat 2.2 is digital version of encoder. The absolute position is sent, no analog signals are transmitted. EnDat 2.2 sensors are available with resolution up to 25 bits per turn.

D050

Data / Type	Unit	D050		
Ratio	/	63		
Nominal output torque (25 °C)	Nm	18		
Maximum output torque	Nm	36		
Nominal input speed	min ⁻¹	2 000		
Maximum input speed	min ⁻¹	5 000		
Holding brake voltage	V DC	24		
Holding brake torque	Nm	2		
Backlash	arcmin	1.5		
Tilting stiffness	Nm/arcmin	4		
Torsional stiffness	Nm/arcmin	2.5		
Radial force	N	1 440		
Axial force	N	1 900		
Nominal motor voltage	V DC	48	320	560
Nominal motor current	Arms	4.6	0.93	0.24
Maximum motor current	Arms	19.8	4.0	4.0
EMF Constant	Vef/1 000 rpm	3.5	17.5	17.5
Torque Constant	Nm/Arms	0.06	0.29	0.29
Terminal resistance	Ω	1.07	27.1	28.3
Terminal Inductance	mH	1.13	28.4	28.4
Operating temperature range	°C	-10 .. +40		
Input inertia	kg.cm ²	0,007		
Actuator weight	kg	1.3 (no brake) / 1.7 (with brake)		
Degree of protection	/	IP64		
UL-certification	/	Upon request, only standard connectors		

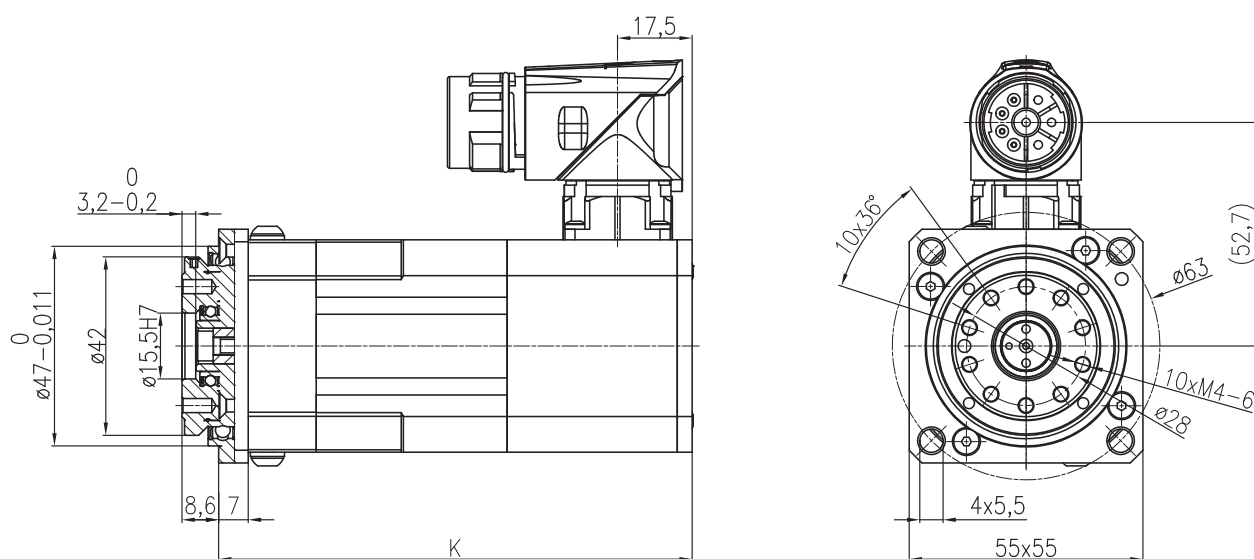


Dimensions

D050	K dimension
Resolver	99 mm
Resolver + brake	119 mm
Hiperface	112.5 mm
Hiperface + brake	141 mm
EnDat 2.1	128.5 mm
EnDat 2.1 + brake	157 mm
EnDat 2.2	97 mm
EnDat 2.2 + brake	125.5 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.

D050 with one integrated connector



Dimensions

D050	K dimension
Hiperface DSL	112.5 mm
Hiperface DSL + brake	141 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.



Options

We are offering the possibility of design changes on the servomotor including:

- ◆ change of shape or dimensions of front flange
- ◆ sealed version – up to IP67 including shaft protection (different length of motor)
- ◆ change for other DC-bus voltage or speed
- ◆ other feedback types
- ◆ other specialities

Servodrives with one integrated connector

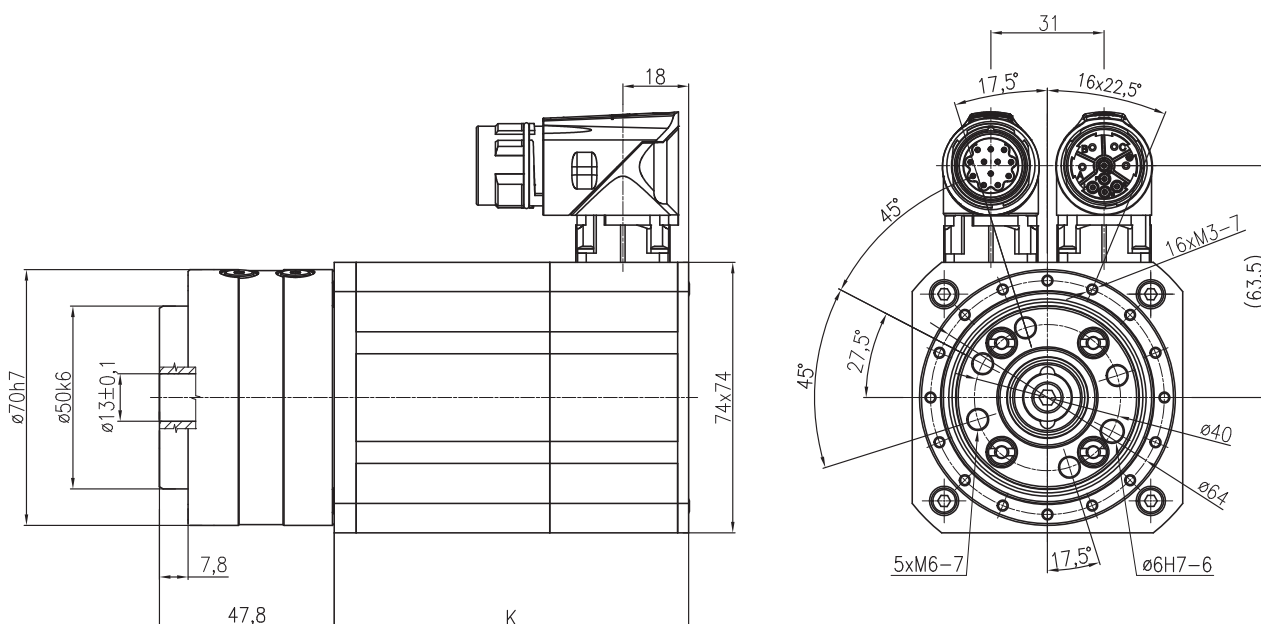
One connector and one cable – we introduce next technology step in our range of servodrives. The information about the position is transmitted by means of the fast digital communication between the feedback sensor (Hiperface DSL) and servoamplifier. The data wires are integrated to the power cable. Decreasing of the space and price could be achieved.

ADVANTAGES:

- ◆ saving the cost of cables and connectors
- ◆ saving space for cable leads
- ◆ easier and faster installation
- ◆ rotary connector (almost 360°)
- ◆ compatibility of connectors
- ◆ possibility of one-side-mounted cable order and installation of connector by customer

D070

Data / Type	Unit	D070		
Ratio	/	57,75		
Nominal output torque (25 °C)	Nm	50		
Maximum output torque	Nm	125		
Nominal input speed	min ⁻¹	2 000		
Maximum input speed	min ⁻¹	5 000		
Holding brake voltage	V DC	24		
Holding brake torque	Nm	4.5		
Backlash	arcmin	< 1.5		
Tilting stiffness	Nm/arcmin	40		
Torsional stiffness	Nm/arcmin	8		
Radial force	N	2 800		
Axial force	N	4 100		
Nominal motor voltage	V DC	48	320	560
Nominal motor current	Arms	11.6	1.66	1.15
Maximum motor current	Arms	43	6.2	4.3
EMF Constant	Vef/1 000 rpm	4.9	34	49
Torque Constant	Nm/Arms	0.08	0.56	0.81
Terminal resistance	Ω	0.17	8.4	17.3
Terminal Inductance	mH	0.34	16.5	34
Operating temperature range	°C	-10 .. +40		
Input inertia	kg.cm ²	0.5		
Actuator weight	kg	2.9 (no brake) / 3.4 (with brake)		
Degree of protection	/	IP64		
UL-certification	/	Upon request. only standard connectors		

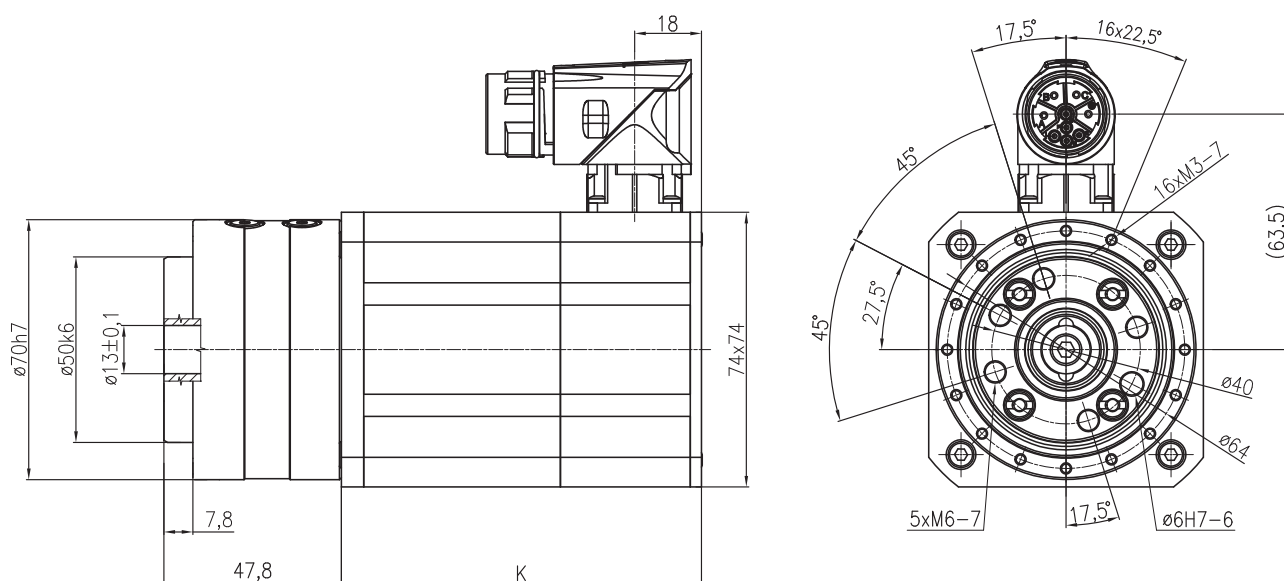


Dimensions

D070	K dimension
Resolver	89 mm
Resolver + brake	134 mm
Hiperface	97 mm
Hiperface + brake	142 mm
EnDat 2.1	105 mm
EnDat 2.1 + brake	152 mm
EnDat 2.2	84 mm
EnDat 2.2 + brake	129 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.

D070 with one integrated connector



Dimensions

D070	K dimension
Hiperface DSL	97 mm
Hiperface DSL + brake	142 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.



Options

We are offering the possibility of design changes on the servomotor including:

- ◆ change of shape or dimensions of front flange
- ◆ sealed version – up to IP67 including shaft protection (different length of motor)
- ◆ change for other DC-bus voltage or speed
- ◆ other feedback types
- ◆ other specialities

Servodrives with one integrated connector

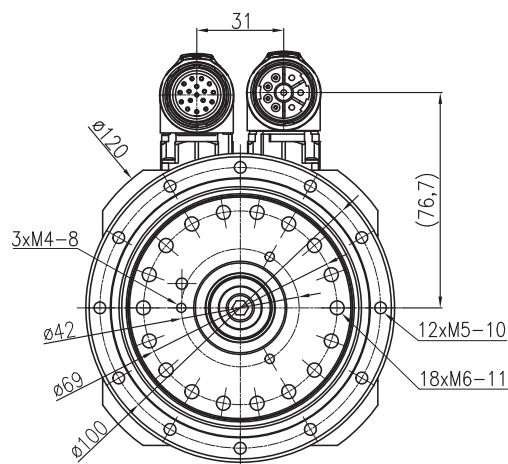
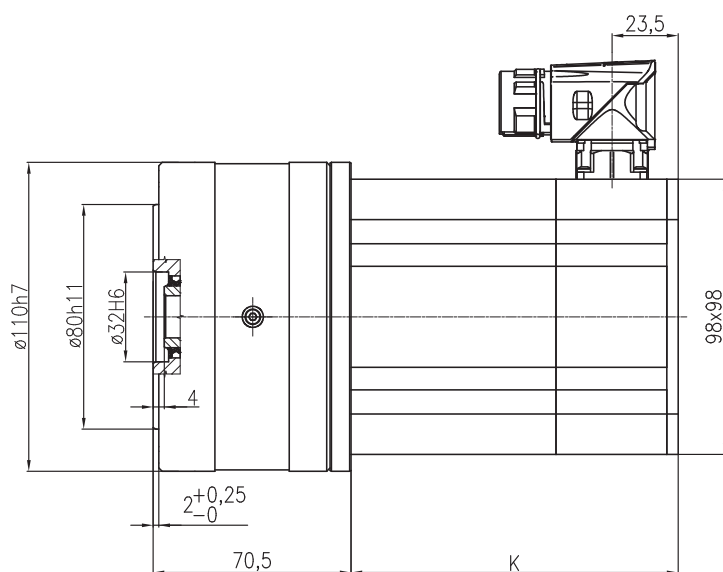
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ADVANTAGES:

- ◆ saving the cost of cables and connectors
- ◆ saving space for cable leads
- ◆ easier and faster installation
- ◆ rotary connector (almost 360°)
- ◆ compatibility of connectors
- ◆ possibility of one-side-mounted cable order and installation of connector by customer

D110

Data / Type	Unit	D110		
Ratio	/	67, 89, 119		
Nominal output torque (25 °C)	Nm	130		
Maximum output torque	Nm	325		
Nominal input speed	min ⁻¹	2 000		
Maximum input speed	min ⁻¹	4 500		
Holding brake voltage	V DC	24		
Holding brake torque	Nm	4.5		
Backlash	arcmin	< 1.5		
Tilting stiffness	Nm/arcmin	150		
Torsional stiffness	Nm/arcmin	22		
Radial force	N	9 300		
Axial force	N	13 100		
Nominal motor voltage	V DC	48	320	560
Nominal motor current	Arms	27.3	4.8	2.5
Maximum motor current	Arms	132	21	12.1
EMF Constant	Vef/1 000 rpm	7.4	45.5	81
Torque Constant	Nm/Arms	0.12	0.75	1.34
Terminal resistance	Ω	0.03	1.24	4.0
Terminal Inductance	mH	0.17	6.3	20.2
Operating temperature range	°C	-10 .. +40		
Input inertia	kg.cm ²	2.3		
Actuator weight	kg	8.0 (no brake) / 8.8 (with brake)		
Degree of protection	/	IP64		
UL-certification	/	Upon request, only standard connectors		

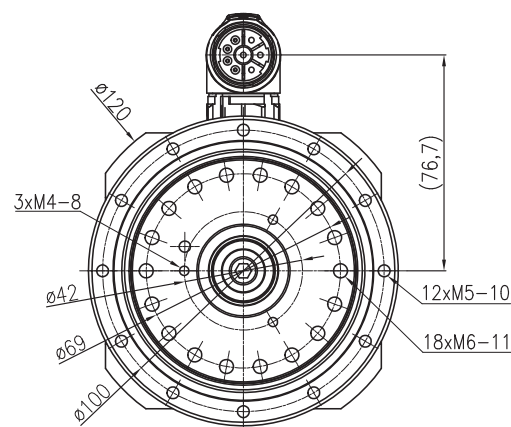
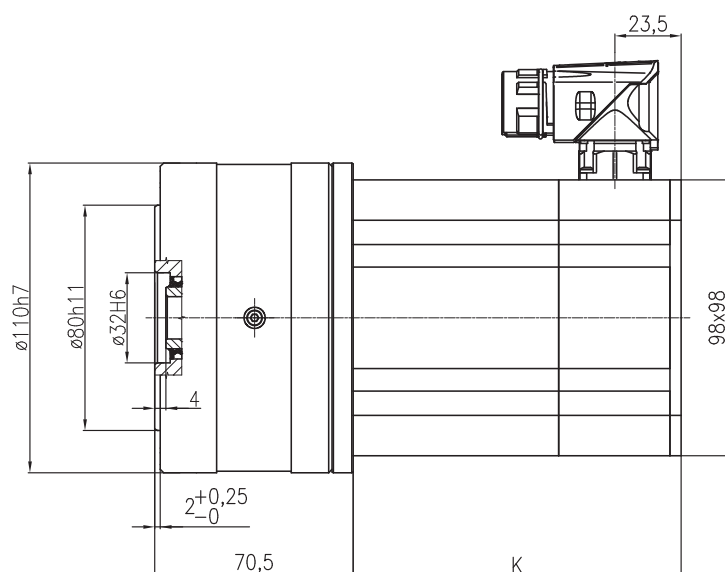


Dimensions

D140	K dimension
Resolver	112 mm
Resolver + brake	155 mm
Hiperface	116.5 mm
Hiperface + brake	159.5 mm
EnDat 2.1	123 mm
EnDat 2.1 + brake	168 mm
EnDat 2.2	105 mm
EnDat 2.2 + brake	148 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.

D110 with one integrated connector



Dimensions

D110	K dimension
Hiperface DSL	116.5 mm
Hiperface DSL + brake	159.5 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.



Options

We are offering the possibility of design changes on the servomotor including:

- ◆ change of shape or dimensions of front flange
- ◆ sealed version – up to IP67 including shaft protection (different length of motor)
- ◆ change for other DC-bus voltage or speed
- ◆ other feedback types
- ◆ other specialities

Servodrives with one integrated connector

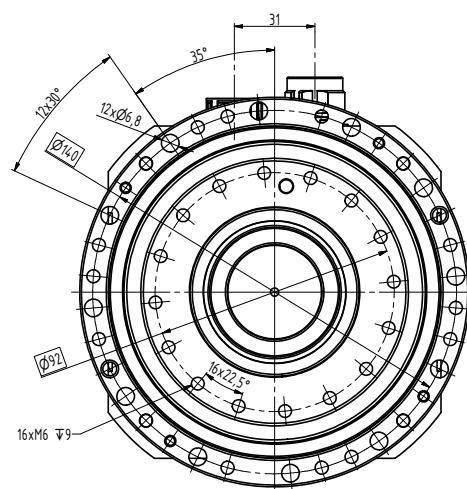
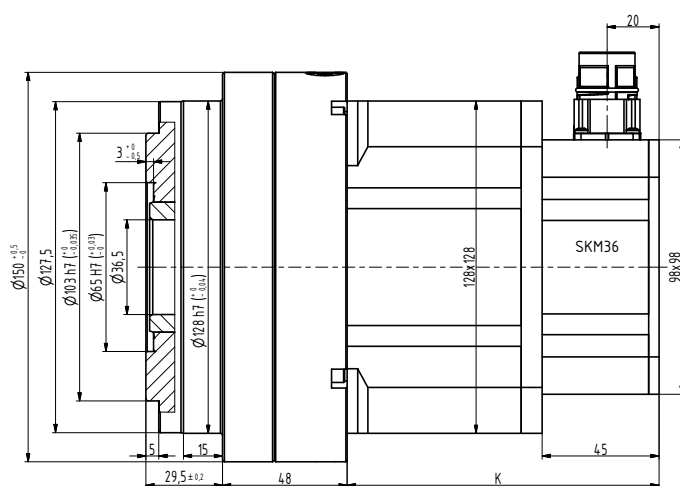
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ADVANTAGES:

- ◆ saving the cost of cables and connectors
- ◆ saving space for cable leads
- ◆ easier and faster installation
- ◆ rotary connector (almost 360°)
- ◆ compatibility of connectors
- ◆ possibility of one-side-mounted cable order and installation of connector by customer

D140

Data / Type	Unit	D140		
Ratio	/	69,115		
Nominal output torque (25 °C)	Nm	268		
Maximum output torque	Nm	670		
Nominal input speed	min ⁻¹	2 000		
Maximum input speed	min ⁻¹	3 000/4 500		
Holding brake voltage	V DC	24		
Holding brake torque	Nm	9		
Backlash	arcmin	1.0		
Tilting stiffness	Nm/arcmin	1 160		
Torsional stiffness	Nm/arcmin	22		
Radial force	N	11 500		
Axial force	N	17 000		
Nominal motor voltage	V DC	48	320	560
Nominal motor current	Arms	30	5.7	3.16
Maximum motor current	Arms	160	32	15.8
EMF Constant	Vef/1 000 rpm	10	50	81
Torque Constant	Nm/Arms	0.17	0.83	1.34
Terminal resistance	Ω	0.05	1.15	2.9
Terminal Inductance	mH	0.27	6.8	17.4
Operating temperature range	°C	-10 .. +40		
Input inertia	kg.cm ²	5.5		
Actuator weight	kg	14 (no brake) / 15 (with brake)		
Degree of protection	/	IP64		
UL-certification	/	Upon request, only standard connectors		

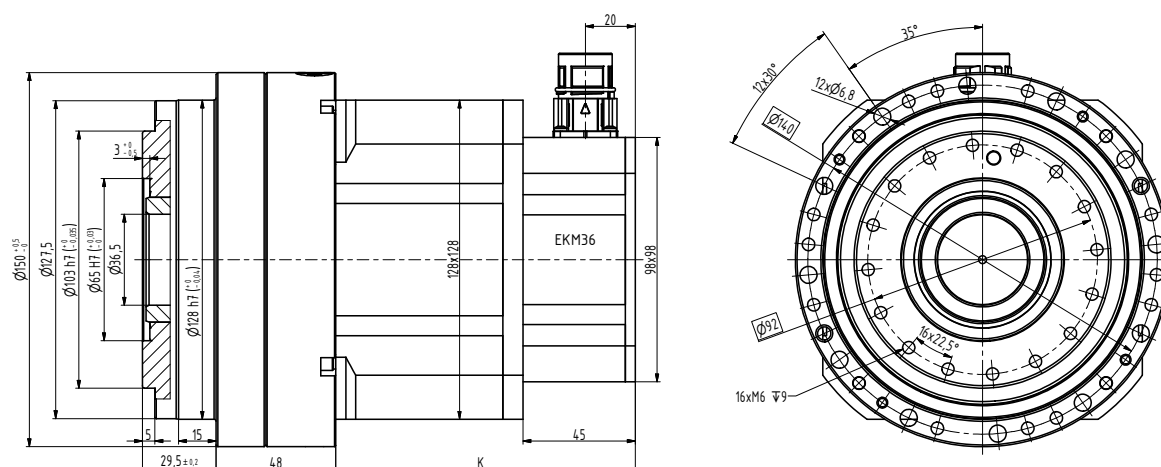


Dimensions

D110	K dimension
Resolver	112 mm
Resolver + brake	155 mm
Hiperface	120 mm
Hiperface + brake	163 mm

Length of actuator depends on specific type of feedback sensor.
Please contact us for more information.
Hollow shaft version is possible upon request.

D140 with one integrated connector



Dimensions

D140	K dimension
Hiperface DSL	120 mm
Hiperface DSL + brake	163 mm

Length of actuator depends on specific type of feedback sensor. Please contact us for more information.

Options

We are offering the possibility of design changes on the servomotor including:

- ◆ change of shape or dimensions of front flange
- ◆ sealed version – up to IP67 including shaft protection (different length of motor)
- ◆ change for other DC-bus voltage or speed
- ◆ other feedback types
- ◆ other specialities

Servodrives with one integrated connector

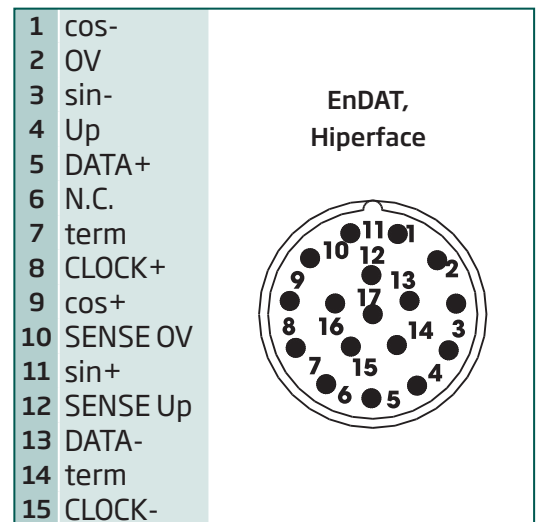
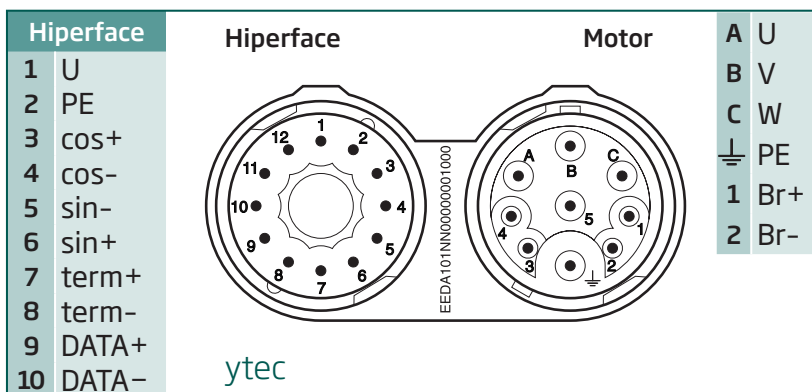
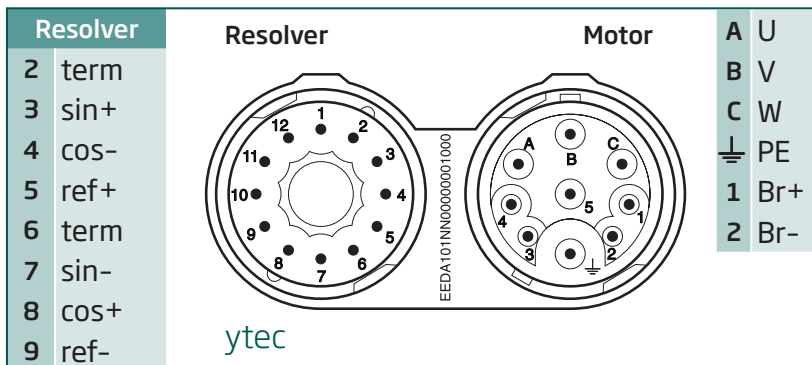
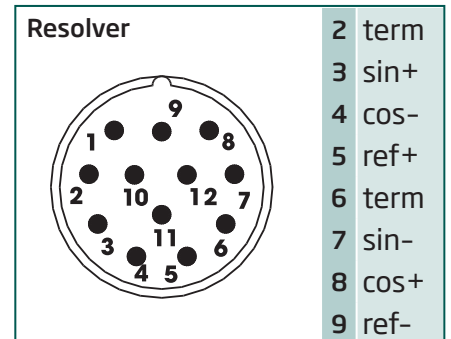
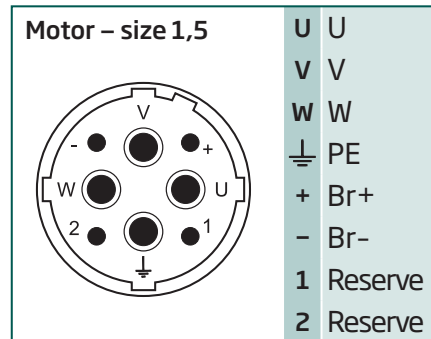
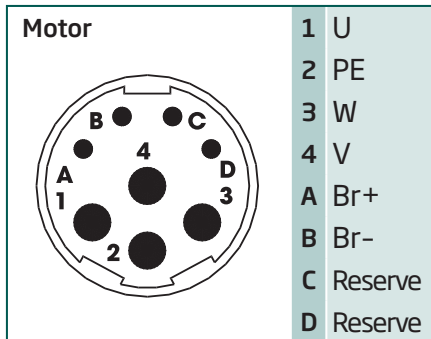
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ADVANTAGES:

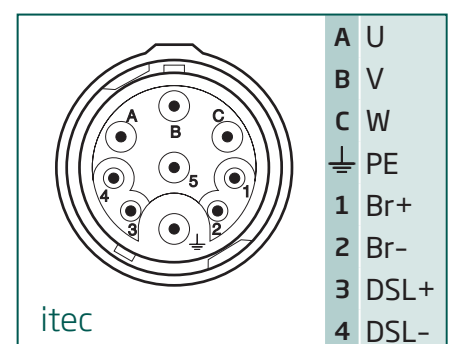
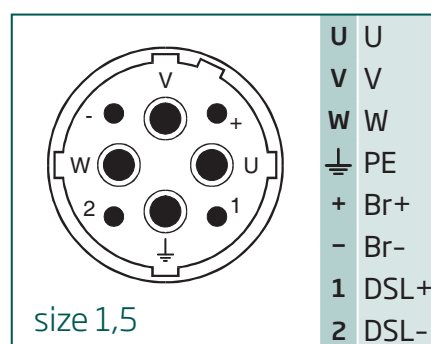
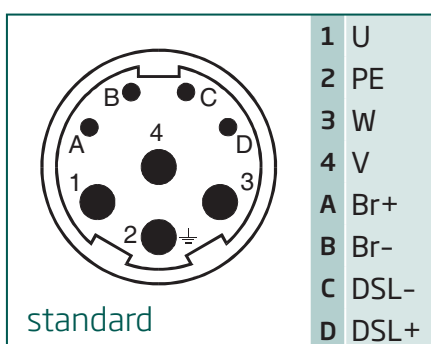
- ◆ saving the cost of cables and connectors
- ◆ saving space for cable leads
- ◆ easier and faster installation
- ◆ rotary connector (almost 360°)
- ◆ compatibility of connectors
- ◆ possibility of one-side-mounted cable order and installation of connector by customer

Connections for motor connectors

Standard servomotors

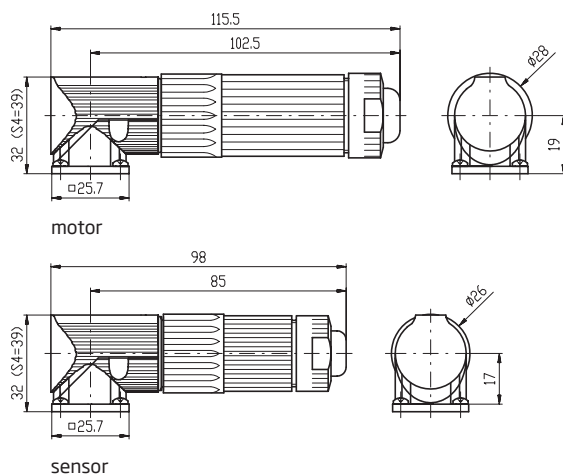


Servomotors with one integrated connector

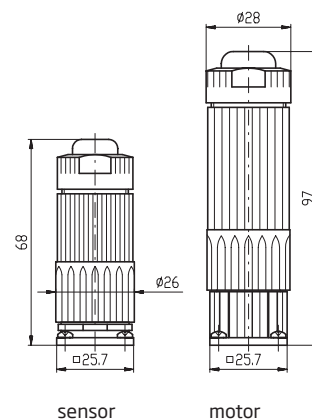


Dimensions of connectors

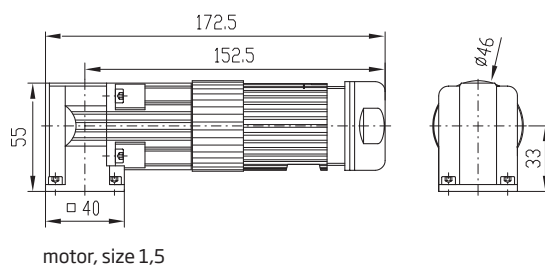
Rectangular connectors (S1, S2, S3, S4)



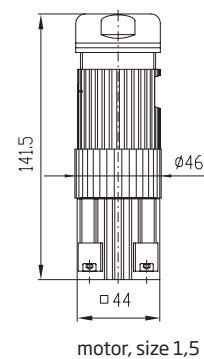
Straight connectors



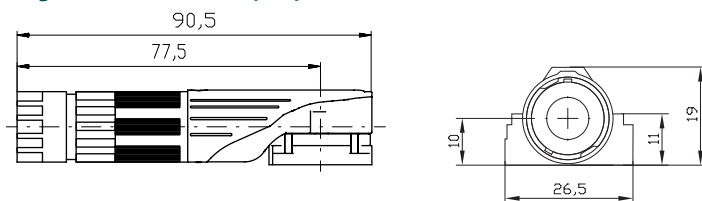
Rectangular connectors (S2, S3) (size 1,5)



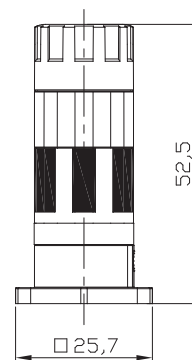
Straight connectors (size 1,5)



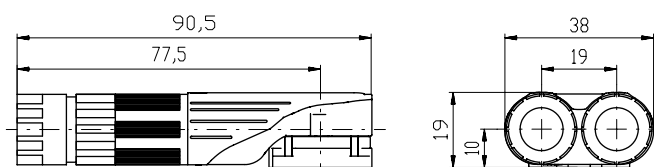
Itec rotary connector (I4)



Itec straight connector (I)



Ytec rotary connectors (Y)



Servomotors ♦ Servoamplifiers ♦ Gearboxes ♦ Control systems

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