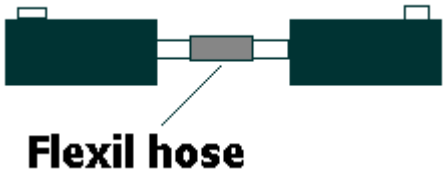
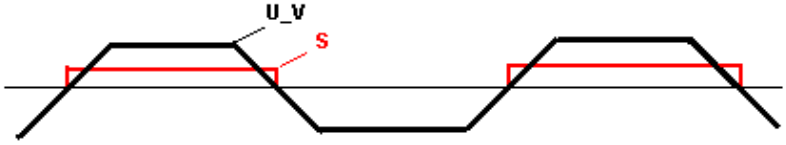
Adjustment motors 1FT5

Disconnect adjustment the motor from a power part of a drive.
Connect shaft adjustmento the motor and the auxiliary motor, as is shown in drawing:

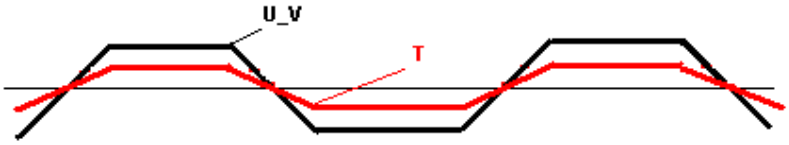


Oscillograph connect to a socket of the sensor of position of a rotor:
Signal S to potential of the Channel 1 oscillograph
Masse M: To the general of the Channel 1 oscillograph
You connect 2nd channel of an oscillograph through a divider :
Phase of the motor U to potential of the Channel 2 oscillographs
Phase of the motor V to the general of the Channel 2 oscillographs

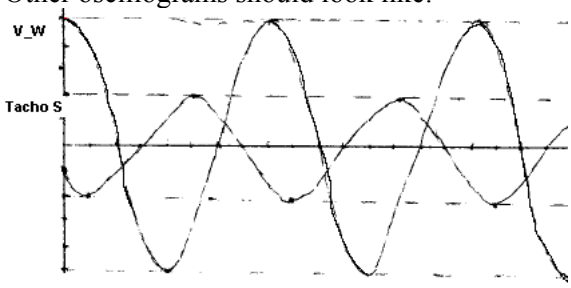
You rotate adjustment the motor 1FT5 clockwise by means of the auxiliary motor if to take a detached view a shaft of the motor.
Combine fronts of 1st and 2nd channel as is shown in drawing.

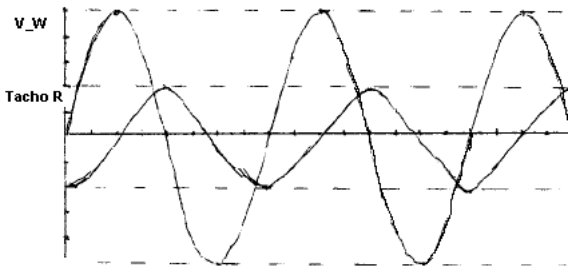


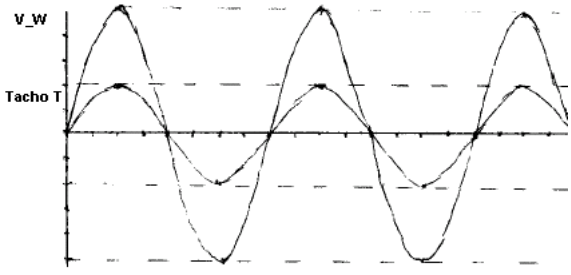
You check adjustment tachometer generator, you switch 2nd channel oscillographs to phase T tachometer generator. You check fronts as is shown in drawing.



Other oscillograms should look like:







Motor encoders

1

1.1 Motor 1FT5

1.1.1 Integrated encoders

Temperature sensor

Type:	Q63100–P426–M135 (Characteristic DIN 44081)
Resistance when cold (20 °C):	< 250 Ohm
Connection:	through the encoder cable
Response temperature:	155 °C ±5 °C
Shaft heights 36 and 48:	2 integrated PTC thermistors (in series)
Shaft heights 63 to 132:	1 integrated PTC thermistor

The change in resistance is **not** proportional to the winding temperature change.

The evaluation circuit signal in the SIMODRIVE converter must be externally evaluated.

High, brief overload conditions require additional protective measures, as a result of the thermal coupling time of the sensor.

The cables for the temperature sensor are included in the encoder cable.

Caution

The integrated temperature sensor protects the servomotors from overload conditions up to $4 * I_{0\ 60\ K}$.

For servomotors (shaft heights 36 and 48), the temperature sensor only protects up to $2 * I_{0\ 60\ K}$.

For thermally critical load situations, e.g. high overload when the motor is at standstill, adequate protection is no longer provided. For example, a thermal overcurrent relay must be provided as additional protection.

GE

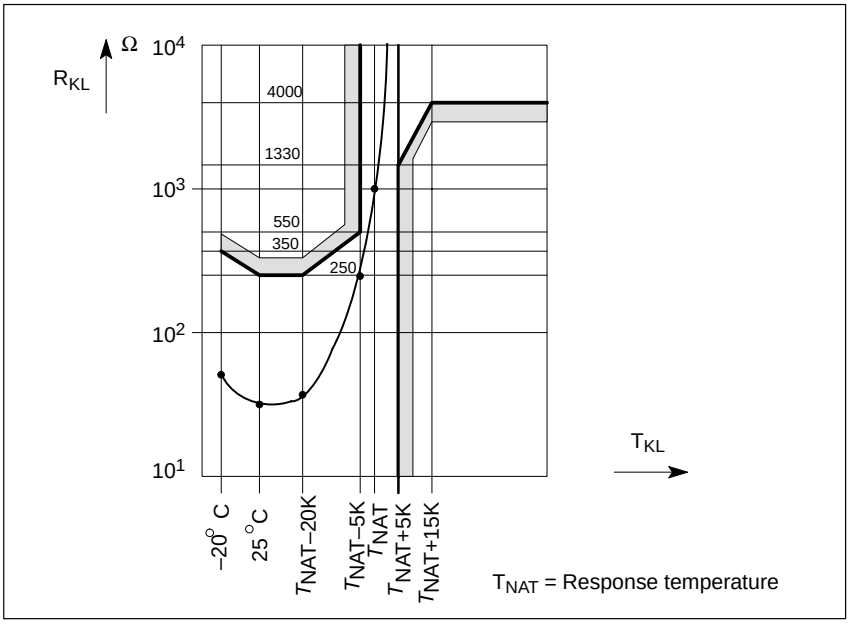


Fig. 1-1 Temperature characteristic

Tachometer system

Version: Brushless analog encoder system

Coupling: On the NDE side through the taper (integrated in the motor)

Application:

- Tachometer for speed actual value sensing;
- Magnetic devices or a Hall switch system as rotor position encoder for inverter control

Output signals:

- Trapezoidal voltage signals from the tachometer
- Absolute signal for the rotor position
  18 pieces of information per motor revolution

Table 1-1 Technical data, tachometer system 1FU

Technical data	**1FU1030** Shaft heights 36 and 48	**1FU1050** Shaft heights 63 to 132
	Hall switch system	Magnetic device
Speed (mech. limiting speed)	8000 RPM	8000 RPM
Peak value, phase voltage at rated speed	16/40 V	40 V
Voltage tolerance	+15 %, –5 %	±8 %
Voltage adjustment/calibration	±20 %	±20 %
Peak ripple	≤ 1 %	≤ 0.5 %
Linearity error	≤ 0.2 %	≤ 0.2 %
Reversing error	≤ 0.2 %	≤ 0.2 %

Encoder cable: 6FX□202–2CB31–□□□0
Performance/Standard, Length

Mating connector: 6FX2003–0CE12

Pulse encoder ROD 320.005

Version:	Optical encoder system with different pulse numbers (refer to Catalog)
Coupling:	on the NDE side through the taper (integrated in the motor)
Application:	Indirect measuring system for digital position control loop
Evaluation:	Incremental
Output signals:	Squarewave; RS422 (TTL)

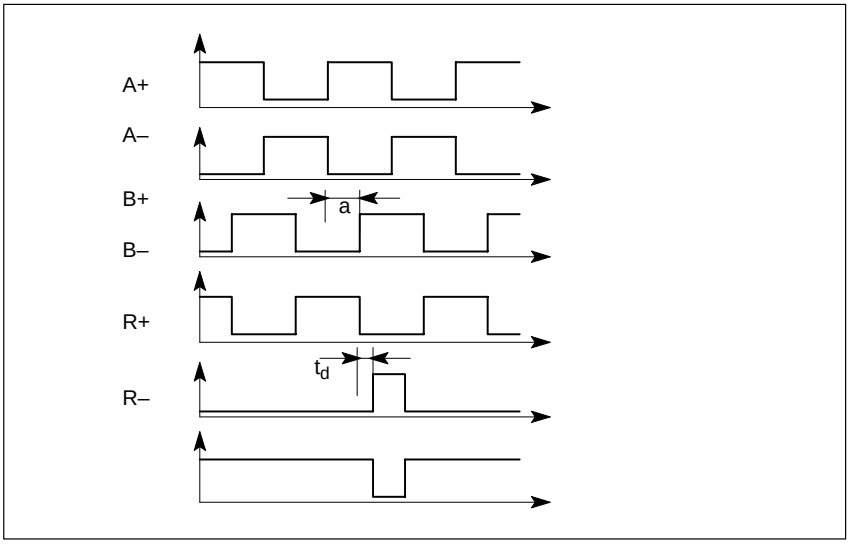


Fig. 1-2 Signal characteristics for clockwise direction of rotation

The servomotors may only be utilized for a temperature rise of $\Delta T = 60$ K.

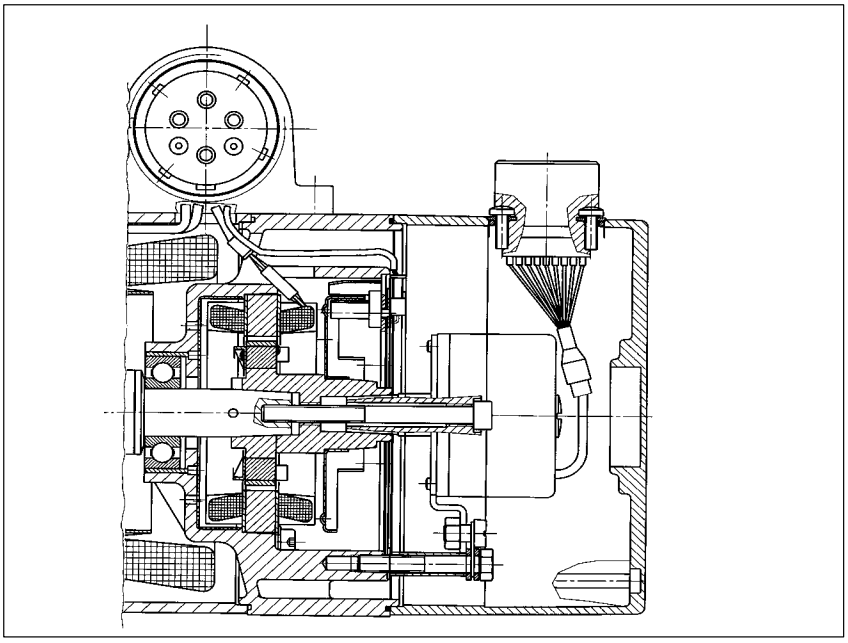


Fig. 1-3 1FT5 servomotor with integrated ROD 320.005 pulse encoder

GE

Table 1-2 Technical data, ROD 320.005 pulse encoder

Mech. speed Electr. speed Operating voltage Current drain Frequency range	max. 8500 RPM dependent on the pulse No.(ref. below) DC 5 V $\pm$5 % $\leq$150 mA (without load) 0 to 300 kHz
Edge clearance Delay U_{a0} to U_{a1} and U_{a2} Output load capability	a $\geq$ 420 ns $t_d \leq$ 50 ns $I_{high} \leq$ DC 20 mA $I_{low} \leq$ DC 20 mA; $C_{load} \leq$ 1000 pF
Short–circuit strength	Briefly, all outputs to 0 V; 1 output continuously at$\leq$ 25 °C
Light source	LED which is vibration proof
Operating temperature	–30 °C to +100 °C
Intrinsic moment of inertia	$0.035 * 10^{-4}$ kgm^2
Ground	0.25 kg

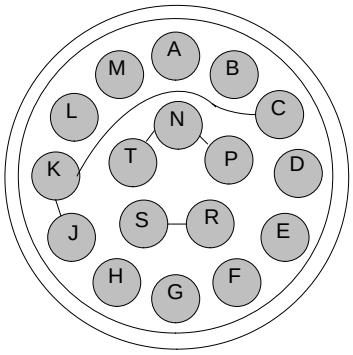
Maximum electrical speed:

$$n_{max} = \frac{f_g * 10^3 * 60}{\text{Pulse number}} \text{ [RPM]}$$

f_g [kHz] Limiting frequency (–3dB)

Connection, 17–pin flange–mounted socket (connector pins)

PIN–No.	Signal
A	A+
B	B+
C, J, K	+5 V
D	A–
E	B–
F	R+
G	R–
H	Screen
N, P, T	0 V
R, S	Jumper
L	$\overline{\text{Uas}}$[1)]



When viewing the connector side (pins)

Mating connector: 6FC9348–7AV01 (socket)

Pre–assembled cables: Refer to Catalog NC Z

1) Noise signal: LED monitoring

1.1.2 Mounted encoders

Incremental encoders ROD426

Version:	Optical encoder system with different pulse numbers- (refer to Catalog)
Coupling:	On the NDE side through a compression– or spring–loaded coupling (mounted on the motor); synchronous flange
Application:	Indirect measuring system for the digital closed–loop control circuit
Evaluation:	Incremental
Output signals:	Squarewave; RS422 (TTL) 2 channels, displaced through 90° electrical 1 zero pulse per revolution

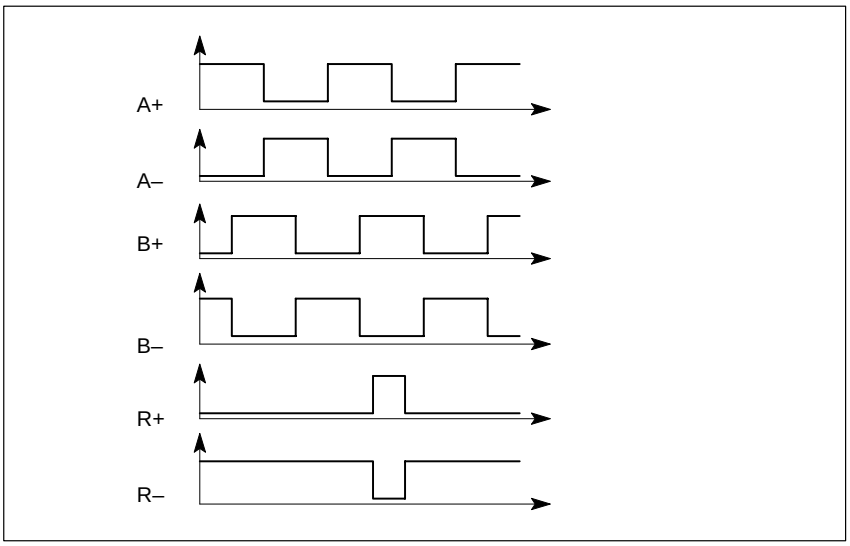


Fig. 1-4 Signal characteristics for a clockwise direction of rotation

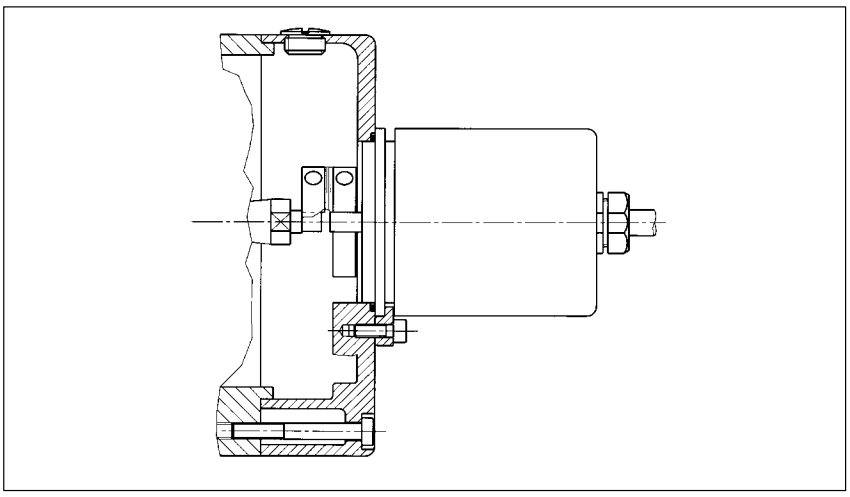


Fig. 1-5 1FT5 servomotor with mounted rotary encoder

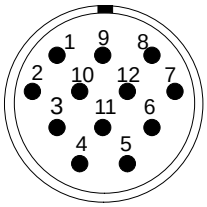
GE

Table 1-3 Technical data, ROD 426 pulse encoder

Speed Operating voltage Current drain Frequency range	max. 12 000 RPM**/** DC 5 V ±5 % ≤ 150 mA (without load) 0 kHz to 300 kHz
Signal level Minimum edge clearance U_{a1} to U_{a2} Electrical resolution	RS 422 (TTL) ≥ 0.45µs at 300 kHz 500 to 5000 pulses**/**revolution (corresponds to the resolution of a pulse disk); for external multiplication up to 20 000 pulses**/**revolution
Degree of protection (acc. to DIN 40050)	• without shaft input: IP 67 • with shaft input: IP 64
Operating temperature Storage temperature	–30 °C to +100 °C –30 °C to +80 °C
Vibration stressing (acc. to DIN IEC 68–2–6) Shock stressing (acc. to DIN IEC 68–2–29)	100 m**/**s^2 (50...2000 Hz) 1000 m**/**s^2 (11 ms)
Moment of inertia of the mounted encoder including coupling and motor shaft	0.0175 ∗ 10^{-4} kgm^2
Moment of inertia of the encoder	1.45 ∗ 10^{-6} kgm^2
Weight	0.25 kg

12–pin connection (connector pins)

PIN No.	Signal
1	B–
2	+5 V Sense
3	R+
4	R–
5	A+
6	A–
7	$\overline{\text{Uas}}$[1)]
8	B+
9	not connected
10	0 V
11	0 V Sense
12	+5 V



When viewing the connector side (pins)

Mating connector: 6FX2003–0CE12 (socket)

Pre–assembled cables: Refer to Catalog NC Z

1) Noise signal: LED monitoring

Prepared for encoder mounting, synchronous flange

For encoders with synchronous flange (ROD 426 mounting–compatible).

Order designation: G51

Version: Shaft heights 36 and 48 with VMA coupling
Shaft heights 63 to 132 with spring–disk coupling

The following encoders can be mounted:

SIMODRIVE Sensor incremental encoders with synchronous flange

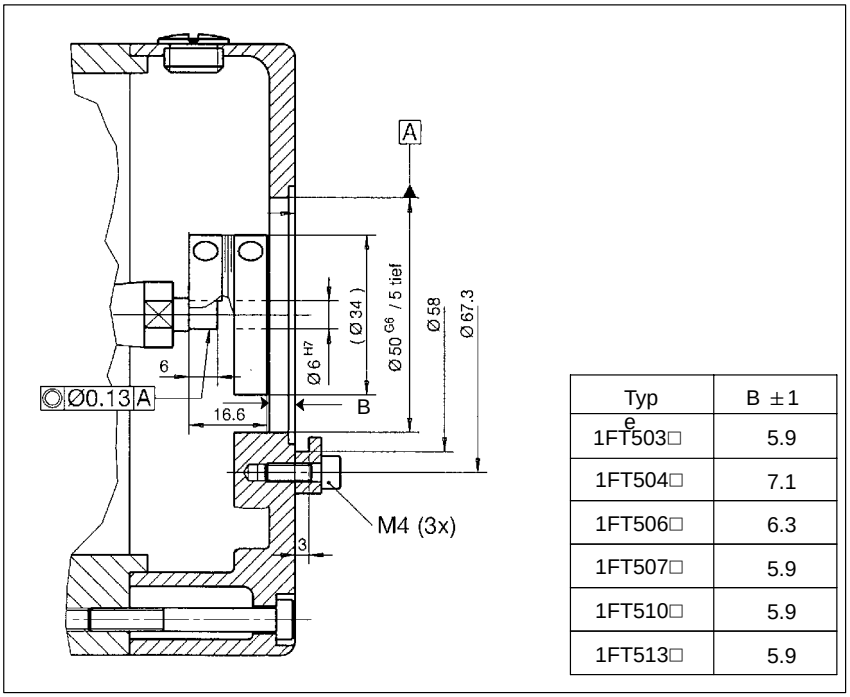
- 6FX2001–2□□□ with RS 422 (TTL)
- 6FX2001–3□□□ with sinusoidal $1V_{pp}$
- 6FX2001–4□□□ with HTL

as well as mounting–compatible encoders

SIMODRIVE Sensor absolute value encoders with synchronous flange

- 6FX2001–5□□□ with SSI or Profibus DP

as well as mounting–compatible encoders.



Typ e	B ±1
1FT503□	5.9
1FT504□	7.1
1FT506□	6.3
1FT507□	5.9
1FT510□	5.9
1FT513□	5.9

Fig. 1-6 Mounting absolute angle encoders with standard pulse encoder flange onto motors 1FT503□ to 1FT513□

GE