

Bedienungsanleitung

für Multiturn Drehgeber mit RS 422 und RS 485 Schnittstelle



Typ 5882



- Hohlwelle bis Ø 12 mm
- Nur 40,5 mm Einbautiefe, damit kompakter als viele inkrementale Drehgeber
- Baugröße Ø 58 mm
- Auch als programmierbare Ausführung lieferbar. Folgende Parameter sind programmierbar:

- Codeart, Auflösung pro Umdrehung, Gesamtauflösung, Drehrichtung (cw oder ccw), Nullpunkt
- Sehr einfache Montage der Hohlwellenausführung. Der Geber wird ohne Kupplungen auf die Antriebswelle gesteckt.
- Teilung: bis zu 8192 (13 Bit) pro Umdrehung, 4096 (12 Bit) Umdrehungen
- berührungslos arbeitende Multiturnstufe
- SSI-Schnittstelle
- Schutzart IP 65
- Schockfest bis 250 g

Typ 9081



- Hohlwelle bis Ø 28 mm oder Vollwelle Ø 12 mm
- Nur 50 mm Einbautiefe
- Auch als programmierbare Ausführung lieferbar. Folgende Parameter sind programmierbar: Codeart, Auflösung pro Umdrehung, Gesamtauflösung, Drehrichtung (cw oder ccw), Nullpunkt

- Sehr einfache Montage der Hohlwellenausführung. Der Geber wird ohne Kupplungen auf die Antriebswelle gesteckt. Dies spart bis zu 30 % Kosten und 50 % Einbauraum gegenüber Wellenausführungen.
- Teilung: bis zu 8192 (13 Bit) pro Umdrehung, 4096 (12 Bit) Umdrehungen
- berührungslos arbeitende Multiturnstufe
- SSI-Schnittstelle
- Schutzart IP 65

Typ 5862



- Vollwelle Ø 6 oder Ø 10 mm
- nur 66 mm Einbautiefe
- Baugröße Ø 58 mm
- Auch als programmierbare Ausführung lieferbar.

Folgende Parameter sind programmierbar:

- Codeart, Auflösung pro Umdrehung, Gesamtauflösung, Drehrichtung (cw oder ccw), Nullpunkt
- Auflösung: bis zu 8192 (13 Bit) pro Umdrehung, 4096 (12 Bit) Umdrehungen
- SSI-Schnittstelle
- Schutzart IP 65
- Schockfest bis 250 g
- Berührungslos arbeitende Multiturnstufe

Bestellschlüssel:

1001 = **RS422** ESC
Protokoll, max
19 200 Baud

3001 = **RS485** ESC
Protokoll, max
19 200 Baud

8.5882.XX1X.1001
8.5862.XX1X.1001
8.9081.XX1X.1001

8.5882.XX3X.3001
8.5862.XX3X.3001
8.9081.XX3X.3001

Zubehör:

Passender Gegenstecker :
Best.-Nr. 8.0000.5012.0000

- Netzteil 90 - 250 V AC
- CD-ROM mit Software Ezturn

Programmierset bestehend aus:

- Schnittstellenkonverter
- Verbindungskabel von Schnittstellenkonverter zu Drehgeber

Best.-Nr. 8.0010.9000.0004

Mit diesem Programm und dem Kabel, können im Terminal-Mode die Befehle getestet und der Geber parametrisiert werden.

1. Anschlussbelegung

RS485-Schnittstelle, 12-poliger Stecker:

Signal :	0 V	+UB	T/R-	T/R+				VR						
Pin	1	2	3	4	5	6	7*	8	9	10	11	12		PH
Farbe:	WH	BN	GN	YE				RD						

R = Receive-Kanal
T = Transmit-Kanal
VR = Vor-/Rück-Eingang. Bei aktivem Eingang

(High-Pegel = +U_G) werden die Codewerte in fallender Reihenfolge ausgegeben (ccw) Steckergehäuse

PH =

* Der Setzwert entfällt bei der Variante 3001, kann aber über den Befehl "<ESC> G" (Preset schreiben) ebenfalls realisiert werden.

RS422 -Schnittstelle, 12-poliger Stecker:

Signal :	0V	+UB	+T	-T	+D	-D	ST*	VR	A1	A2	A3	A4		
Pin	1	2	3	4	5	6	7	8	9	10	11	12		PH
Farbe:	WH	BN	GN	YE	GY	PK	BL	RD	BL	VT	GY	PK	RD	BU

T: Taktsignal
D: Datensignal
ST*: SET Eingang. Momentaner Positionswert wird als Position „0“ festgelegt
VR: Vor-/Rück- Eingang. Bei aktivem Eingang werden die

Codewerte in fallender Reihenfolge ausgegeben (CCW).
PH: Steckergehäuse
Unbenutzte Anschlüsse sind vor Inbetriebnahme zu isolieren.

A1, A2, A3, A4: Ausgänge, mit Ezturn veränderbar

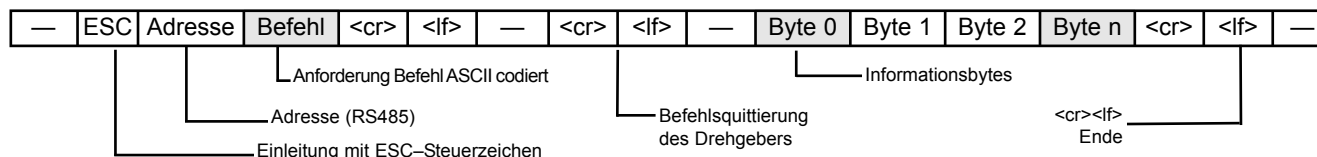
*damit die ESC-Befehle funktionieren muss der Eingang ST mit +UB verbunden werden.

2. ESC-Befehle siehe folgende Seiten

3. Masteradresse: 00 (RS485)

unter dieser Adresse können die Geber angesprochen werden, wenn die eingestellte Geräteadresse unbekannt ist.
Befehlsformat: <ESC>AAC<cr><lf>
AA = Adresse 0 ... 1F Hex, C = Kommando

4. Zeitverhalten der ESC-Steuerung



5. Kundenseitige Parametrierung mit der Bedienungssoftware Ezturn® (im Lieferumfang enthalten).

Programmierung der Parameter über RS485-Konverter (Verbindungskabel) und Ezturn Parametriersoftware. Danach Stecker abziehen und Geber anschließen

6. Anschlussbelegung Stecker 12-polig, M23



Operating instructions

for multiturn encoder with RS 422 or RS 485 interface



Type 5882



- Hollow shaft up to Ø 12 mm
- Only 40.5 mm clearance needed, thus more compact than most incremental encoders.
- Housing Ø 58 mm
- Also available in programmable version. The following parameters can

- be programmed: code type, resolution per revolution, total resolution, direction of rotation (cw or ccw), zero point.
- Very easy mounting of the hollow shaft version. The encoder is mounted directly on the drive shaft without coupling.
- Divisions: up to 8192 (13 bits) per revolution, 4096 (12 bits) revolutions
- Contactless multiturn stage
- Protection: IP 65
- Shock resistant up to 250 g

Type 9081



- Hollow shaft up to Ø28 mm or shaft Ø12 mm
- Programmable version available. Programmable parameters: Type of code, resolution per revolution, total resolution, direction of rotation (cw or ccw), offset for mechanical zero point compensation

- Only 50 mm clearance needed
- Very easy mounting of the hollow shaft version. The encoder is mounted directly on the drive shaft without couplings. This saves up to 30 % cost and 50 % clearance compared to shaft versions.
- Divisions: 8192 (13 bits) per revolution, 4096 (12 bits) revolutions
- SSI interface
- IP 65
- design in integrated technology

Type 5862



- Shaft Ø 6 or Ø 10 mm
- Only 66 mm clearance needed
- Housing Ø 58 mm
- Also available in programmable version. The following parameters can be programmed: code type,

- resolution per revolution, total resolution, direction of rotation (cw or ccw), zero point
- Resolution: up to 8192 (13 bits) per revolution, 4096 (12 bits) revolutions
- SSI interface
- Protection IP 65
- Shock resistant up to 250 g
- Contactless multiturn stage

Order code:

1001 = **RS422** ESC
Protokoll, max
19 200 Baud

8.5882.XX1X.1001
8.5862.XX1X.1001
8.9081.XX1X.1001

3001 = **RS485** ESC
Protokoll, max
19 200 Baud

8.5882.XX3X.3001
8.5862.XX3X.3001
8.9081.XX3X.3001

Accessories:

Corresponding mating connector:
Ord.No 8.0000.5012.0000

Programming set including
- Interface converter
- Connection cable from the interface converter to the encoder

- 90-250 VAC power supply
- CD-ROM with Ezturn® software
Order code
8.0010.9000.0004

1. Terminal assignment

RS485 interface, 12 pin plug:

Signal :	0 V	+UB	T/R-	T/R+				VR						
Pin	1	2	3	4	5	6	7*	8	9	10	11	12	PH	
Col:	WH	BN	GN	YE				RD						

R = Receive-Kanal

T = Transmit-Kanal

VR = UP/down input. When this input is active high, decreasing value are transmitted (ccw)

PH = Plug housing

* There is no input for 3001 version, but it can be realised also with command "<ESC> GP" (with preset)

RS422 interface, 12 pin plug

Signal :	0V	+UB	R+	R-	T+	T-	ST*	VR	A1	A2	A3	A4		
Pin	1	2	3	4	5	6	7	8	9	10	11	12	PH	
Col:	WH	BN	GN	YE	GY	PK	BL	RD	BL	VT	GY PK	RD BU		

R: Receive channel

T: Transmit channel

ST*: SET input. The current position value is stored as new zero position (or the actual value is set to the pre-value when using the programmable version).

set

VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.

PH: Plug housing

Insulate unused outputs before initial start-up.

A1, A2, A3, A4: outputs, with Ezturm programmable

*for running the ESC-commands the input ST must be connected with+UB

Preset values:

Baud rate: 19200 Baud¹⁾

Data: 8 Bit

Parity: no

Stopbit: 2

¹⁾ The cycle time of a position request should not fall below the value of **10 ms**.

2. ESC-Command, see the following pages

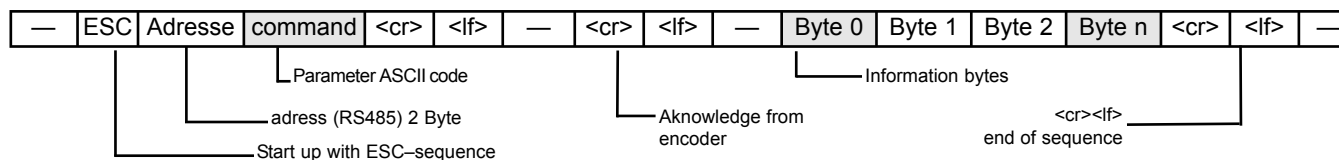
3. Master address: 00 (RS485)

this is the general address to connect the encoder, while the address is unknown

Format: <ESC>AAC<cr><lf>

AA = adresse 0 ... 1F Hex, C = command

4. Runtime performance of the ESC-Command

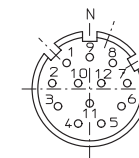


5. Customer programming with the software Ezturm® (contain in the scope of supply).

Programming the parameter via RS485-converter (cable) and Ezturm software.

Then disconnect the plug and connect the encoder.

6. Terminal assignment 12 pin plug, M23



Top view of mating side, male contact base.

Fritz Kübler GmbH

Zähl- und Sensortechnik

P.O. BOX 3440

D-78023 Villingen-Schwenningen

GERMANY

Telefon +49 (0) 77 20 - 39 03 - 0

Telefax +49 (0) 77 20 - 2 15 64

sales@kuebler.com

www.kuebler.com

ESC-Commands Overview Multiturn Encoder versions with RS -422/485 Interface



Masteraddress : 00 General address to connect the encoder while the device address is unknown

Command format : <ESC>AACC<cr><lf>

AA= Device address (RS485), CC = command <cr> = Carriage Return <lf> = Line Feed

R E A D only Parameters:

Start Char	Address (RS485)	Command	Parameter name	Access	Meaning	Length Bit	value
ESC	01-1Fh	O	OpParameter Byte 0 Byte 1 Byte 2 Byte 3	Ro Bit 0 Bit 1 Bit 2 Bit 3 Bit 0 Bit 0 Bit 1 Bit 2 Bit 3	Code Sequence 1= CCW = counterclockwise 1 = Diagnostic active 1 = Scaling active unused unused 1= Multiturn scaling active 1 = Revolution active 1 = Scaling on Units/revolution 1 = Limit switch active (1) nc	16	Boolean
ESC	01-1Fh	V	Version Info	Ro	Hardware and Software version	25 Byte	ASCII String
ESC	01-1Fh	M	Measuring Value	Ro	Total measuring range value	32	1...33554432
ESC	01-1Fh	D	Scaling Value	Ro	Resolution/revolution in steps	16	1...8191
ESC	01-1Fh	S	Preset	Ro	Preset value	32	1...< 33554432
ESC	01-1Fh	A	Alarms	Ro	Battery warning, Encoder fault	16	Boolean
ESC	01-1Fh	E	Warnings	Ro	Limit switch, Encoder stillstand	16	Boolean
ESC	01-1Fh	T	Operatingtime	Ro	0.1 h steps	32	0.1...2 ³²
ESC	01-1Fh	C	OffsetValue	Ro	Difference Preset/ to physical value	32	0...2 ³²
ESC	01-1Fh	N	SerialNumber	Ro	Serial number	32	XXXXXXXX
ESC	01-1Fh	H	Limit switch High	Ro	Limit switch upper value	32	1...33554432
ESC	01-1Fh	L	Limit switch Low	Ro	Limit switch lower value	32	1...33554432
ESC	01-1Fh	F	Scaling factor	Ro	Actual Scaling value	32	0.000001...1.0
ESC	01-1Fh	B	Device Code	Ro	Spezial device code, Code Output	16	8000 ... A000
ESC	01-1Fh	U	Number of revolutions	Ro	Actual Number of Revolutions	16	1..4096
ESC	01-1Fh	P	Position	Ro	Actual position	32	1..33554432

Programmable Parameters :

Start Char	Address (RS485)	Comm and	Parameter name	Acc.	meaning	Len.	value
ESC	01-1Fh	GP	Write Preset	W	Set encoder to a new position	8 Byte	1 ... < 33554432
			Example		<ESC>03GP00005200<cr><lf> device on address 03 will be set to a new position value of 5200		5200h
ESC	01-1Fh	GR	Singleturn value	W	Resolution per revolution	8 Byte	1 ... < 8192
⊕			Example:		<ESC>03GR00000360<cr><lf> singleturn resolution on address 03 will be set to a value of 360 Number of revolutions is 4096 !		360h Min =1 Max = 8192
ESC	01-1Fh	GM	Number of revolutions	W	Number of revolutions	4 Byte	1 ... < 4096
			Example		<ESC>12GM0120<cr><lf> Number of revolutions on address 12 will be set to a value of 120		120h Min =1 Max = 4096
ESC	01-1Fh	GT	Total measuring range	W	Total measuring range	8 Byte	1 ... < 33554431
⊕			Example		<ESC>09GT00100000<cr><lf> Total measuring range on address 09 will be set to a value of 100000		100000h Min =1 Max = 33554431
ESC	01-1Fh	GL	Limitswitch low value	W	Limitswitch low	8 Byte	1 ... < 33554432
			Example		<ESC>09GL00000100<cr><lf> lower value on address 09 will be set to a value of 100		100h
ESC	01-1Fh	GH	Limitswitch high value	W	Limit switch high	8 Byte	1 ... < 33554432
			Example		<ESC>09GH00100000<cr><lf> upper value on address 09 will be set to a value of 100000		100000h
ESC	01-1Fh	GF	Scaling value	W	Gear factor	8 Byte	Spezial format
⊕			Example		<ESC>09GF1F400000<cr><lf> scaling value on address 09 will be set to a value of 1F400000		1F400000h
ESC	01-1Fh	GD	Change Direction	W	Direction 1 = CCW 0 =CW	1 Byte	Special format
			Example		<ESC>02GF1<cr><lf> direction will be set to CCW		1 = CCW 0 = CW
ESC	01-1Fh	GS	Enable Scaling	W	Scaling enabled 1 = enabled 0 =disabled	1 Byte	Special format
			Example		<ESC>02GS0<cr><lf> scaling will be disabled		1 = enabled 0 = disabled

ESC	01-1Fh	X	Change Device address	W	address 01..31 1 = CCW 0 =CW	2 Byte	Special format
			Example		<ESC>02X21<cr><lf> address will be set to 21		01..31
ESC	01-1Fh	Y	Change Baudrate	W	Baudrate 0,1,2 0= 19200,1 = 9600, 2= 4800	1 Byte	Special format
			Example		<ESC>02Y1<cr><lf> Baudrate changed to 9600		0,1,2

Important:

⊕ These functions are only available if the scaling value is calculated externally with a 32 bit accuracy precision and uploaded to the encoder using the <ESC>GF command. The format is special in a 2's complement.

Warning Parameters:

Start Char	Address RS485	Command	Parameter name	Access	meaning	Length Bit	value
ESC	01-1Fh	E	Alarms	Ro	Battery warning, Encoder fault	16	
Transmitted string			Response from Encoder				Interpretation
							Bit 15 = 1 Encoder stillstand Bit 14 = 1 Position warning Bit 13 = 1 Upper Limit switch on Bit 12 = 1 Lower Limit switch on Bit 11 = 1 Direction of rotation ccw Bit 10 = 0 unused Bit 9 = 0 unused Bit 8 = 0 unused Bit 7 = 0 unused Bit 6 = 0 unused Bit 5 = 1 Reference point reached Bit 4 = 1 Battery limit reached Bit 3 = 0 unused Bit 2 = 0 unused Bit 1 = 1 Light control Bit 0 = 1 Frequency exceeded

Alarm Parameters:

Start Char	Address RS485	Command	Parameter name	Access	meaning	Length Bit	value
ESC	01-1Fh	A	Alarms	Ro	Battery warning, Encoder fault	16	
Transmitted string			Response from Encoder				Interpretation
			<cr><lf>5000<cr><lf>				Bit 15 = 1 Temperature exceeded Bit 14 = 1 Battery flat Bit 13 = 0 unused Bit 12 = 1 General Encoder Fault logical .or. of Temperature exceeded, Battery limit reached, Light control, Frequency exceeded Bit 0 = 1 Position error All other bits unused = 0
			means Battery flat and General Fault				

Examples:

Read Operating Parameters:

Start Char	Address RS485	Command	Parameter name	Access	meaning	Length Bit	value
ESC	01-1Fh	0	OpParameter Byte 0	Ro Bit 0	Code Sequence CW = clockwise 0 CCW = c.clockw	16	Boolean
				Bit 1	Diagnostic active (1)		
				Bit 2	Scaling active (1)		
			Byte 1	Bit 13	Total Meas. range(0) 1= resol/revolut.		
				Bit 14	Limit switch active (1)		
				Bit 15	nc		
Transmitted string			Response from Encoder				Interpretation
<ESC>000<cr><lf>			<cr><lf>7005<cr><lf>				Bit 15 = 0 Bit 14 = 1 Limit switch active Bit 13 = 1 Resolut/Revol. active Bit 12 = 1 calculated factor Bit 2 = 1 Scaling enabled Bit 1 = 0 Bit 0 = 1 CounterClockwise CCW All other Bits unused = 0
			means Limit switch active,Scaling active, direction CCW				

Read Alarm Parameters (Battery empty)

Start Char	Address RS485	Command	Parameter name	Access	meaning	Length Bit	value
ESC	01-1Fh	A	Alarms	Ro	Battery warning, Encoder fault	16	
Transmitted string			Response from Encoder				Interpretation
<ESC>00A<cr><lf>			<cr><lf>4000<cr><lf>				4 = MSB
							Bit 14 = 1 Battery empty
							All other bits 0

Read Warning Parameters:

Start Char	Address RS485	Command	Parameter name	Access	meaning	Length Bit	value
ESC	01-1Fh	E	Alarms	Ro	Battery warning, Encoder fault	16	
Transmitted string			Response from Encoder				Interpretation
<ESC>00E<cr><lf>			<cr><lf>0098<cr><lf>				Bit 15 = 1 Encoder stillstand
							Bit 12 = 1 Lower Limit switch on
							Bit 11 = 1 Direction of rotation 1 = ccw

Examples:

Read Operating Parameters in ASCII-Strings:

<ESC>000<cr><lf>		<cr><lf> 7005 <cr><lf>	
Transmitted string		Response from Encoder	
0x1Bh,0x30h,0x30h,0x4F 0x0d,0x0A		0x0D,0x0A,0x37,0x30,0x30,0x35,0x0D 0x0A	
		Interpretation	
		7 = MSB	
		Bit 15 = 0	
		Bit 14 = 1 Limit switch active	
		Bit 13 = 1 Resolut/Revol. active	
		Bit 12 = 1 calculated factor	
		5 = LSB	
		Bit 2 = 1 Scaling enabled	
		Bit 1 = 0	
		Bit 0 = 1 CCW	
		All other Bits unused	
0x1Bh = <ESC>			
0x30h = 0			
0x4Fh = 0			
0x0Dh = <cr>			
0x0Ah = <lf>			

Read actual Position

<ESC>05P<cr><lf> 1235 <cr><lf>

Transmitted string	Response from Encoder	Interpretation
0x1Bh,0x30h,0x35h,0x50 0x0d,0x0A	0x0D,0x0A,0x30h, 0x30h, 0x30h, 0x30h,0x31,0x32,0x33,0x35,0x0D 0x0A	actual position 00001235
0x1Bh = <ESC> 0x30h = 0 0x35h = 5 0x50h = P 0x0Dh = <cr> 0x0Ah = <lf>		

Return values from encoder

Transmitted string	Response from Encoder	Interpretation
command interpreted and executed	0x0D,0x0A	<cr><lf>
command doesn't exist	0x30h,0x33h, 0x0D,0x0A	03 <cr><lf>
incomplete command or values out of range	0x30h,0x35h, 0x0D,0x0A	05 <cr><lf>
Important !		
all values are in hexadecimal !		