

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_B) 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 Ezturm veränderbar

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

2. ESC-Befehle siehe folgende Seiten

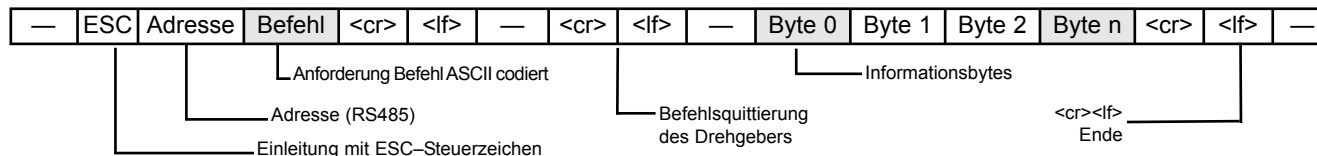
3. Masteradresse: 00 (RS485)

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

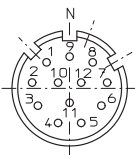
4. Zeitverhalten der ESC-Steuerung



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

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

6. Anschlussbelegung Stecker 12-polig, M23



Ansicht auf Steckerseite
 Stiftkontakteinsatz

Operating instructions

for multiturn encoder with RS 422 or RS 485 interface



Type 5882



- Hollow shaft up to \varnothing 12 mm
- Only 40.5 mm clearance needed, thus more compact than most incremental encoders.
- Housing \varnothing 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 \varnothing 28 mm or shaft \varnothing 12 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 \varnothing 6 or \varnothing 10 mm
- Only 66 mm clearance needed
- Housing \varnothing 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

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

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).
 VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.
 PH: Plug housing
 A1, A2, A3, A4: outputs, with Ezturm programmable
Insulate unused outputs before initial start-up.

*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

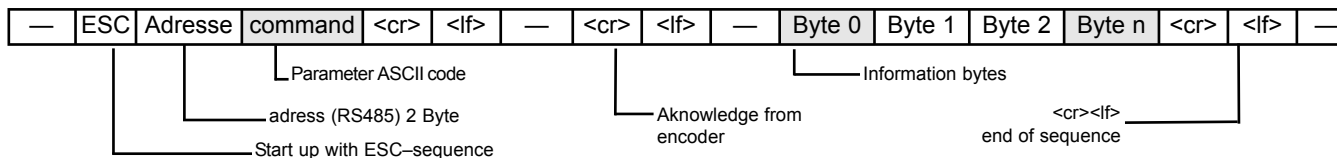
3. Master address: 00 (RS485)

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

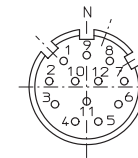


5. Customer programming with the software Ezturm® (contain in the scope of supply).

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.

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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 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	0.00001...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)	Command	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> means Battery flat and General Fault			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	

Examples:

Read Operating Parameters:

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

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:

Transmitted string	Response from Encoder	Interpretation
<ESC>000<cr><lf> 0x1Bh,0x30h,0x30h,0x4Fh 0x0d,0x0A	<cr><lf> 7005 <cr><lf> 0x0D,0x0A,0x37,0x30,0x30,0x35,0x0D 0x0A	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 !		