

MANUAL

CAN-BUS

for

Digital Servo Controller

DS, DSP, BAMO-D

BAMOBIL-D

BAMOCAR-D



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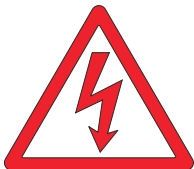
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Attention:
The commissioning guide should be used only in conjunction with the DS hardware manual and the software description NDrive.

Safety symbols

Attention danger to life
High voltage



Attention
Important
Warning



The user must ensure:

- that when the unit fails
 - when an operator error occurs,
 - when the controlling and control units fail, etc..
- the drive homes to a safe operating state.

Apart from that machines and installations must be provided with monitoring and safety systems independent from the unit. Danger to man and property must be impossible to incur!

Assembly work

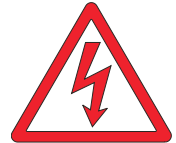
- only if all power is cut
- only by qualified professionals

Installation work

- only if all power is cut
- only by qualified electrical professionals
- Comply with safety regulations

Setting and programming work

- only by qualified professionally specialised in electronic drives and software
- observe programming notes
- Comply with safety regulations

**CE:**

When it is mounted in machines and installations the proper operation of the unit is not permitted until the machine or installation has been approved according to the regulations of the EC machine directive 2006/42/EG, and the EMC directive 2004/108/EG .

Die EC directive 2004/108/EG plus the EMC standards EN61000-2 and EN61000-4 are complied with in the EMC Notes chapter specified installation and test conditions.

A manufacturer's certificate is available.

The manufacturer of the machine or the installation is responsible for the observance of the threshold values prescribed in the EMC regulations..

The serial data bus system CAN (Controller Area Network) was originally developed for application in vehicles.

In the mean time ,CAN- BUS is widely used in equipments and machinery. CAN was standardized in ISO 11898.

CAN meets , in particular meets the high security requirements demanded by highly available machines and medical equipments.

High transmission rates and favorable connectivity costs vouch for CAN-BUS. With CAN –BUS, Stations are not addressed here , instead, the content of a message are marked by an unique network wide Identifier .

The identifier also decides the priority of a message.

A good deal of system and configuration flexibility can be achieved.

Hassle-free addition of further devices to the network can be done.

CAN-BUS interface has been incorporated in all digital UNITEK equipments as a **slave** and has been designed to be connected to a CAN-BUS master.

Primary power supply is fed by the Master or through an internal DC/DC converter.

The UNITEK-CAN-Bus can take over the following functions.

From Master (CNC/SPS) to the Slave (DRIVE-DS) (Receive)

Logic functions	Setpoint	Parameters	
Enable	Torque setpoint	Control parameters	
Reverence fahrt	Speed setpoint	Settings	
Start, Stop	Position setpoint		
	current limits		

From Slave (DRIVE-DS) to the Master (CNC/SPS) (Transmit)

Logic functions	Actual value	Parameters	Meldungen
RUN	Torque actual value	Control parameters	Status-message
ENABLE	Speed actual value	Settings	Error message
POS	Position actual value		
Limit switch			

The addresses (REGID) are in the parameter overview page 17-20

f.e.. Speed reference (SPEED_CMD) = REGID 0x31 <Value in Hex>

CAN-BUS

CAN-BUS Connections.

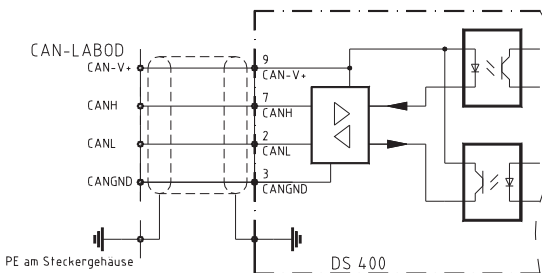
CAN-BUS is the digital connection for CNC- Control (CAN-Master)
CAN-BUS components of LABOD electronics.

Programming and operation through a control panel with CAN-BUS.

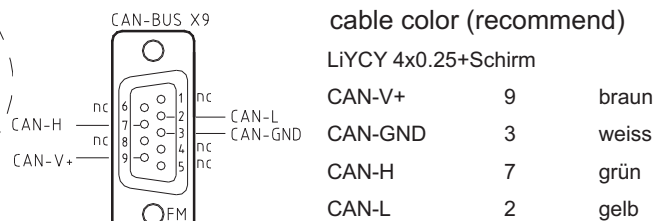
Interface nach ISO 11898

Surge impedance 120 Ohm,
Conductor resistance (loop) 160 Ohm/km
Operating capacity(800Hz) < 60 nF/km

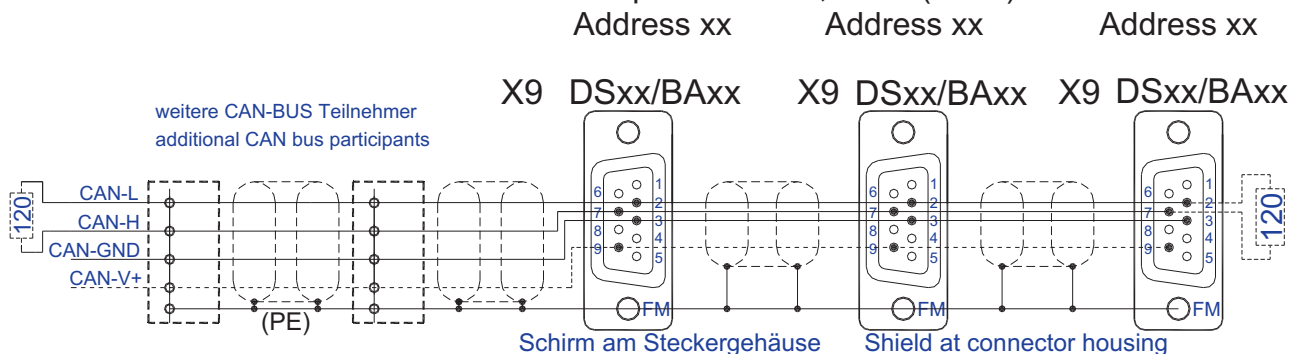
Input circuit



Connector pin assignment X9 (D9p)



CAN-BUS connection with several servo amplifiers DS xx, BAxx (slave)



Cable and connection impedance between CAN-H and CAN-L approx. 120 Ohms.

Attention: Please do not connect Can-V+(X9:9) in case of internal CAN-BUS power supply.!

Setting CAN-BUS

Station addresses for transmitting and receiving , as well as transmission rates are set up in the parameter field CAN-Set up in the program PC-DRIVE.

Address	Symbol	Default	Range
Empfangs-Adresse (Slave)	RPDO1	0x201	0x201 bis 0x27F
Sende-Adresse (Slave)	TPDO1	0x181	0x181 bis 0x1FF

Transfer rate NBT	Setting value BTR	Cable length max.	
1000 kBaud	0x4002	20 m	
500 kBaud	0x4025	70 m	
625 kBaud	0x4014	70m	
250 kBaud	0x405c	100m	
100 kBaud	0x4425	500m	

Description of Software format.

The software format is designed for optimal communication with CNC- machines and CAN Modules of LABOD electronics. This format does not correspond to CAN Open Unitek Standard 500 kB/s (LABOD 615kB/S) .

UNITEK Drives can be added as a slave to a CAN Open Network (TPDOI,RPD01).

Number format

Parameter values and parameter numbers are in Little-Endian-Format.

Bit7 to 0, Bit 15 to 8, Bit 23 to 16, Bit 31 to 24

CAN Format for UNITEK-DS-Servo, BAMOCAR-D3 , BAMOBIL-D3 und BAMO-D3.

The CAN-Protocol is a 3 or 5 byte data packet on reception and a 4 or 6 packed data packet on transmission .

The identifier is 11 bit wide. It includes the **COB-identifier**, the **RTR function** (Remote Transmission Request)and the DLC-information (Data Length Code). The first byte from the data field is for the REGID-Index(Parameter number) , the Data of RIGID Index(Parameter value).

CAN Format

Range	Head			Data field				
	COB-ID	RTR	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Funktion	11 Bit	0	Länge	REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24

Master-Slave connection.

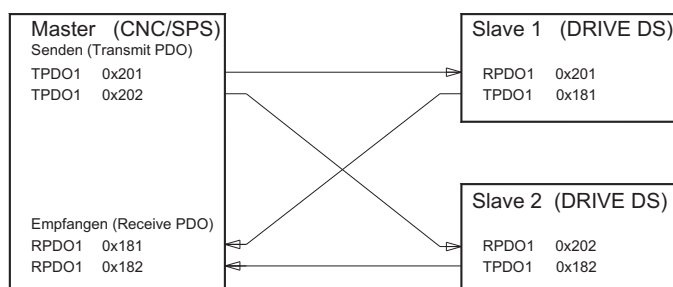
In order to simplify the configuration, a predefined Master/Slave connection set has been specified in CAN open. For networks with one master and up to 127 slaves , this classification of COB-identification offers a simple solution for a CANopen Network. Information distribution originates only from the master. Direct communication between slaves is not possible.

COB - Identifier										
Functions-Code							Knode-ID			
10				7			6			0
Example 0x181										
0	0	1	1	0	0	0	0	0	0	1
1				8				1		

Favorite Objects (slave)
TPDO1 (0x201 to 0x27F) and
RPDO1. (0x181 to 0x1FF)

The objects
TPDO2 .. 4 .. 4 RPDO2 and can also
be used.

Connection from master to slave



1. Head field

Range	Head			Data field				
	COB-ID	RTR	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Functions	11 Bit	0	Länge	REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24

1.a COB-ID-Bits (CAN OBJECT ID)

The default value is for CANopen for TPDO1 = 0x181und for RPDO1 = 0x201.

COB-Identifier											Object	
Functions code				Knote-ID								
0	0	1	1	0	0	0	0	0	0	1	TPDO1	0x181-0x1FF
1			8				1					
	1	0	0	0	0	0	0	0	0	1	RPDO1	0x201-0x27F
2			0				1					

This address can be changed , in which a direct station address in the servo amplifier DS4xx for receiving (FORE-CANIDREAD 0 x 68) and for transmitting (FORE-CANIDWRITE 0x69) has been initialized in the field CAN-Setup using a PC through the programming software DRIVE. This address can also be changed through CAN. The servo amplifier (DRIVE-DSxx) will be dialed with the latest address and the receive ID (REGID 0x68 <Address>) and the transmit –ID (REGID 0x69 <Address>) would be received from DSxx (slave).(Refer Example 1)

1.b RTR-Bit (REMOTE TRANSMISSION REQUEST)

The value for RTR is always set to 0.

1.c DLC-Bits (DATA LENGTH CODE)

With the DLC bits the size of the data field is determined.

Receiving: 0x3 value corresponds REGID plus 2byte (16Bit)
0x5 value corresponds REGID plus 4byte (32Bit)

Transmitting: 0x4 value corresponds REGID plus 2byte plus Dummy (16Bit)
0x6 value corresponds REGID plus 4byte plus Dummy (32Bit)

2. Data field

Data field for receiving in the DS Servo is 3 or 5 Byte wide , whereas it is 4 or 6 Byte wide for transmitting from DS-Servo over the CAN-Bus.

2.a REGID

Up to 254 registers can be defined. The important parameter index are available in the REGID-List.

2.b Data

The data length is specified in the field DLC bits. (16 or 32 bit)
Byte 2 through byte 5 are determined for the 32-bit data register
Byte 2 through byte 3 are determined for the 16-bit data register

Examples of field data

Position setpoint

Position Num 300010000 0x11E1CA10
Data length 32Bit
REGID-Index for POS-SOLL is 0x6e

Data length
DLC Bits = 5 (for data length 32Bit)

REGID							
0	1	1	0	1	1	1	0
6				e			

Parameter-address
REGID = 0x6e (for POS-SOLL)

Data input

Daten D7 bis 0								Daten D15 bis 8								Daten D23 bis 16								Daten D31 bis 24							
0	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	1
1				0				C				A				E				1				1				1			

Data = 0x11E1CA10 (corresponding to the position Num. 300010000)

The input is in little-endian format (Intel-Format)

0x = Input in HEX

Examples for CAN-BUS communication

CAN-BUS data reception at DS-Servo.

Stations address at DS-Servo	COB-ID	(default = 0x201)
Data format	DLC	(3,4,5)
Parameter	Data1	(REGID see Parameter list)
Parameter-Content	Data2 bis Data 5	

Examples:

1. Station address change through CAN	receive	Page 10
2. Controller block (no Release)	receive	Page 11
3. Rpm- Set value	receive	Page 11
4. Position set value	receive	Page 12
5. Torque – Set value	receive	Page 11
6. Parameter value	receive	Page 12
7. EEPROM write operation	receive	Page 13

CAN-Data transmission from DS-Servo over CAN-BUS

Request data transmit from DS-Servo

Request transmit once	REGID 0x3d	in case of data 1 input
Parameter-content transmit from	REGID 0000	in case of data 2 input
	00	in case of data 3 input

Request transmit after event	REGID 0x51	in case of data 1 input.
Mode Bit for CAN-request	REGID 0x10	in case of data 2 input.
	00	in case of data 3 input.

Request permanent transmit	REGID 0x51	in case of data 1 input.
Request parameter content	REGID 0x51	in case of data 2 input.
for time information for the repeated timing.	0x??	in case of data 3 input

Abord permanent transmit Data1,Data2 same, enter for Data3 = 0xff

Examples :

8. Transmit status once	transmitting	Page 14
9. Transmit once after event	transmitting	Page 15-17
10. Permanent transmission of rpm actual value .	transmitting	Page 18

Information transmit to the CAN-BUS

Input Station addresses at DS-Servo	COB-ID	(default = 0x181) enter
-------------------------------------	--------	-------------------------

Return back of DLC , parameter- REGID in case of Data 1 , parameter content in case of data 2 to 5

Examples:

11. Routine for simple rpm control	Page 19
12. Routine for simple position control	Page 19

Example 1 : Station address change through CAN.

The address for reception (slave) in a new DS-Servo is 0x201 (default)
This address has to be changed into 0x 210.

The REGID Index for reception ID is 0x 68 ((FORE_CANIDREAD)

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Functions				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example1	0x201	0	3	0x68	0x10	0x02	----	----

Address 0201
RTR 0
DLC 3
REGID 0x68
Data 0x0210

Station address change in the PC program NDrive

Input:

Rx ID Empfangs-Adresse am DS (default 201)
Tx ID Sende-Adresse vom DS (default 181)
BTR Übertragungsrate (Hexwert) s.Seite 5
 default 4025 =

Information:

-Brp
-Sjw
-Tseg1
-Tseg2
-Sam
=>NBT Transfer rate (kBaud)

Example 2 Inhibit controller (not enable) received the DS-Servo

Function

Station address for receiving (DS-Slave)
 REGID for inhibit is
 Data length 2 Byte
 Data for inhibit MODE BIT2

Hex value

201
 0x51 (MODE)
 DLC = 3
 0x0004

Range	Head			Data field				
	COB-ID	R	DLC	R	DLC	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example2	0x201	0	3	0x51	0x04	0x00	----	----

Example 3 Speed reference received the DS-Servo

Function

Station address for receiving
 REGID for Speed reference (SPEED_SOLL) ist
 Data length 2 Byte
 Data for 10% Speed Num. 3277 (100%=32767) =

Hex value

0201
 0x31
 DLC=3
 0x0CCD

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example3	0x201	0	3	0x31	0xCD	0x0C	----	----

Example 4 Positions reference received the DS-Servo

Function

Station address for receiving
 REGID for positions reference (POSITION_SOLL) is
 Data length 4 Byte
 Data for Position 3000000

Hex value

0x201
 0x6e
 DLC=5
 0x2DC6C0

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example4	0x201	0	5	0x6e	0xC0	0xC6	0x2D	0x00

Example 5 Torque reference received the DS-Servo

Function

Station address for receiving
 REGID for torque reference (TORQUE_CMD) is
 Data length 2 Byte
 Data for 50% torque Num 16380

Hex value

0x201
 0x90=
 DLC=3
 0x3FFC

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example5	0x201	0	3	0x90	0xFC	0x3F	---	---

Example 6 Parameter setting received the DS-Servo

Funktion

Station address for receiving
 REGID for parameter acceleration (Acc-Ramp)
 Data length 2 Byte
 Daten for 1000ms acceleration

Hexwert

0x201
 0x35
 DLC=3
 0x03E8

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example6	0x201	0	3	0x35	0xCD	0x0C	----	----

Example 7

write EEPROM

received the DS-Servo

Funktion

Station address for receiving

REGID for EEPROM write

Data length 2 Byte

EEPROM-Level0

(EEPROM-Level1 = 0X0001, Level2 = 0X0002)

Hexwert

0x201

0x84

DLC=3

0x0000

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example7	0x201	0	3	0x84	0x00	0x00	----	----

Transmission from DS-Servo through CAN-BUS

(All examples with station addresses default (0x 201 receive , ox 181 transmit)

Example 8 Status message transmit once from DS-Servo

Function	Hex-value
Station addresses for transmit request is	0x201
REGID for data to be read from DS –Servo and sent to Can (Read) is	0x3d
REGID for status (CORE_ STATUS) is	0x 40

Actual status

Bit 0 Drive release (Enable)
 Bit 7 Position control (POS)
 Bit 8 Rpm control (SPEE)

Request to send

REGID READ in Data1, REGID KERN_ STATUS in Data2, Data3 = 00 (keine Zeiteingabe)

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example8	0x201	0	3	0x3d	0x40	0x00	----	----

Returned Information

Function	Hex value
Station adresse for transmit is =	0x181
REGID for Status (KERN_ STATUS) ist	0x40

Actual status

Bit0 Drive enabled (Enab)
 Bit7 Position control (POS)
 Bit8 Speed control (SPEE)

Data for KERN_ STATUS (0x40) are 0x0181

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example8	0x181	0	3	0x40	0x81	0x01	----	

Example 9 Status message

After the event send from DS (0x51 - BIT4)

Function

Station address for transmit request is 0x 210

Hex- value
0x201

REGID for data after event (Event-trigger) read from DS Servo
and send to CAN (READ) is MODE BIT (4)

0x51
0x10

REGID für MODE BIT 4 ist

Default value for REGID_MASK-STATUS is 3000

In case of change of status bit 12(CAL) or status bit 13 (Tol) , the complete status message
(CORE-STATUS Bit 0 = up to Bit 15) would be sent over the CAN-BUS.

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Funktion				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9	0x201	0	3	0x51	0x10	0x00	----	----

Returned Information

Aktual status (Status from DS-Servo, 0x40)

Bit 0 Drive enabeld (Ena)
Bit 7 Position control (P-S)
Bit 8 Speed control (S-I)
Bit 12 calibrated (Cal)

REGID_MASK_STATUS is set to 3000!

Bit 13 position reached, within the positional tolerance (Tol) >>> Event-Trigger
If a change of bit 13 of the core status is sent.

Data for KERN_STATUS (0x40)are 0x3181

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Funktion				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9	0x181	0	4	0x40	0x81	0x31	----	

Example 9.1 Status-message

After the selected event send from DS

With REGID_MASK_STATUS (0x52), the event trigger to change the associated status bits.

for example : REGID_MASK_STATUS = 0x20 equivalent continuous current (Icns)

REGID_MASK_STATUS = 0x12 equivalent limit switch + und - (Lim+, Lim-)

Trigger event to determine REGID_MASK_STATUS

Function

Station addresseis for the transmission request

REGID for REGID_MASK_STATUS

REGID for status-trigger-selection (f.e. Limit switch)

Hex value

0x201

0x52

0x12

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9-1	0x201	0	3	0x52	0x12	0x00	----	----

Transmit status after selected Status-event

Function

Station addresses for transmit request is

Read REGID for data after event (Event-trigger)from DS-Servo

und an CAN senden (READ) ist MODE BIT (4)

REGID for MODE BIT 4 is

Hex value

0x201

0x51

0x10

Set value for ERGID-MASK_STATUS is 0012

In case if a limit switch is occupied (+ or _) the complete set value for ERGID-MASK_STATUS will be 0012

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9-1	0x201	0	3	0x51	0x10	0x00	----	----

Returned Information

Aktual status (Status from DS-Servo, 0x40)

Bit 0	Drive enabled	(Ena)
Bit 2 oder Bit 3	Limit switch ON	(Lim+ oder Lim-)
Bit 7	Position control	(P-S)
Bit 8	Speed control	(S-I)
Bit 12	calibrated	(Cal)

Data for KERN_STATUS (0x40) are

0x3185 oder 0x 3189

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9-2	0x181	0	4	0x40	0x85	0x31	----	

Example 9.2 Error message

After the event send from DS (0x51 - BIT4)

Function

Hex value

Station address for transmit request is
REGID for error data after event(event-trigger) to be read
from DS-Servo and transmitted to CAN_BUS (READ)
ist MODE BIT (?)
REGID for MODE BIT ? (d(error)> CAN is

0x201

0x??

0x??

In case of an error message , the complete error message (0x8f) (ERR BITMAP1 Bit 0 = up to Bit 15) would be transmitted over the CAN-BUS.

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9-2	0x201	0	3	0x??	0x??	0x00	----	----

Returned Information

Current error (Error message in the DS-Servo, 0x8f)

Bit 6 Motor temperature (motor-temp)

When changing from one or more bit errors ERR bitmap1 (0x8f) is sent.

Data for ERR BITMAP1 (0x8f) are 0x0040

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Function				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example9-2	0x181	0	4	0x8f	0x40	0x00	----	

Example 10 Actual value of rpm to be permanently sent from DS (0x3d)

For a permanent re-transmission , the register REGID_READ will be refreshed with a repetition timing.

In the Byte Data 3, a time information in ms would be input for the re-transmission in Hex. format.

Function	Hex value
Hex-value for the repetition timing 100 ms is the input in Byte Data 3 =	0x64
REGID (Byte 1) for data to be read from DS4xx and sent to CAN (READ) is	0x3d
REGID (Byte2)for speed actual (SPEED_IST) ist	0x30

Transmit request.

REGID READ in Byte 1, REGID KERN_STATUS in Byte 2, Byte 3 = 0x64 (Zeiteingabe)

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Funktion				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example4-2	0x210	0	3	0x3d	0x30	0x64	----	----

Abort transmission:

At Data 3 (Time) >>> enter Hex value 0xFF .

In the time interval of 100ms returned information

Function	Hex value
Station address for transmit request is	0x201
REGID for speed actual (SPEED_IST) is	0x30
The value for actual speed 100% (Num 32767) is	0x7FFF

Range	Head			Data field				
	COB-ID	R	DLC	Data 1	Data 2	Data 3	Data 4	Data 5
Funktion				REGID	D7 bis 0	D15 bis 8	D23 bis 16	D31 bis 24
Example4-2	0x190	0	4	0x30	0xFF	0x7F	----	----

CAN-BUS

Example 11
Speed control
Driving with different speeds and stop

COB-ID	RTR	DLC	REGID	Data1	Data2	Data3	Data4	Data5	Kommentar
201	0	3	3d	e2	00				Empfangen Sendeanforderung BTB
181	0	4	e2	01	00	00			Senden BTB 0xe2
201	0	3	51	04	00				Empfangen Sperre
201	0	3	3d	e8	00				Empfangen Sendeanforderung Freigabe (Hardware)
181	0	4	e8	01	00	00			Senden Freigabe 0xe8
201	0	3	51	00	00				Empfangen Nicht Sperre (Freigabe)
201	0	3	35	f4	01				Empfangen ACC-Rampe (500ms = 0x01f4)
201	0	3	ed	e8	03				Empfangen DEC-Rampe (1000ms = 0x03e8)
201	0	3	31	d4	03				Empfangen Drehzahl-Sollwert 0x31 (30%=0x03d4)
201	0	3	3d	30	64				Empfangen Sendeanforderung Drehzahl-Istwert (alle 100ms)
181	0	4	30	xx	xx	xx			Senden Drehzahl Istwert 0x30 (Wert xxxx alle 100ms)
201	0	3	31	a4	7f				Empfangen Drehzahl-Sollwert 0x31 (100%=7fa4)
201	0	3	31	00	00				Empfangen Drehzahl Null
201	0	3	51	04	00				Empfangen Sperre

Example 12
Reference and driving position
Reference and drive to a position and back to zero position

COB-ID	RTR	DLC	REGID	Data1	Data2	Data3	Data4	Data5	Kommentar
201	0	3	3d	e2	00				Empfangen Sendeanforderung BTB
181	0	4	e2	01	00	00			Senden BTB 0xe2
201	0	3	51	04	00				Empfangen Sperre
201	0	3	31	00	00				Empfangen Drehzahl Null
201	0	3	3d	e8	00				Empfangen Sendeanforderung Freigabe (Hardware)
181	0	4	e8	01	00	00			Senden Freigabe 0xe8
201	0	3	51	00	00				Empfangen Nicht Sperre (Freigabe)
201	0	3	78	01	00				Empfangen Start Referenzfahrt
201	0	3	52	30	00				Empfangen Wert für REGID_MASK_STATUS
201	0	3	51	10	00				Empfangen Sendeanforderung Statusmeldung nach Ereignis
181	0	4	40	xx	xx	xx			Senden Statusmeldung (Wertxxxx)
201	0	5	6e	c0	c6	2d	00		Empfangen Positionsziel 3000000Num
201	0	3	3d	f4	00				Empfangen Sendeanforderung in Toleranz
181	0	4	f4	01	00	00			Senden in Toleranz
201	0	5	6e	00	00	00	00		Empfangen Positionsziel Null
181	0	3	f4	01	00				Senden in Toleanz
201	0	3	51	04	00				Empfangen Sperre