SMTBD1 AMPLIFIER

PARAMETER SETTING INSTRUCTIONS

Serial_inst

PRELIMINARY ONLY

WARNING

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The SMT-BD1 amplifier is available with the BPCW software. BPCW is compatible with the WINDOWS® operating system for the parameter setting of each amplifier.

It is also possible, by mean of the ASCII instructions described in this manual, to set and modify the parameters of several amplifiers using a host system (DNC, PLC, PC), according to the following conditions.

- The customer has to develop himself the host system software for the amplifier parameter setting. This software is not developed by INFRANOR Lourdes who accepts no responsibility for the “programme / operating system / machine” compatibility or for any technical support for this work. All the instructions accessible via the BPCW software have no equivalent instructions listed in this manual. Therefore, the access to some functions is only possible via the BPCW software.
- INFRANOR LOURDES reserves the right to modify and / or complete the list of parameters and ASCII instructions without notice.
- The OEM or the end user assumes the final responsibility for the use of parameter setting softwares others than BPCW. INFRANOR LOURDES disclaims any responsibility for physical damage caused by the use of any parameter setting software other than BPCW.

 Issue: 2.1

Contents

Chapter 1 – General description

SMT-BD1 amplifiers are based on a Digital Signal Processor (DSP). The parameters used for their operation are digital values processed by the DSP. These values are entered via the serial link, for the amplifier configuration.

This manual describes the parameter setting via the serial link for the standard SMT-BD1 amplifiers and for the options c, d, e, f, g, i, j. For more information regarding the use of these parameters, please refer to the SMT-BD1 amplifier and options manuals.

Chapter 2 - Dialogues

The specifications of the SMT-BD1 amplifier serial link communication are listed below: 8 Data bits, 1 Stop bit, No parity, 4800 Bauds.

The parameters can be sent to the amplifier by an ASCII terminal using the instruction list given in this manual. Each instruction is coded as 2 ASCII characters with or without parameter.

There are two instruction types:

- The variables: These instructions allow to modify or to read the value of a variable. If there is a parameter, the variable corresponding to the instruction will take this value. Otherwise, the amplifier will send back the actual variable value via the serial link.
- The procedures: These instructions execute some specific functions of the amplifier.

Each instruction (which can be followed by an hexadecimal 16 bit parameter) sent to the amplifier must end with a “carriage return” character (ASCII code 13).

All these characters, except for the “carriage return”, will be sent back by the amplifier (echo).

The amplifier answer starts with a separation character “:” (ASCII code 58) possibly followed by an hexadecimal 16 bit value. The amplifier will then send a “carriage return”, a “line feed” and “>”.

Notes

- If the amplifier does not know the instruction, it will send back “?” instead of “:”.
- Some instructions are only valid when the amplifier is disabled.
- If the entered parameter is out of the appropriate variable range or if the restrictive condition (amplifier disabled) is not answered, the parameter will not be taken into account (the amplifier will keep the former variable value).
- The parameters are always in hexadecimal and in an amplifier standard format. Conversions have to be made by the operator.

Dialogue examples

The PC sends the NP instruction (number of motor pole pairs):

NP4

and a “carriage return” character (ASCII code 13) for ending the instruction.

The amplifier will answer with:

NP4:

>

“:” indicates that the instruction has actually been decoded. The value 4 is stored in the variable corresponding to the number of motor pole pairs. After the character “carriage return”, the amplifier will also send the “>” character in order to indicate that it has taken the instruction into account.

If the PC sends the instruction:

NP

The amplifier will answer with:

NP:0004

>

As there is no parameter, the amplifier sends back the number of pole pairs (in this case: 4 pole pairs) after the characters NP and “:”.

Chapter 3 - Instructions list

The parameter conversion into a physical value is made by multiplying the variable value by a conversion factor indicated in the line “conversion”, if necessary.

3.1 - Motor parameters

These parameters are necessary for the motor control. They can be modified only when the motor is disabled (ENABLE signal not active).

Pole pairs	Variable
Instruction	NP
Parameter	Possible values: between 1 and C
Condition	Amplifier disabled.
Remarks	This value is the ratio between the number of motor pole pairs and the number of resolver pole pairs.

Phase order	Variable
Instruction	PM
Parameter	Possible values: equal to 5555 (120°) or AAAA (240°).
Condition	Amplifier disabled.
Remarks	Depending on the wiring of the motor phases U. V and W.

Resolver offset	Variable
Instruction	CL
Parameter	Possible values: between 0 and FFFF (0 to 360°).
Condition	Amplifier disabled.
Remarks	Depending on the resolver adjustment. For a motor with a number of pole pairs NP>1, there are NP possible values for CL.

Current phase lead	Variable
Instruction	AF
Parameter	Possible values: between 0 and 7FFF.
Conversion	$4{,}577716546399.10^{-8}$ $\frac{\text{electrical degree}}{\text{rpm}}$
Condition	Amplifier disabled
Remarks	Calculated for maximum motor speed.

3.2 - Current limitation parameters

Maximum current	Variable
Instruction	IM
Parameter	Possible values: between 0 and 7FFF.
Conversion	3.051850948^{e}-3 (for getting the amplifier max. current value in percent).
Remarks	7FFF corresponds to 100 % of the amplifier max. current (according to its current rating).

Rated current	Variable
Instruction	IN
Parameter	Possible values: between 0 and 4000. If IM < 4000 hexa, then IN < IM.
Conversion	3.051850948^{e}-3 (for getting the amplifier max. current value in percent).

I^2t mode Variable

Instruction I P
Parameter 0 or 1
Conversion IP ≠ 0 --> mode fusing and IP= 0 --> mode limiting
Remarks The value is 0 or ≠ 0

3.3 - Regulator parameters

Speed error low pass filter Variable

Instruction Fl
Parameter Filter cut-off frequency.
Possible values: between 0B10 (1000 Hz) and F069 (20 Hz).
Conversion Frequency = $\frac{1000}{\pi} \mathrm{Ln}\left(\frac{65536}{\text{parameter}}\right)$ in Hz

Anti-resonance filter Variable

Instruction FR (5.7 firmware EPROM version and higher)
Parameter 0 or 1
Conversion FR ≠ 0 --> filter active and FR= 0 --> filter inactive
Remarks The value is 0 or ≠ 0

Proportional gain of the speed loop Variable

Instruction KP
Parameter Possible values: between 0 and FFFF.
Conversion 1/16
Remarks This term is used in P, PI, PI^2 and position mode.

Integral 1 gain of the speed loop Variable

Instruction KI
Parameter Possible values: between 0 and FFFF.
Conversion 1/256
Remarks This term is used in PI, PI^2 and position mode.

Integral 2 gain of the speed loop (Proportional gain of the position loop) Variable

Instruction KE
Parameter Possible values: between 0 and FFFF.
Conversion 1/65536
Remarks This term is used in PI^2 and position mode.

Feedforward term of the position loop Variable

Instruction KV
Parameter Possible values: between 0 and FFFF.
Conversion 1/65536
Remarks This term is used in position mode.

3.4 - Analog input command parameters

Accel/Decel time Variable

Instruction TL
Parameter Possible values: between 0 and FFFF. The maximum value is about 32 s.
Conversion 0.0005 (for getting the time in seconds).

Maximum speed Variable

Instruction VL
Parameter Possible values: between 0 and 1DDE.
900 rpm -> 01EC
3 600 rpm -> 07AE
14 000 rpm -> 1DDE
Condition Amplifier disabled.
Conversion 1.8310546875 (for getting the speed in rpm).
Remarks The maximum speed also depends on the motor. Check the compatibility.

Analog input low pass filter Variable

Instruction FC
Parameter Filter cut-off frequency.
Possible values: between 0B10 (1000 Hz) and F069 (20 Hz).
Conversion Frequency = $\frac{1000}{\pi} \mathrm{Ln}\left(\frac{65536}{\text{parameter}}\right)$

Reverse movement Variable

Instruction IV
Parameter 0 or 1
Condition Amplifier disabled.
Remarks The value read is 0 or ≠ 0

3.5 - Encoder output parameters

Encoder resolution Variable

Instruction RC
Parameter Depends on the motor maximum speed (VL).
If VL < 01EC (900 rpm) RC ≤ 2000 (hexa)
If 01EC ≤ VL < 07AE (3600 rpm) RC ≤ 1000 (hexa)
If 07AE ≤ VL < 1DDE (14000 rpm) RC ≤ 400 (hexa)
Condition Amplifier disabled.
Remarks The encoder output on the X2 connector will not be modified by this instruction (see FE). But this value is immediately taken into account for the gearing ratio with options c,d,e,g.
If this value is stored in the EEPROM, the encoder output on X2 will be updated at the next turning on of the amplifier.

Number of zero pulses Variable

Instruction ZN
Parameter 1 to 4
Condition Amplifier disabled.

Zero pulse origin shift Variable

Instruction ZP
Parameter 0 to 7FFF (360°).
Condition Amplifier disabled.
Remarks The marker pulse reference position is calculated with regard to the resolver 0 position (absolute position over one revolution).
The parameter is always represented in 15 bits but the actual resolution depends on the maximum speed:

maximum speed < 900 rpm	15 bits
900 rpm < max. speed < 3600 rpm	14 bits
3 600 rpm < max. speed < 14000 rpm	12 bits

Zero pulse width Variable

Instruction ZW
Parameter 0 to 7FFF (360°).
Condition Amplifier disabled.
Conversion 0,010986328125 (in degrees).
Remarks The parameter is always represented in 15 bits but the actual resolution depends on the maximum speed:

maximum speed < 900 rpm	15 bits
900 rpm < max. speed < 3600 rpm	14 bits
3 600 rpm < max. speed < 14000 rpm	12 bits

Encoder output programmation Procedure

Instruction FE
Condition Amplifier disabled.
Remarks The encoder signal output on the X2 connector is only valid if the FE instruction has been executed. The execution time is about 20 s.

The encoder output on the X2 connector is defined by means of the RC, ZN, ZP and ZW parameters. After the modification of these values, it is necessary to program the encoder output with the FE instruction in order to have the output taking into account these new values. The programmation time is about 20 s. The sending back of the sign ">" by the amplifier does not mean that the programmation is over (see LEDs on front panel).

At power on, an encoder output programmation will be executed with the RC, ZN, ZP and ZW values stored in the EEPROM.

3.6 - Stepper motor emulation parameters for SMT-BD1/c

Motor deadband Variable

Instruction BM
Parameter 0 to 7FFF.
Conversion Value in encoder edges (encoder pulse x 4).
Remarks The value in degrees depends on the encoder resolution (RC).

Following error Variable

Instruction ET
Parameter 0 to 7FFF.
Conversion Value in encoder edges (encoder pulse x 4).
Remarks The value in degrees depends on the encoder resolution (RC).

TTL / Differential input signal Variable

Instruction IT
Parameter 0 or 1
Conversion IT ≠ 0 --> Differential input IT=0 --> TTL input
Remarks The value is 0 or ≠ 0.This parameter defines the input signal type

3.7 - Electronic gearing parameters for SMT-BD1/d

Motor deadband Variable

Instruction BM
Parameter 0 to 7FFF.
Conversion Value in encoder edges (encoder pulse x 4).
Remarks The value in degrees depends on the encoder resolution (RC).

Following error Variable

Instruction ET
Parameter 0 to 7FFF.
Conversion Value in encoder edges (encoder pulse x 4).
Remarks The value in degrees depends on the encoder resolution (RC).

Slave alignment speed Variable

Instruction Vl
Parameter 1 to VL parameter value
Conversion 1.8310546875 (for getting the speed in rpm).
Remarks This value defines the slave motor alignment speed

Send master position to activate multidrop alignment mode Procedure

Instruction Tl (2.9C firmware EPROM version and higher)
Parameter Master position value (0 to FFFF)
Conditions Both master and slave motors must be lined up at standstill.
Remarks * This instruction sends the master motor position value to the slave amplifier for the position reference acquisition, and the multidrop alignment mode is activated.

* This instruction has no effect when the address 0 is selected (automatic alignment mode)

Send master position for multidrop alignment on power up Procedure

Instruction TS (2.9C firmware EPROM version and higher)
Parameter Master position value (0 to FFFF)
Conditions * Both master and slave motors must be at standstill
* Both master and slave amplifiers must be turned on and disabled

Remarks * This instruction sends the master motor position value to the slave amplifier, in order to have the slave motor lining up the master when enabled (if multidrop alignment mode is activated).

* If this instruction has not been received before the amplifier enabling when the multidrop alignment mode is activated, the Position fault will be displayed.

* To disable the multidrop alignment mode, send the TS0 instruction when amplifier enabled; the **Busy** fault is displayed, indicating that the multidrop alignment mode is disabled.

This instruction has no effect when the multidrop alignment mode is disabled.

Enable/disable alignment mode Variable

Instruction GP (3.0C firmware EPROM version and higher)
Parameter 0 or 1.
Condition Amplifier disabled
Conversion GP ≠ 0 --> alignment mode activated and GP = 0 --> alignment mode disabled
Remarks The value is 0 or ≠ 0

Master/slave position offset Variable

Instruction KS (3.0C firmware EPROM version and higher)
Parameter 0 to FFFF
Remarks Master /slave position offset on 16 bits

3.8 - Tension control parameters for SMT-BD1/e

Speed ratio scaling Variable

Instruction KR
Parameter 0 to 7FFF.
Conversion 0,0030517578 (for getting the reduction ratio in %);

Maximum ratio variation Variable

Instruction BM
Parameter Possible values: between 0 and FFFF.
Conversion 0.00152592 (for getting the maximum slave speed variation) in % of the maximum speed value.

Speed following error Variable

Instruction ET
Parameter 1 to VL parameter value.
Conversion 1.8310546875 (for getting the speed error in rpm)

Tension input filter Variable

Instruction FC

Parameter Filter cut-off frequency.
Possible values: between 0B10 (1000 Hz) and F069 (20 Hz).

Conversion Frequency = $\frac{1000}{\pi} \mathrm{Ln}\left(\frac{65536}{\text{parameter}}\right)$ in Hz

Remarks This term is used in the standard speed mode (with analog input command).

Tension input threshold Variable

Instruction TB

Parameter Possible values: between 8000 and 7FFF.

Conversion 0.000305185 (for getting the tension input threshold in Volts)

Tension set point ramp Variable

Instruction TL

Parameter Possible values: between 0 and FFFF. The maximum value is about 32 s.

Conversion 0.0005 (for getting the time in seconds).

Remarks This term is used in the standard speed mode (with analog input command).

Tension acquisition Variable

Instruction TM

Parameter Possible values: between 8000 and 7FFF.

Conversion 0.000305185 (for getting the load cell voltage in Volts)

Remarks This instruction allows the acquisition of the tension value given by the load cell.
(low pass filtered with 25 Hz cut-off frequency)

Tension set point Variable

Instruction TS

Parameter Possible values: between 8000 and 7FFF.

Conversion 0.000305185 (for getting the tension set point in Volts)

Tension error scaling Variable

Instruction KS

Parameter Signed values.The absolute value of KS is between CCC and 7FFF.

Conversion 0.00305185 (for getting the error reduction gain in %)

Remarks The sign of this gain is chosen in order to have a stable load cell feedback.

Proportional gain of the tension loop Variable

Instruction GP

Parameter Possible values: between 0 and FFFF.

Conversion 1/512

Integral gain of the tension loop Variable

Instruction GI

Parameter Possible values: between 0 and FFFF.

Conversion 1/65536

Derivative gain of the tension loop Variable

Instruction GD

Parameter Possible values: between 0 and FFFF.

Conversion 1/32

3.9 - Spindle indexing parameters for SMT-BD1/f

Indexing speed Variable

Instruction VI

Parameter 0 to VL parameter value

Conversion 1.8310546875 (for getting the speed in rpm).

Position error Variable

Instruction BM
Parameter 0 to 7FFF
Conversion 0.00549931641 (for getting the error in mechanical degrees)

Velocity accuracy Variable

Instruction ET
Parameter 28F to 7FFF
Conversion 0.0015259255 (for getting the accuracy in %)

Indexing position 1 Variable

Instruction TS
Parameter 0 to FFFF
Conversion 0.005493164 (for getting the shaft position in mechanical degrees)
Remarks Selection by IDX0=ON and IDX1=ON

Indexing position 2 Variable

Instruction TB
Parameter 0 to FFFF
Conversion 0.005493164 (for getting the shaft position in mechanical degrees)
Remarks Selection by IDX0=ON and IDX1=OFF

Indexing position 3 Variable

Instruction KS
Parameter 0 to FFFF
Conversion 0.005493164 (for getting the shaft position in mechanical degrees)
Remarks Selection by IDX0=OFF and IDX1=ON

Indexing position 4 Variable

Instruction KR
Parameter 0 to FFFF
Conversion 0.005493164 (for getting the shaft position in mechanical degrees)
Remarks Selection by IDX0=OFF and IDX1=OFF

3.10 - Registration control parameters for SMT-BD1/g

Registration mode Variable

Instruction TB
Parameter 0 or 1.
Condition Amplifier disabled
Conversion TB ≠ 0 --> Unidirectional and TB=0 --> Bidirectional
Remarks The value is 0 or ≠ 0

Product reference and Datum mode Variable

Instruction GP
Parameter Possible values: between 0 and 2.
Condition Amplifier disabled
Conversion GP = 0 --> Relative,
GP = 1 --> Absolute with datum on the fly,
GP = 2 --> Absolute with first product stop
Remarks The value is 0 or 1 or 2

Reference sensor Variable

Instruction GI
Parameter 0 or 1.
Condition Amplifier disabled
Conversion GI ≠ 0 --, DM input and GI= 0 --> encoder marker pulse
Remarks The value is 0 or ≠ 0

Reference shift Variable

Instruction TS
Parameter 0 or 1.
Condition Amplifier disabled
Conversion TS ≠ 0 --> Analog shift and TS= 0 --> Digital shift
Remarks The value is 0 or ≠ 0

Reference shift value Variable

Instruction KS
Parameter Signed values between 8000 and 7FFF.
Conversion 0.00152592 (for getting the shift in % of the reference pitch)

Reference pitch Variable

Instruction KR
Condition Amplifier disabled
Parameter Possible values: between 64 and $3^{E}80$.
Conversion Value in encoder edges (encoder pulse x 4)

Maximum pitch error Variable

Instruction IT
Parameter Possible values: between KR/2 and 2.KR
Conversion Value in encoder edges (encoder pulse x 4)

Pitch correction limit Variable

Instruction GD
Parameter Possible values: between 0 and IT parameter value
Conversion Value in encoder edges (encoder pulse x 4)

Accumulator correction limit Variable

Instruction RF
Parameter Possible values: between 0 and GD parameter value
Conversion Value in encoder edges (encoder pulse x 4)

Registration distance Variable

Instruction TM
Parameter Possible values: between 0 and 2.KR
Conversion Value in encoder edges (encoder pulse x 4)

Registration speed Variable

Instruction VI
Parameter 1 to VL parameter value
Conversion 1.8310546875 (for getting the speed in rpm).

Registration accel/decel time Variable

Instruction TI
Parameter Possible values: between 0 and 800. The maximum value is about 1 s.
Conversion 0.0005 (for getting the time in seconds).

Motor deadband Variable

Instruction BM
Parameter 0 to 32767.
Conversion Value in encoder edges (encoder pulse x 4).

Following error Variable

Instruction ET
Parameter 0 to 32767.
Conversion Value in encoder edges (encoder pulse x 4

3.11 - Winding/unwinding tension control parameters for SMT-BD1/i

Maximum speed variation Variable

Instruction BM
Parameter Possible values: between 0 and FFFF.
Conversion 0.00152592 (for getting the maximum slave speed variation) in % of the maximum speed value.

Tension input filter Variable

Instruction FC
Parameter Filter cut-off frequency.
Possible values: between 0B10 (1000 Hz) and F069 (20 Hz).
Conversion Frequency= $\frac{1000}{\pi}\text{Ln}\left(\frac{65536}{\text{parameter}}\right)$ in Hz
Remarks This term is used in the standard speed mode (with analog input command).

Tension sensor acquisition Variable

Instruction TM
Parameter Possible values: between 8000 and 7FFF.
Conversion 0.000305185 (for getting the tension sensor voltage in Volts)
Remarks This instruction allows the acquisition of the tension value given by the load cell.
(low pass filtered with 25 Hz cut-off frequency)

Tension set point 1 Variable

Instruction TS
Parameter Possible values: between 8000 and 7FFF.
Conversion 0.000305185(for getting the tension set point in Volts)
Remarks Selection by TS1=OFF and TS2=OFF

Tension set point 2 Variable

Instruction TI
Parameter Possible values: between 8000 and 7FFF.
Conversion 0.000305185(for getting the tension set point in Volts)
Remarks Selection by TS1=ON and TS2=OFF

Tension set point low Variable

Instruction TB
Parameter Possible values: between 8000 and 7FFF.
Conversion 0.000305185 (for getting the tension input threshold in Volts)
Remarks Selection by TS2 = ON

Tension set point ramp Variable

Instruction TL
Parameter Possible values: between 0 and FFFF. The maximum value is about 32 s.
Conversion 0.0005 (for getting the time in seconds).
Remarks This term is used in the standard speed mode (with analog input command).

Spool diameter ratio Variable

Instruction KR
Parameter 100 to 6400.
Conversion 1/256=0,00390625 (for getting the ratio value).

Diameter sensor acquisition Variable

Instruction RF
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor value in Volts)
Remarks This instruction allows the acquisition of the voltage value given by the diameter sensor.
(low pass filtered with 10 Hz cut-off frequency)

Empty spool diameter sensor value Variable

Instruction IT
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor value in Volts)

Full spool diameter sensor value Variable

Instruction ET
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor value in Volts)

Speed regulator gain ratio Variable

Instruction GC
Parameter 10 to $3^{E}80$
Conversion 1/16=0,0625 (for getting the ratio value)

Diameter sensor value for maximum gain Variable

Instruction VI
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor value in Volts)

Tension error scaling Variable

Instruction KS
Parameter Signed values.The absolute value of KS is between 147 and 7FFF.
Conversion 0.00305185 (for getting the error reduction gain in %)
Remarks The sign of this gain is chosen in order to have a stable load cell feedback.

Proportional gain of the tension loop Variable

Instruction GP
Parameter Possible values: between 0 and FFFF.
Conversion 1/256

Integral gain of the tension loop Variable

Instruction GI
Parameter Possible values: between 0 and FFFF.
Conversion 1/65536

Derivative gain of the tension loop Variable

Instruction GD
Parameter Possible values: between 0 and FFFF.
Conversion 1/256

3.12 - Winding/unwinding accumulator control parameters for SMT-BD1/j

Spool diameter ratio Variable

Instruction KR
Parameter 100 to 6400.
Conversion 1/256=0,00390625 (for getting the ratio value)

Diameter sensor acquisition Variable

Instruction TM
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor voltage value in Volts)
Remarks This instruction allows the acquisition of the tension value given by the diameter sensor. (low pass filtered with 1 Hz cut-off frequency).

Empty spool diameter sensor value Variable

Instruction TI
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor voltage value in Volts).

Full spool diameter sensor value Variable

Instruction TB
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor voltage value in Volts)

Accumulator sensor acquisition Variable

Instruction RF
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the accumulator sensor voltage value in Volts)
Remarks This instruction allows the acquisition of the tension value given by the accumulator height sensor.

Accumulator sensor value at standstill Variable

Instruction GI
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the accumulator sensor voltage value in Volts)

Accumulator sensor value for maximum speed Variable

Instruction GD
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the accumulator sensor voltage value in Volts)

Speed regulator gain ratio Variable

Instruction KS
Parameter 10 to $3^{E}80$
Conversion 1/16=0,0625 (for getting the ratio value)

Diameter sensor value for maximum gain Variable

Instruction TS
Parameter Possible values: between 0 and 7FFF.
Conversion 0.000305185 (for getting the diameter sensor voltage value in Volts)

3.13 - Other useful instructions

Amplifier Fault code Variable

Instruction ER
Parameter Reading only.

The fault code is a 16 bit word.
Each bit corresponds to a fault defined below (1 = fault, 0 = no fault):

Bit (0 – 15)	Fault
1	I^2t
2	Resolver – digital converter
3	Position following error
4	EEPROM
7	Procedure execution error
8	Power stage fault
9	- power overvoltage - short-circuit - IGBT module overtemperature
10	Resolver cable interruption
11	Power undervoltage
12	Amplifier thermal sensor
13	Motor thermal sensor

The watch-dog fault is not accessible via the serial link.

Logic inputs Variable

Instruction LI
Parameter Reading only.
Remarks This variable indicates whether the amplifier logic inputs are activated or not.

Bit	Meaning
3	0 positive logic 1 negative logic
4	0 FC+ not activated 1 FC+ activated
5	0 FC- not activated 1 FC- activated
6	0 CI activated 1 CI not activated
7	0 CV0 activated 1 CV0 not activated

System indicators Variable

Instruction SS
Parameter Reading only.
Remarks This variable gives the indicators for the amplifier operation mode.

Bit (0 -15)	Meaning
10	PI speed mode.
11	Specific option control mode (c, d, e, g, i, j)
12	P speed mode
13	PI² speed mode

P speed mode Procedure

Instruction MU
Parameter No parameter.
Condition Amplifier disabled.
Remarks Switching on to P speed mode.

PI speed mode Procedure

Instruction MV
Parameter No parameter.
Condition Amplifier disabled.
Remarks Switching on to PI speed mode.

PI² speed mode Procedure

Instruction MW
Parameter No parameter.
Condition Amplifier disabled.
Remarks Switching on to PI² speed mode.

Enable/disable specific option (c, d, e, g, i, j) Procedure

Instruction MI
Parameter No parameter.
Condition Amplifier disabled.
Remarks Switching on to option control mode (c, d, e, g, i, j). The difference between each option is defined on the subprint itself.

Resolver value Variable

Instruction RE
Parameter Reading only. 0 to FFFF.
Remarks This instruction sends back the resolver position on 16 bits. It gives the motor absolute position over one revolution.

Speed monitor Variable

Instruction VM
Parameter Reading only. -1DDE to 1DDE.
Conversion 1.8310546875 (for getting the speed in rpm).
Remarks This instruction sends back the motor speed on 16 bits.

Current monitor Variable

Instruction IA (from 2.8C firmware EPROM version)
Parameter Reading only. -7FFF to 7FFF.
Conversion 3.051850948^{e}-3 (for getting the amplifier current in percent).
Remarks This instruction sends back the amplifier current on 16 bits.

Amplifier software version Variable

Instruction VE
Parameter Reading only.
Remarks The amplifier software version is coded as 4 hexadecimal figures.
Version 2.8C = 028C in hexadecimal.

Reset amplifier faults Procedure

Instruction RZ

Parameter storage in the EEPROM Procedure

Instruction ST
Condition Amplifier disabled.

Addressing Variable

Instruction AD
Parameter 0 to F.
Remarks This instruction allows to initialise the communication with an amplifier in the multi-axis configuration.

Chapter 4 - Multiaxis configuration

When the SMT-BD1 amplifiers are operating in a multi-axis rack, it is interesting to make the parameter setting of these amplifiers by means of a single host system without the need to connect and disconnect the serial link on each axis.

4.1 - Structures

The SMT-BD1 amplifiers allow a multi-axis connection according to both figures below: - RS-232 serial link with SMT-BD1 amplifiers (standard amplifier configuration) - RS-422/485 serial link with SMT-BD1 /2 amplifiers (amplifier option).

4.1.1 - Serial link RS-232

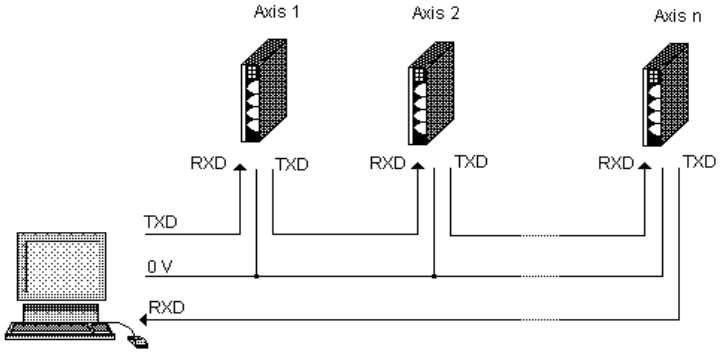

Figure 1: Ring connection of the amplifiers by means of the serial link RS-232

The connection of the various units (computer or amplifiers) is made as a ring: the transmission signal (TxD) of each unit is connected to the reception signal (RxD) of the next unit.

4.1.2 - Serial link RS-422/485

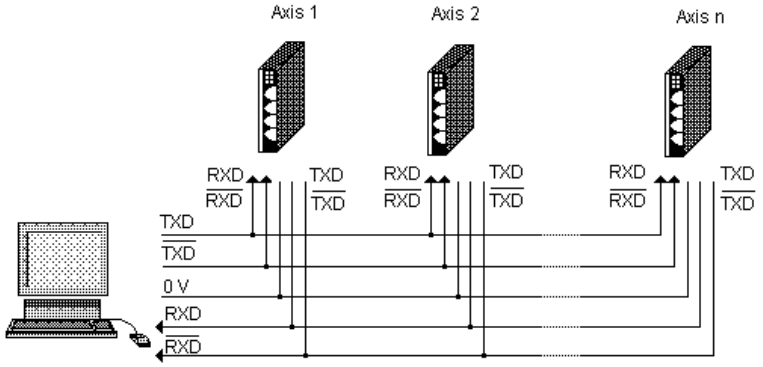

Figure 2: Parallel connection of the amplifiers by means of the serial link RS-422/485

All amplifiers are parallel connected to the computer.
The amplifiers reception signals (RxD) are connected to the computer transmission signal (TxD) and the amplifiers transmission signals (TxD) are connected to the computer reception signal (RxD).

4.2 - Connection

Each amplifier has 4 micro-switches allowing an address assignment. The amplifiers of a same rack must have different addresses.

An address in multi-axis configuration must have a value between 1 and F (hexa). The 0 address corresponds to the standard configuration (no addressing).

The connection with an amplifier with address “x” requires the instruction ADx (see this instruction in § 3.10). The connection with another amplifier with address “y” requires to first disconnect the present amplifier by sending the instruction AD0 and to connect it by means of the instruction ADy.

After the connection, it is possible to dialogue with the amplifier via the instructions described in the paragraph re-garding the parameter setting.