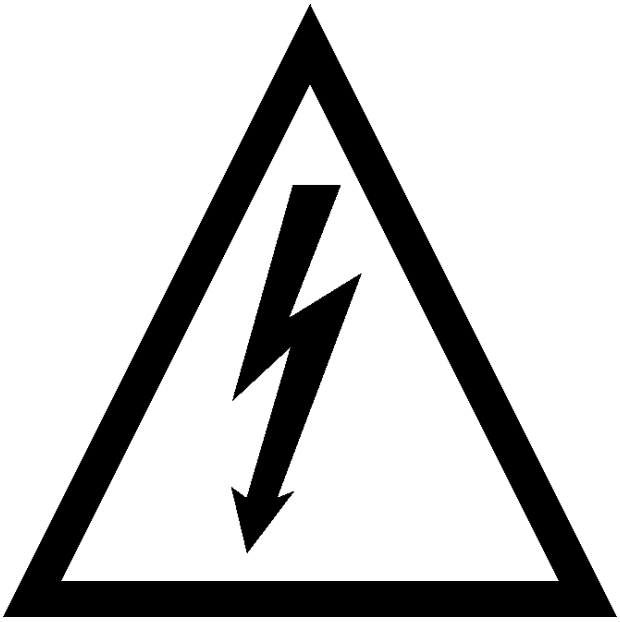
ES TECHNOLOGY

Technical features and installation instructions

BSD300SS

REVISIONS						
New version code	**DATE**	**REMARKS**	**Firmware Version**	**Interface Version**		
BSD300SS 0.1	10/01/10	MANUAL POSITIONER 24 PROFILES	MV2.1	MK5		
BSD300SS 0.2	15/02/10	UPDATE	A2E6	ESDRIVE		
BSD300SS 0.3	11/03/10	UPDATE	A2ED	ESDRIVE		
BSD300SS 0.4	15/09/11	UPDATE	A2EE	ESDRIVE		
BSD300SS 0.5	24/03/14	UPDATE	1028	ESDRIVE2		



ATTENTION!

BSD 300 SS series converters work in high voltage. Even after disconnecting the converter, the internal capacitive circuits remain in voltage for a short period of time. For this reason it is absolutely necessary to wait at least two minutes before operating inside the converter.
In addition, the converter is equipped with an internal recovery resistance that works in high voltage with very high operating temperature. Therefore, do not touch the recovery resistance for any reason even when the converter is disabled.

GENERALITY

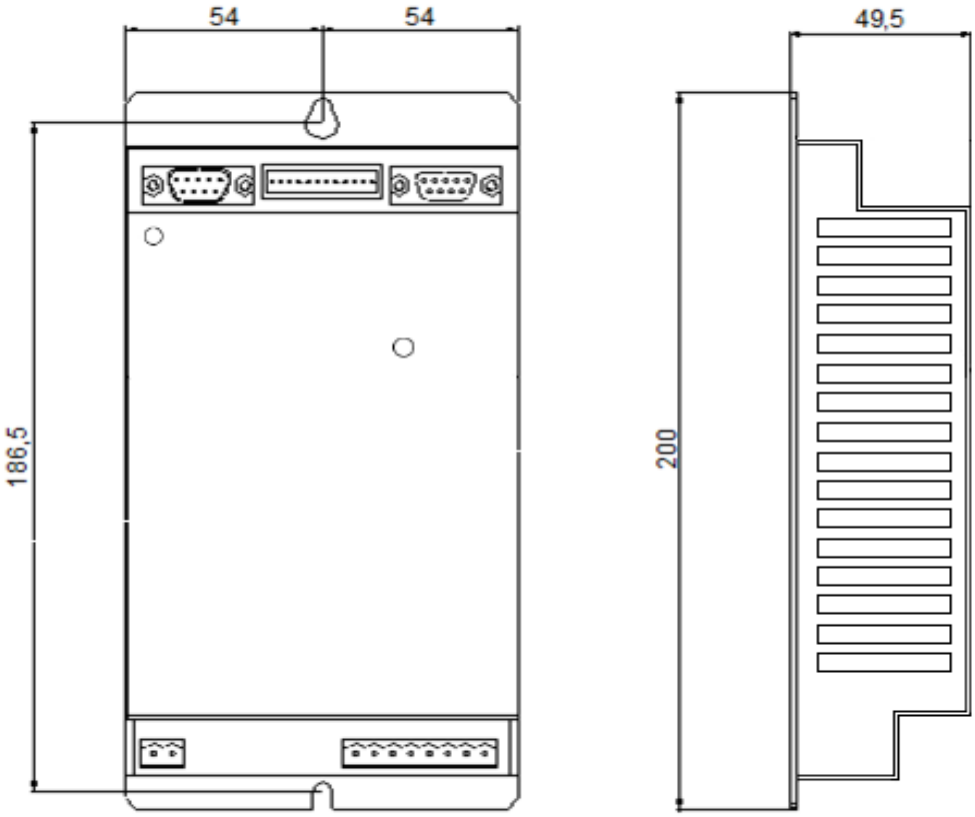
The four-quadrant sinusoidal brushless converters of the BSD 300 SS series belong to the new generations of power servo amplifiers in ASIPM technology and digital regulation with DSP.

In compact design include the power supply, recovery circuit and braking resistors. The design and engineering of the product was aimed above all at the possibility of testing and severely burning each converter to obtain maximum quality and reliability.

The converters of the BSD 300 SS series are designed to control the speed of a.c. synchronous motors of the sinusoidal type for applications with a high dynamic response and where a perfect motion smoothness and uniformity of positioning is required.

OVERALL DIMENSIONS

BSD 300 3A SS



SPECIFICATIONS

TYPE	POWER SUPPLY	RMS RATED CURRENT AT 40 °C	MAXIMUM CURRENT FOR 1.5 sec.
BSD 300 SS 3A	220 V_{AC}	3A	5A

General characteristics

Supply voltage BSD 300 SS:	Three-phase 110 / 220 V_{AC} ±10%
Auxiliary supply voltage:	24 V_{CC} , 8W
Mains frequency:	50/60 Hz
Bandwidth:	<= 200 Hz
PWM switching frequency:	10 kHz

NOTE: The zero signal of the converter is not galvanically separated from the power supply. Therefore, due care should be taken in the connection.

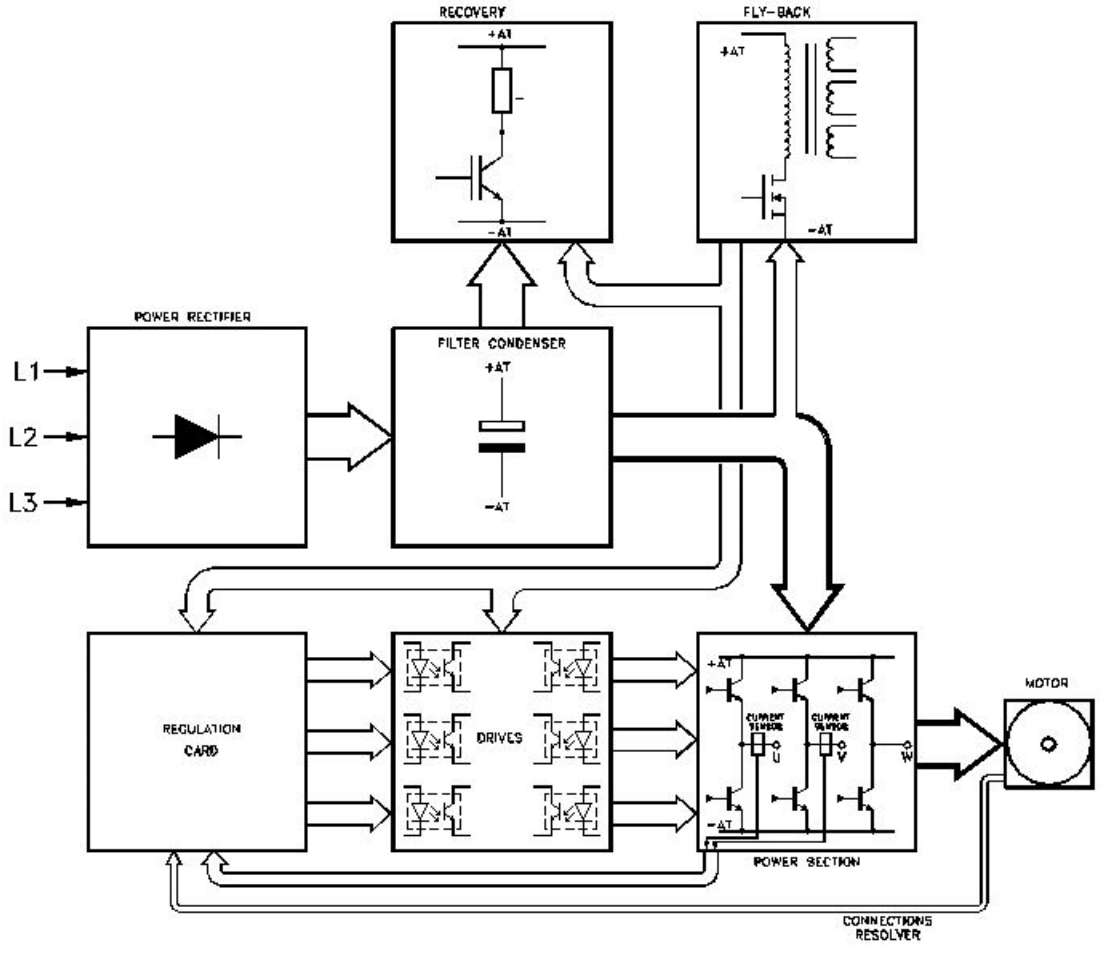
Internal protections:

- Against short circuits between motor terminals. Permanent fault: it is necessary to turn off the power, eliminate the cause of the short circuit and restore the power
- Against network overvoltage. The fault resets when the voltage returns to the nominal value
- Against network undervoltage. The fault resets when the voltage returns to the nominal value
- Against power overheating. Fault resets after cooling the power module
- Against engine overheating via I2t function. The drive returns to maximum torque after cooling the engine according to its thermal constant
- Against breakage of the resolver or connections: once the connection or connection is restored, the fault disappears and you can re-enable the converter

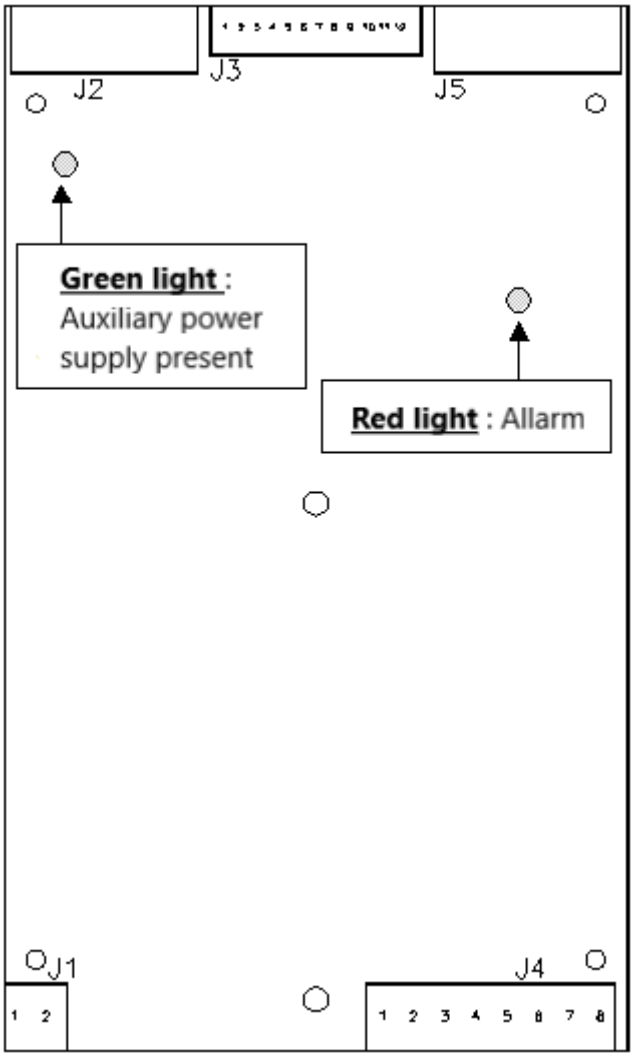
How to use:

Temperature:	from 0 ¸40°C
Humidity:	90% maximum non-condensing
Altitude:	1000 m.
Degree of protection:	IP 00

Functional scheme



CONNECTOR ARRANGEMENT



CONNECTOR J1: Auxiliary power connection +24Vdc:

J1 connector

TERMINAL	NAME	TYPE	DESCRIPTION
1	**+24V**	**IN**	+24V for converter auxiliary power supply
2	**0V**		0V for auxiliary power supply

CONNECTOR J2: IN/OUT table available on the "RESOLVER" connector:

J2 connector (DB9 female)

TERMINAL	NAME	TYPE	DESCRIPTION
1	**+REF**	**OUT**	Terminal of connection to the winding **RIF** of the *RESOLVER*
2	**-REF**	**OUT**	Terminal of connection to the winding **RIF** of the *RESOLVER*
3	**-SIN**	**IN**	Terminal of connection to the winding **SIN** of the *RESOLVER*
4	**+SIN**	**IN**	Terminal of connection to the winding **SIN** of the *RESOLVER*
5	**-COS**	**IN**	Terminal of connection to the winding **COS** of the *RESOLVER*
6	**+COS**	**IN**	Terminal of connection to the winding **COS** of the *RESOLVER*
7	**PTC/NTC**	**IN**	Motor thermal probe connection terminal
8	**PTC/NTC**	**IN**	Motor thermal probe connection terminal
9			N.A.

No.B. The connection of the resolver must be made with a shielded cable with three pairs of individually shielded conductors. The screen must be soldered to the metal casing of the DB9 connector.

CONNECTOR J5: RS 485 serial interface connection:

J5 connector (DB9 male)

TERMINAL	NAME	TYPE	DESCRIPTION
1	**0C**		Common external power supply
2	No.C.		
3	**B**	**IN/OUT**	Channel B of RS 485
4	No.C.		
5	**COM**		Common
6	No.C.		
7	No.C.		
8	**A**	**IN/OUT**	Channel A of RS 485
9	**+5V**		External power supply

Transmission speed 9600 BAUD

CONNECTOR J3: TABLE IN/OUT available on removable terminal block:

J3 connector

TERMINAL	NAME	TYPE	DESCRIPTION
1	**N.A.**		DO NOT CONNECT THIS CLAMP
2	**V. ENABLE**	**IN**	Input for enabling the positioning cycle. Bring this clamp to +24V compared to 0_EN to enable positioning.
3	**T. ENABLE**	**IN**	Input for enabling converter torque. Bring this clamp to +24V compared to 0_EN.
4	**D_AUX1**	**IN**	Digital input for hardware consent to the execution of profiles. It is placed in or to enable software profile.
5	**D_AUX2**	**IN**	Digital input for the end of the stroke of the search for zero altitude. Normally the voltage between this clamp and 0_EN is 24V. The limit switch is considered reached when this voltage is 0V for at least 100ms
6	**0_EN**	**IN**	Common for digital inputs to terminals 2, 3, 4, 5
7	**OUT_1**	**OUT**	Digital output 2 indicating "moving axis". The photo-insulated transistor between this clamp and 0_OUT_1 closes to indicate the above. ***No.B.: This clamp can absorb a maximum of 100mA***
8	**0_OUT_1**	**OUT**	Common for digital output 1
9	**OUT_2**	**OUT**	Digital output 2 indicating "moving axis". The photo-insulated transistor between this clamp and 0_OUT_2 closes to indicate the above. ***No.B.: This clamp can absorb a maximum of 100mA***
10	**0_OUT_2**	**OUT**	Common for digital output 2
11	**DRIVE OK**		Output for voltage-free contact of the internal lock relay. The contact is normally closed in correct operation of the converter and opens to the intervention of the protections. (max. 24V, 100 mA)
12	**DRIVE OK**		Output for voltage-free contact of the internal lock relay. The contact is normally closed in correct operation of the converter and opens to the intervention of the protections. (max. 24V, 100 mA)

Attention: Pin 1 is connected to the +15 V of the drive adjustment which is not galvanically isolated from the power.

CONNECTOR J4: Power Connections

J4 connector

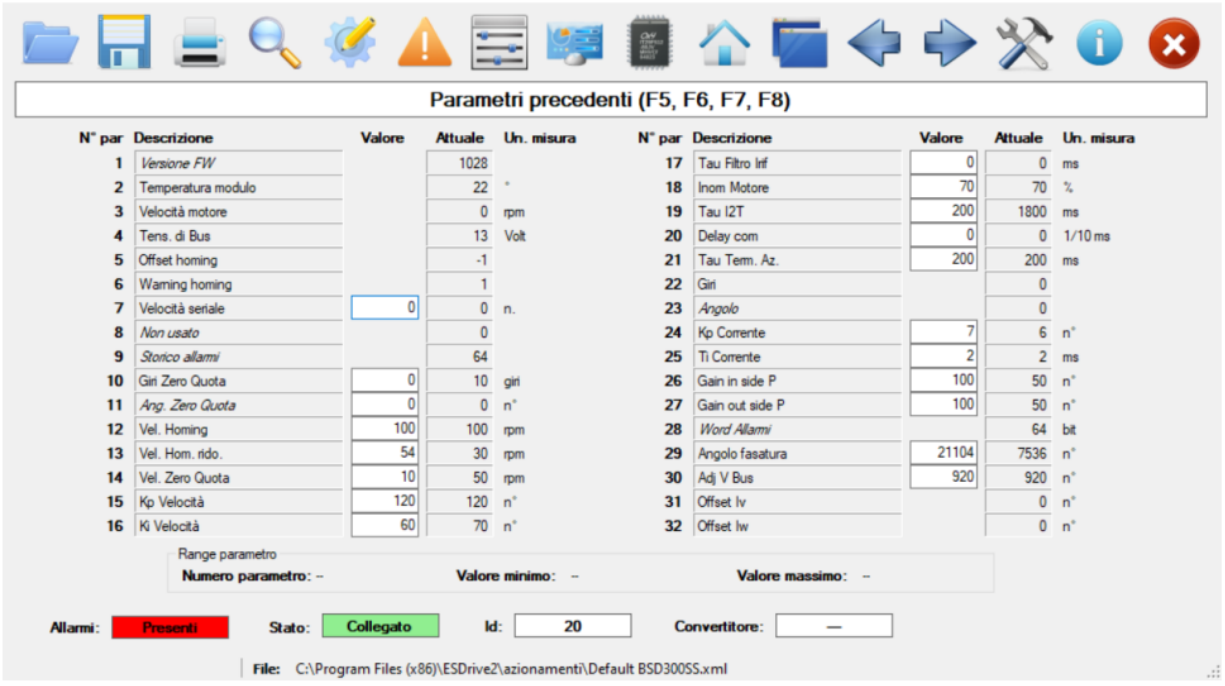
TERMINAL	NAME	TYPE	DESCRIPTION
1	**L1**	**IN**	Phase 1 of the secondary of the three-phase transformer for the power supply of the converter (220VAC maximum)
2	**L2**	**IN**	Phase 2 of the secondary of the three-phase transformer for the power supply of the converter (220VAC maximum)
3	**L3**	**IN**	Phase 3 of the secondary of the three-phase transformer for the power supply of the converter (220VAC maximum)
4	**GND**		Ground connection terminal
5	**GND**		Ground connection terminal
6	**U**	**OUT**	Connection terminal for the **U**-phase of the motor
7	**V**	**OUT**	Connection terminal for the **V**-phase of the motor
8	**W**	**OUT**	Connection terminal for the **W**-phase of the motor

CONVERTER CONFIGURATION

The BSD 300 SS converter can be configured using the appropriate software interface compatible with all versions of Windows supplied with the drive.
The software can be downloaded directly at https://www.es-technology.com/download or use the CD supplied with the drive, select the "setup.exe" file and follow the on-screen instructions

User Interface Pages

The user interface comes with some symbols at the top always visible with which you can access the configuration pages or perform some operations



The symbol  is the presentation page

The symbols  and  allow you to scroll through the parameter pages.

The symbol  enables the converter configuration page.

The symbol  displays the alarm page.

The symbol  allows you to access the interface settings.

The symbol  allows you to perform some operations such as updating the firmware or application and other functions

The symbols  and  make it possible respectively to save or upload a configuration file from a special folder

The symbol  is used to identify the identifier of the connected drive in case you are not aware of it

The symbol  stably stores data inside the drive

In the parameter pages, each piece of data is represented by a line consisting of:

- parameter number
- parameter description
- field for reading or entering the parameter value
- unit of measurement of the parameter

To change a parameter you need to follow this sequence:

- hover your cursor over the input field for the desired parameter and select it with a single mouse click
- Enter the value you want. Doing this operation disables the automatic reading of the parameters and turns yellow to indicate that the value has changed.
- Send the parameter to the drive by pressing the Enter/Enter key.
- Wait for the background of the input field to turn white again

If you have to change more parameters, you have to repeat the sequence indicated above each time. It is not correct to change the fields of two or more parameters and then send them to the converter because in this way only the last selected one is modified.
If you try to assign a parameter a value that is less or greater than allowed, such as negative values for controller gains, the interface will send the converter the maximum or minimum permissible value.

The parameters are normally displayed in decimal form, if you want to see them in hexadecimal format simply double-click on the parameter description field.
If automatic reading is disabled, the value of a single parameter can be read from the converter by double-clicking on the unit of measurement field.

Description of the main parameters

N.B: the parameters P15, P16, P17, P24, P25, require the converter to be disabled in order to be varied and sent.

Parameter	Description	U.M.	Range
P1	Firmware version	N	0:FFFF
	Displays the firmware version of the drive		

Parameter	Description	U.M.	Range
P9	Alarm history	N	0:FFFF
	It stores all alarms detected by the drive from ignition. It is convenient to represent it in hexadecimal format. The meaning of the alarms can be derived from the Alarms page of the supervision software. To reset the alarm memory it is necessary to write 0 to this parameter.		

Parametro	Descrizione	U.M.	Range
P10	Zero turns odds	GIRI	0 ÷ 32767
	Once the zero micro has been reached, the motor exits the micro and finds the encoder zero mark. From this point it performs the number of revolutions set in this parameter and the fraction of a revolution set in P11		

Parametro	Descrizione	U.M.	Range
P11	Dimension zero angle	GIRI	0 ÷ 32767
	Once the zero micro has been reached, the motor exits the micro and finds the encoder zero mark. From this point it performs the number of revolutions set in parameter 10 and the fraction of a revolution set in this parameter The angle is expressed in hexadecimal according to the 360 ° FFFF correspondence		

Parameter	Description	U.M.	Range
P12	Homing speed	RPM	0 □ 200
	Determine the search speed of the micro of zero, the sign determines the direction of rotation. For proper operation it is recommended to set a value between 10 and 200 *[the negative sign before the value, determines the reverse rotation of the motor].* A positive value determines the **hourly** rotation of the motor		

Parameter	Description	U.M.	Range
P13	Reduced homing speed	RPM	0 □ 200
	Determines the speed of rotation after the micro of zero has been reached, this speed is maintained until the zero notch of the simulated encoder is reached. A positive value determines the **counterclockwise** rotation of the motor		

Parameter	Description	U.M.	Range
P14	Zero altitude speed	RPM	0 □ 200
	Determines the speed of rotation of the motor when moving to zero altitude, after the zero notch of the simulated encoder has been reached. A positive value determines the **hourly** rotation of the motor		

Parameter	Description	U.M.	Range
P15	KP speed controller proportional gain	N	0 □ 255
Send with zero enablement	Determine the proportional gain of the speed controller, the higher the value the higher the bandwidth of the system		

Parameter	Description<	U.M.	Range
P16	KI integral gain of the speed controller	N	0 □ 255
Send with zero enablement	Increasing the value increases the integral component of the speed controller		

Parameter	Description	U.M.	Range
P17	Tf speed regulator low pass filter time constant	N	0 □ 5
Send with zero enablement	It allows you to filter the signal coming from the internal speed controller, it can be used in cases where you want to improve fluidity of motor rotation. Typical value 0. It is recommended, if possible, not to use this parameter in order not to reduce the bandwidth of the drive excessively.		

Parameter	Description	U.M.	Range
P18	Rated motor current as % of rated converter current	%I.NOM	0 □ 100
	Fix the rated current of the motor as a function of the rated current of the converter (Ex. BSD 300 SS 3 A, motor = 2A nominal, set parameter to 67%)		

Parameter	Description	U.M.	Range
P19	Thermal constant of the motor in seconds	SEC/10	0 □ 32767
	Determines the intervention time of the engine overtemperature protection, this data is found in the engine catalog and is expressed in seconds		

Parameter	Description	U.M.	Range
P21	Thermal constant of the converter in seconds of the converter.	SEC/10	0 □ 32767
	Determines the intervention time of the I^2T device		

Parameter	Description	U.M.	Range
P24	Kpi proportional gain of current ring regulators	N	1 □ 255
Send with zero enablement	Fix the gain of the current rings of the converter.		

Parameter	Description	U.M.	Range
P25	Time constant of current ring regulators	N	1 □ 255
Send with zero enablement	Fix the time constant of the converter current rings.		

Parameter	Description	U.M.	Range
P26	GAIN INSIDE	N	1 □ 255
	Determines the gain of the speed controller near the altitude to be reached		

Parameter	Description	U.M.	Range
P27	Outside Gain	N	1 □ 255
	Determines the gain of the speed controller in the transfer phase from the current quota to the quota to be reached		

Parameter	Description	U.M.	Range
P28	Word Alarms	N	0□FFFF
	Displays the status of alarms in numerical form. If the value shown is different from 0 it means that there is an alarm in progress. For easier control of alarm conditions use the Alarms page of the supervision software		

Parameter	Description	U.M.	Range
P29	Angular correction necessary for the correct timing of the motor	N	- 32536 □ 32535
	WARNING: Do not change this parameter directly. Its correct value is determined by the converter using the automatic timing procedure		

Parameter	Description	U.M.	Range
P30	Bus voltage correction factor	N	0 □ 32535
	Allows you to change the voltage conversion factor of BUS DC to fit the real value measured with a voltmeter (calibration carried out in testing) ***WARNING: Too high values of this parameter can lead to the unjustified activation of the braking circuit with the consequent breakage of the brake resistor inside the converter***		

Parameter	Description	U.M.	Range
P31	Phase V current sensor offset	N	0 □ 32535
	Displays the voltage of the phase V current sensor.		

Parameter	Description	U.M.	Range
P32	W Phase Current Sensor Offset	N	0 □ 32535
	Displays the voltage of the current sensor of phase W. Parameter not modifiable		

<Parameter	Description	U.M.	Range
P33	Number of polar torques of the motor	N	0 □ 8
	Select the number of polar pairs of the motor. (Ex. Motor 6 poles = 3 polar pairs)		

Parameter	Description	U.M.	Range
P34	Number of polar pairs of the resolver	N	0 □ 8
	Select the number of polar pairs of the resolver, which in most cases is equal to 1		

Parameter	Description	U.M.	Range
P36	Bus voltage in volts	V	0 □ 500
	Displays the actual voltage of the DC BUS considering the conversion coefficient (see parameter P30)		

Parameter	Description	U.M.	Range
P37	Offset on the analog speed reference.	V	- 32768 □32767
	The calibration of this parameter allows to reset the offset of the speed reference. In this way it is possible to keep the engine stationary even if the input reference is not exactly zero. Not used in operation as a positioner.		

Parameter	Description	U.M.	Range
P38	Drive identifier	N	0 □ 128
	This parameter uniquely identifies the drive with which the PC is dialoguing		

Parameter	Description	U.M.	Range
P39	Summarizes the state of the configuration bits	N	0-FFFF
	Shows in numeric format the status of the bits of the Configuration column of the States page		

Parameter	Description	U.M.	Range
P40	Summarizes the state of the state bits	N	0-FFFF
	Shows the bit status of the Status column of the States page in numeric format		

Parameter	Description	U.M.	Range
P41	Summarizes the state of the input bits	N	0-FFFF
	Shows in numeric format the status of the bits of the Input column of the States page		

Parameter	Description	U.M.	Range
P43	Maximum rpm motor rotation speed	RPM	250 □ 20000
	It sets the maximum speed of rotation of the motor. ***WARNING:*** **Do not set a maximum speed less than 250 rpm**		

Parameter	Description	U.M.	Range
P44	Maximum converter current	%I.NOM	0 □ 200
	Determines the maximum current that can be delivered by the converter as a percentage of its rated current. (Ex. BSD 300 SS 3A = 3A nominal 6A peak with the parameter set to 200%)		

Parameter	Description	U.M.	Range
P45	Clockwise acceleration ramp	SEC	0.01□1
	Determines the acceleration ramp time in the direction of hourly rotation.		

Parameter	Description	U.M.	Range
P46	Clockwise deceleration ramp	SEC	0.01□1
	Determines the deceleration ramp time in the direction of hourly rotation.		

Parameter	Description	U.M.	Range
P47	Counterclockwise acceleration ramp	SEC	0.01□1
	Determines the acceleration ramp time in the direction of counterclockwise rotation.		

Parameter	Description	U.M.	Range
P48	Counterclockwise deceleration ramp	SEC	0.01□1
	Determines the deceleration ramp time in the direction of counterclockwise rotation.		

ATTENTION: **The ramps set in parameters 45, 46, 47 and 48 must all have the same value and not exceed the duration of one second.**

Parameter	Description	U.M.	Range
P49	Digital Speed Reference	RPM	-2000 □20000
	This parameter specifies the speed of rotation of the motor when the drive is enabled (T_ENABLE) but not the speed reference (V_ENABLE). To obtain the function of stopping in pairs at the time of enabling only (T_ENABLE) this parameter must be null.		

Parameter	Description	U.M.	Range
P50	Revolutions corresponding to the initial position	TURNS	-32768 □32767
	This parameter is used in operation as a positioner. The position assumed by the engine after the homing phase is assigned the value in revolutions expressed by this parameter and the fraction of revolution indicated by P51.		

Parameter	Description	U.M.	Range
P51	Fraction of turn corresponding to the initial position	TURNS	0-FFFF
	This parameter is used in operation as a positioner. The position assumed by the engine after the homing phase is assigned the value in revolutions expressed by P50 and the fraction of revolution specified by this parameter.		

Parameter	Description	U.M.	Range
P52	Current revolutions.	TURNS	
	This parameter, together with the parameter P53 allows to read the current position of the motor in operation as a positioner. To have a "hold" situation between the parameters P52 and P53 you have to read FIRST the parameter P52 and AFTER the parameter P53		

Parameter	Description	U.M.	Range
P53	The current angle.	N	
	This parameter, together with the parameter P52 allows to read the current position of the motor in operation as a positioner. To have a "hold" situation between the parameters P52 and P53 you have to read FIRST the parameter P52 and AFTER the parameter P53		

Parameter	Description	U.M.	Range
P54	First four profiles of the positioning cycle	N	0 □ FFFF
	This parameter, together with P55, specifies which profiles and in which sequence they should be performed during the placement cycle		

Parameter	Description	U.M.	Range
P55	Last four profiles of the positioning cycle	N	0 □ FFFF
	This parameter, together with P54, specifies which profiles and in which sequence they should be performed during the placement cycle		
Parameter	Description	U.M.	Range
P56	Selecting hardware or software consents when moving from one profile to the next	N	0 □ FFFF
	The individual bits of this parameter determine whether, once the final dimension of a profile is reached, the drive waits for a descent front on the digital input 1 before starting the execution of the next profile, or continues automatically. Regardless of the settings, the first profile still requires a hardware enablement.		

The following parameters (P57 to P128) are reserved for profile settings. The following are examples of the parameters for the first four profiles.

Parameter	Description	U.M.	Range
P57	Speed at which the first profile is to be executed	N	0 □ P4
	Specifies the speed at which the motor rotates during the transfer from the starting position to the dimension of the first profile. The value of this parameter must be positive and less than or equal to the maximum motor speed set in P4.		

Parameter	Description	U.M.	Range
P58	Arrival fee of the first profile	N	- 32767 □ 32535
	This value expresses the absolute position of the arrival share of the first profile. It is expressed in number of revolutions by this parameter and in fractions of a revolution by the P59. The Starting Quota of this profile coincides with the arrival quota of the profile that precedes it, see P54 and P55.		

Parameter	Description	U.M.	Range
P59	Fraction of turn relative to the arrival quota of the first profile	N	0 □ FFFF
	Fraction of turn relative to the dimension of the first profile. This parameter is always positive and must be added to the number of revolutions expressed by P58 to fully define the altitude		

Parameter	Description	U.M.	Range
P60	Speed at which the second profile is to be performed	N	0 □ P4
	Specifies the speed of rotation of the motor during the transfer from the starting altitude of the second profile to its arrival dimension. The value of this parameter must be positive and less than or equal to the maximum motor speed set in P4.		

Parameter	Description	U.M.	Range
P61	Arrival fee of the second profile	N	- 32767 □ 32535
	This value expresses the absolute position of the arrival share of the second profile. It is expressed in number of revolutions by this parameter and in fractions of a turn by the P62. The Starting Quota of this profile coincides with the arrival quota of the profile that precedes it, see P54 and P55.		

Parameter	Description	U.M.	Range
P62	Fraction of turn relative to the arrival altitude of the second profile	N	0 □ FFFF
	Fraction of turn relative to the dimension of the second profile. This parameter is always positive and must be added to the number of revolutions expressed by P61 to fully define the altitude		

Parameter	Description	U.M.	Range
P63	Speed at which the third profile is to be executed	N	0 □ P4
	Specifies the speed of rotation of the motor during the transfer from the starting altitude of the third profile to its arrival dimension. The value of this parameter must be positive and less than or equal to the maximum motor speed set in P4.		
Parameter	Description	U.M.	Range
P64	Arrival fee of the third profile	N	- 32767 □ 32535
	This value expresses the absolute position of the arrival share of the third profile. It is expressed in number of revolutions by this parameter and in fractions of a turn by the P65. The Starting Quota of this profile coincides with the arrival quota of the profile that precedes it, see P54 and P55.		

Parameter	Description	U.M.	Range
P65	Fraction of a turn relative to the arrival altitude of the third profile	N	0 □ FFFF
	Fraction of turn relative to the dimension of the third profile. This parameter is always positive and must be added to the number of revolutions expressed by P66 to fully define the altitude		

Parameter	Description	U.M.	Range
P66	Speed at which the fourth profile is to be executed	RPM	0 □ P4
	Specifies the speed of rotation of the motor during the transfer from the starting altitude of the fourth profile to its arrival dimension. The value of this parameter must be positive and less than or equal to the maximum motor speed set in P4.		

Parameter	Description	U.M.	Range
P67	Arrival quota of the fourth profile	N	- 32767 □ 32535
	This value expresses the absolute position of the arrival share of the fourth profile. It is expressed in number of revolutions by this parameter and in fractions of a turn by the P68. The Starting Quota of this profile coincides with the arrival quota of the profile that precedes it, see P54 and P55.		

Parameter	Description	U.M.	Range
P68	Fraction of turn relative to the arrival altitude of the fourth profile	N	0 □ FFFF
	Fraction of a turn relative to the arrival altitude of the fourth profile. This parameter is always positive and must be added to the number of revolutions expressed by P67 to fully define the altitude		

There are still eighteen profiles to be set, the parameters are entered following the example of the four just described. The parameters of such profiles are arranged according to the following tables:

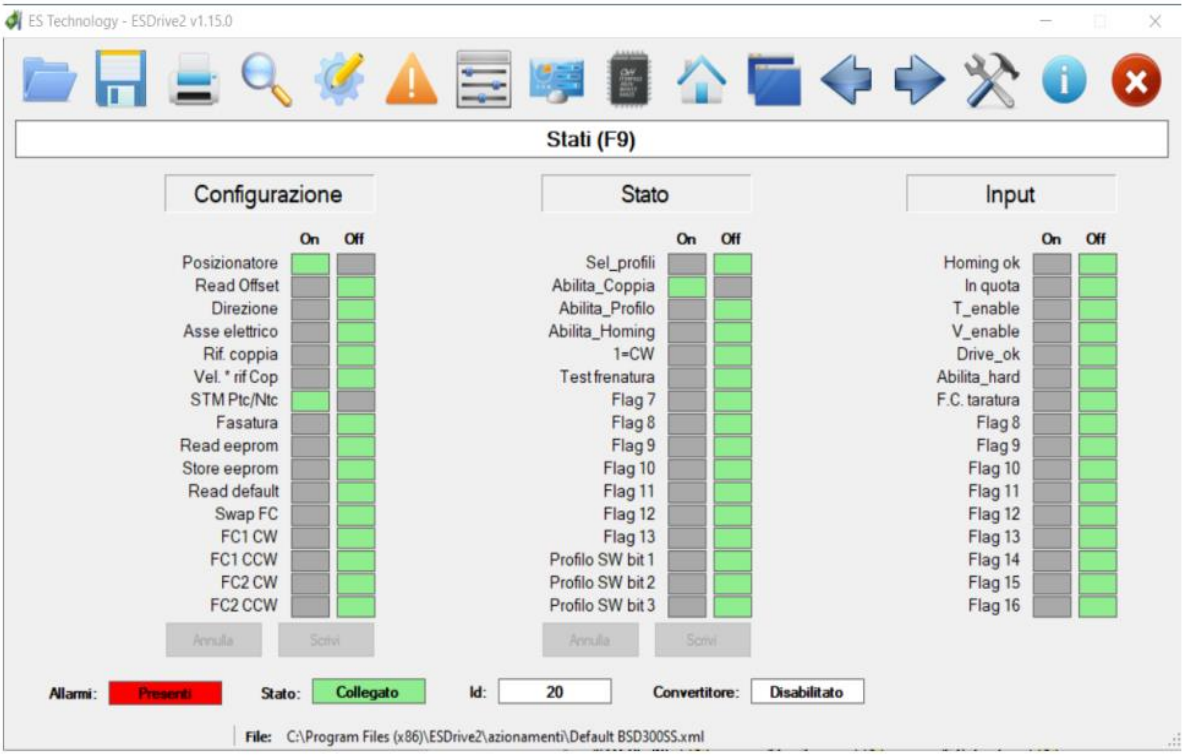
	Velocity	N° Laps	Fraction of turn
Profile 5	P69	P70	P71
Profile 6	P72	P73	P74
Profile 7	P75	P76	P77
Profile 8	P78	P79	P80
Profile 9	P81	P82	P83
Profile 10	P84	P85	P86
Profile 11	P87	P88	P89
Profile 12	P90	P91	P92
Profile 13	P93	P94	P95
Profile 14	P96	P97	P98
Profile 15	P99	P100	P101

As will be explained in the paragraph "positioner" the profiles from one to fifteen can be used in the sequences of up to eight consecutive profiles, the seven profiles ranging from seventeen to twenty-three are executable by software selection. **Sixteen and twenty-four profiles are not used.**

	Velocity	N° Laps	Fraction of turn
Profile 16	**P102, P103, P104 NOT USED**		
Profile 17	P105	P106	P107
Profile 18	P108	P109	P110
Profile 19	P111	P112	P113
Profile 20	P114	P115	P116
Profile 21	P117	P118	P119
Profile 22	P120	P121	P122
Profile 23	P123	P124	P125
Profile 24	**P126, P127, P128 NOT USED**		

UI States page

The BSD 300 SS converter has several operating modes and some automatic calibration functions. To access these properties, select the *States* page. The various commands are given by modifying the individual bits by clicking the mouse. The changes made are reversible because with each click of the mouse the selected bit is reversed.



Once you have selected the desired bit configuration, you must send it to the converter using the Out button. The In key is used to read the configuration of the drive in case the automatic reading is disabled.

Meaning of the "CONFIGURATION" bits

Positioner	Setting this to 1 bit enables operation as a positioner
Read Off_set	Unavailable
N.A.	Unavailable
Electric Axis	Unavailable
Ref. Couple	Unavailable
Vel. * ref Cop	Unavailable
STM Ptc/Ntc	Indicates to the converter whether the motor's thermal probe is normally closed or normally open
Phasing	Unavailable
Read EEProm	Placing this bit at 1 bit instructs the converter to load the parameters from the EEProm. This must be done with the converter disabled and you must wait for the bit to return to 0 before re-enabling the converter or sending other commands.
EEProm Store	**Placing this bit at 1 bit instructs the converter to save the parameters on the EEProm. This must be done with the converter disabled and you must wait for the bit to return to 0 before re-enabling the converter or sending other commands**.
Read Default	Unavailable
Swap FC	Unavailable
FC1 CW	Unavailable
FC1 CCW	Unavailable
FC2 CW	Unavailable
FC2 CCW	Unavailable

Meaning of "STATUS" bits

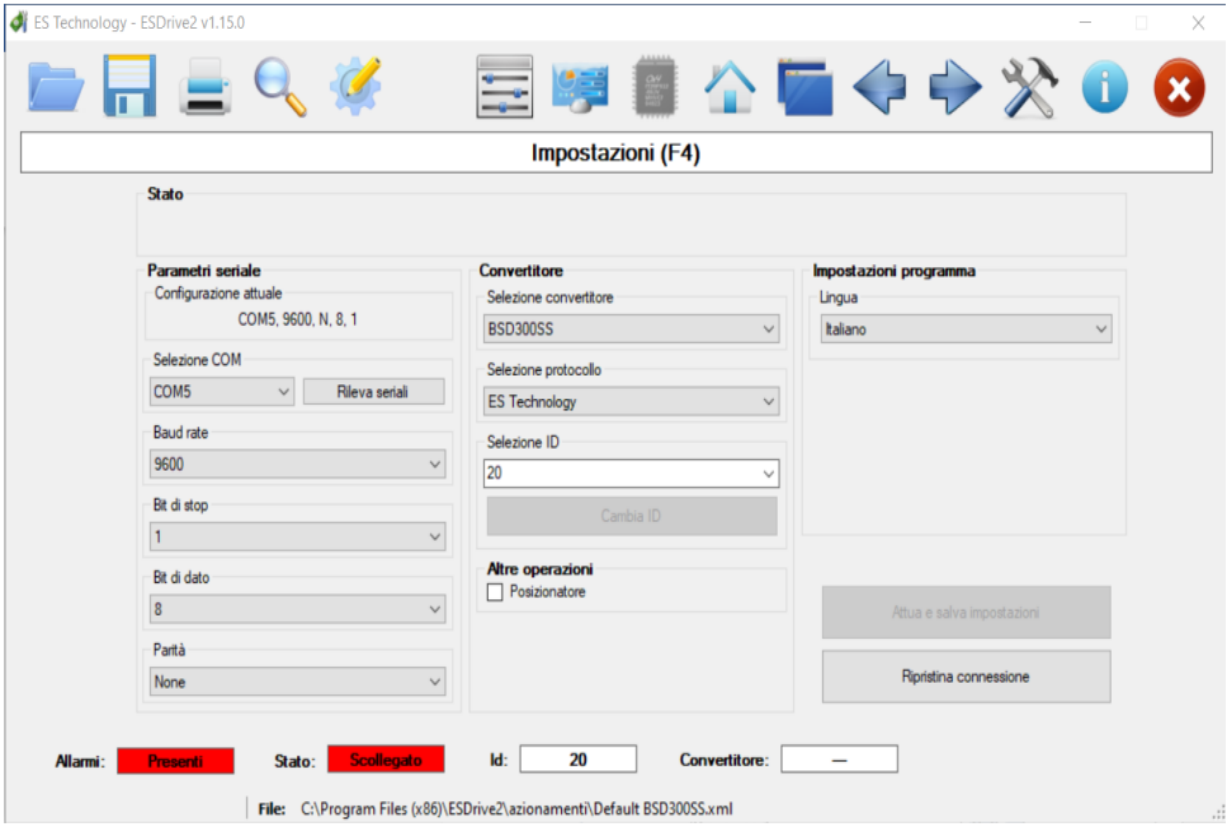
Sel_profiles	Unavailable
Enable_pair	Set this bit to 1 for torque enable, in AND with hardware enable
Enable_profile	Placing this bit at 1 enables profile execution. The bit returns to zero as soon as the converter has started running the profiles. Can be combined with the execution of individual profiles.
Abilita_homing	Placing this bit at 1 enables the hardware Homing sequence.
1=CW	Placing this bit at 1 reverses, with the same set dimensions, the direction of rotation of the motor.
Brake test	Unavailable
Flag 7	Unavailable
Flag 8	Unavailable
Flag 9	Unavailable
Flag 10	Unavailable
Flag 11	Unavailable
Flag 12	Unavailable
Flag 13	Unavailable
Flag 14	Single profile enable bit (parameters 105 to 125)
Flag 15	Single profile enable bit (parameters 105 to 125)
Flag 16	Single profile enable bit (parameters 105 to 125)

Meaning of "INPUT" bits

Homing OK	This bit is set to 1 by the converter after a reset operation (Hardware or Software) has been successfully performed
In quota	This bit is set to 1 by the converter during the execution of a profile and during the hardware reset operation.
T_enable	View the status of pair hardware enablement
V_enable	View the status of speed hardware enablement
Drive_ok	View the hardware enablement status of the drive ok
Abilita_hard	View the status of the hardware enablement of the start profiles
F.C. Taratura	Displays the status of the calibration limit switch
Flag 8	Unavailable
Flag 9	Unavailable
Flag 10	Unavailable
Flag 11	Unavailable
Flag 12	Unavailable
Flag 13	Unavailable
Flag 14	Software profile selection
Flag 15	Software profile selection
Flag 16	Software profile selection

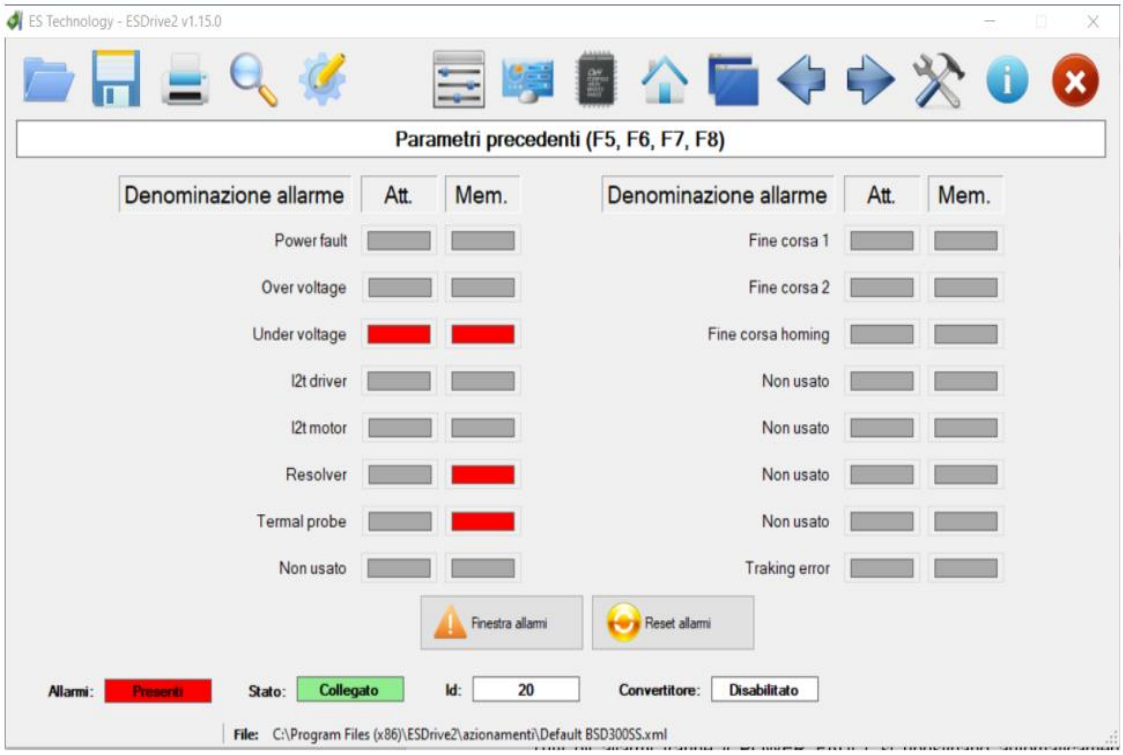
User Interface Settings Page

The Settings page allows you to configure the software for communication
You must choose the serial port with the "Rileva seriale" button, select the communication rate (9600 baud), the stop bit (1), the parity (none), the drive model (BSD300SS), and the protocol (ES Technology). Once the data entered has been verified, click on the " Attua e salva impostazioni " button
The identifier is "20" by default. Sand you know the identifier of the connected drive you can write directly in the prepared box and click the "Cambia ID" button. Sand you do not know the identifier of the drive you can click on the icon  that automatically searches for the identification number



UI Alarms page

On this page they are displayed (Att.) and stored (Mem.), the alarm states of the converter.
The memory is made from the drive and is therefore active if the drive remains on.



All alarms except the Power fault reset automatically. The Power fault needs to turn off the converter to be reset.
The **Reset Alarms** button allows the cancellation of alarm memories.

Description of alarms

Power fault Indicates the general alarm status due to the intervention of the protection of the power section. In this case it is advisable to check the motor and the connections to it to check for any short circuits or insulation losses. An alarm of this type can also be caused by an incorrect calibration of the current ring.

Over voltage BUS surge alarm. This alarm may appear as a result of a sharp braking of the engine that causes a dangerous increase in the BUS voltage beyond 410 V. This alarm could also appear if the power supply network were to rise considerably.

Under voltage BUS undervoltage alarm . This alarm appears when the power supply is not present, check the status of the protective fuses on the power phases.

I^2T drivers Alarm of exceeding the thermal threshold of the driver. This alarm is triggered when the converter delivers a current higher than the nominal for too long a period.

I^2T motor Alarm of exceeding the thermal threshold of the engine. This alarm is triggered when the motor draws a current higher than the nominal for too long a period. This alarm can also be triggered in conjunction with other conditions that lead to the disabling of the converter. When the alarm is activated, the converter reduces the maximum current supplied to the value of the nominal current of the motor. In the case of repeated activations of this alarm check that the engine load is not too high. The intervention threshold of this protection can be adjusted by acting on the parameters Inom Motore (P18) and Tau I^2T (P19)

Resolver Resolver stop alarm. Check the integrity and correctness of connections with the resolver

Termal probe Engine overheating alarm. The converter is temporarily disabled as long as the anomaly persists and automatically restores itself as soon as the conditions of correct operation recur. In case of unjustified alarms, make sure that you have correctly set the Ptc/Ntc STM flag in the Configuration column of the States page

Limit switch 1 Inactive

Limit switch 2 Inactive

F.C. Homing This alarm signals that the limit switch used for the homing operation intervenes too close to the zero notch of the

resolver. It is advisable to move the F.C. by the amount corresponding to about 180° engine.

Traking error Alarm of exceeding the maximum permissible position error in operation as a positioner

INSTALLATION AND CALIBRATION PROCEDURE

This chapter describes the installation and calibration procedures to be performed for commissioning the converter.

Electrical connections

- Connect the motor cable, resolver cable, power cable and 24 Vdc auxiliary power cable.
- Prepare enable and control links.
- Connect a personal computer with the communication program installed to the converter using an RS 485 serial interface cable.
- Provide auxiliary power supply 24Vdc.
- At this point the communication to the computer will be active and the main quantities displayed.
- Provide 220 Vac three-phase power supply

ATTENTION: the ignition MUST always be done with the converter DISABLED. If the converter is turned on by enabled, you will have an alarm status (OK drive open) and RS 485 serial communication will not be available

Automatic timing is not possible with standard product configuration

- In the case of coupling with a motor other than the ES-TECHNOLOGY standard it is necessary to contact the company to configure the drive in advance

Maximum speed calibration

- Change PARAMETER 37 "Vel_Max".
- Save the calibration to EEProm.

Calibration of speed ring gains:

When the motor is connected to the mechanical load it may be necessary to change the values of the proportional factor and the integral factor of the speed P.I. regulator.

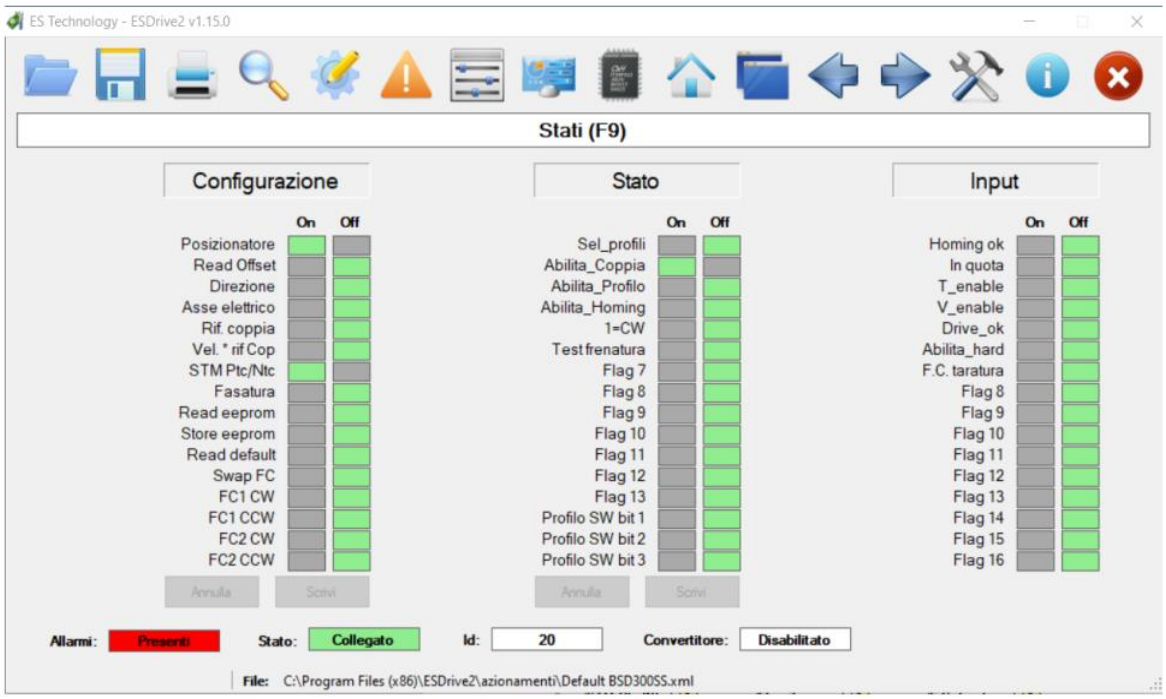
- Disable the converter.
- Change PARAMETER 15 "KP Velocità" (Proportional Gain).
- Change PARAMETER 16 "KI Velocità" (Integral gain).

- Enable the converter.
- Monitor the response in speed while running a profile.
- Save to EEProm if necessary.

ATTENTION**: Before turning off the converter you need to save the parameters on EEPROM otherwise the calibration process will have to be repeated.**

POSITIONER

The BSD 300 SS converter works in positioner mode. To achieve this type of operation you need to set to **1** the "**Positioner"** box located in the first column of the "States" page and then press the button. Write at the foot of the column.
To keep this operating mode active it is necessary, after setting the parameters, to save the configuration to EEPROM by setting the "**Store EEProm**" box to 1 located in the same column, press the Write button and wait for the "**Store Eeprom**" box to return to 0.



When the "**Positioner**" mode is selected, when the converter is switched on, the auxiliary digital input 2 is used as an end of stroke to search for the position of zero. The limit limit is considered reached when there are 0V for at least 100ms on the corresponding clamp.
No.B. Make sure that the bits in the configuration column for the Swap FC, FC1 CW, FC1 CCW, FC2 CW, FC2 CCW fields are all zero.

Hardware reset sequence.

To perform a homing procedure using a limit switch you must:

1. Enable the drive by bringing the clamp 3 (T.ENABLE) to +24V compared to the 6 0_EN clamp (Make sure that the second bit of the word "Status" is set to 1).

2. Set the fourth bit (Enable homing) of the word "Status" to 1.
3. At this point the motor starts to rotate at the speed and direction set to the parameter P12 Homing speed. At this stage it is assumed that the micro of zero is not reached and that therefore between clamp 5 (D_AUX2) and clamp 6 (0_EN) there are +24V.
4. When the micro of zero is reached (0V at terminal 5 (D_AUX2) for at least 100ms) the motor switches to the Reduced Homing Speed set in the parameter P13.
5. At the abandonment of the micro of zero (+24V at the terminal 5 (D_AUX2) for at least 100ms) the motor continues with the reduced homing speed until it reaches the zero notch of the encoder.
6. After reaching the zero notch the motor switches to the Zero Altitude Speed set to the P14 parameter
7. The number of revolutions and the fraction of revolution set respectively in the parameters P10 and P11 are made to reach zero altitude.
8. At the end of this sequence the bit "Enable homing" is returned to zero while the first bit of the word "Input" (Homing ok) is set to one.

Software reset sequence.

The hardware homing procedure can be replaced by a software operation that allows you to set the current position of the axis:

1. Define the current position by setting both the P50 parameter and the P51 parameter.
2. After this operation, the first bit of the word "Input" (Homing ok) is set to one.

NOTE: The first bit of the word "Input" (Homing ok) is reset in the following cases:

- Resolver lack alarm
- Alarm "End of the homing race"
- Running a new homing

Calibration of the position ring

The parameters P27 GAIN OUTSIDE and P26 GAIN INSIDE determine the accuracy of the converter respectively during the trajectory to reach the arrival altitude and after positioning. The higher the value set to the P27 parameter, the more accurately the path from zero to the arrival location is executed. A value that is too high causes an uneven rotation of the motor. The P26 parameter instead adjusts the gain of the position regulator when the motor has reached the position, the higher this value, the greater the precision with which the position is maintained. If this value is too high, the motor behaves as in the previous case (vibrations near the position).

Programming the positioning cycle

The positioning cycle involves the insertion of predefined profiles stored in EEPROM or sent to the converter from time to time via evening RS485. The positioner function has been designed using only absolute position **references** . Any future indication concerning arrival or departure quotas must therefore be understood as meaning.
Each profile is characterized by three parameters: speed, revolutions and angle. The speed parameter represents the speed of the motor (expressed in rpm) with which you want to travel the profile; the rpm and angle parameters instead are the rpm-engine and the angle-engine characterizing the arrival dimension of the profile. It is important to remember that the velocity and rpm quantities are expressed with their value while the angle parameter is instead expressed as a fraction of a turn and in hexadecimal notation. Reading or writing corners on the PC interface should be done by following the simple rules below:

- check that the display of the angle is in hexadecimal mode (it is the default mode and is distinguishable from the characters in *italics*), if you are not in hexadecimal mode just double-click with the mouse on the box where the name of the corner appears.
- With the formula **X(dec)=(65535*angle°)/360**, you find the value of the angle, in decimal format, which rounded down and transformed into hexadecimal provides the correct value of the angle to be introduced in the appropriate box.

The table below will list some angles already expressed in the hexadecimal format shown above.

Angle	0°	45°	90°	135°	180°	225°	270°	315°	360°
Fraction of turn	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1
Hex format.	**0000**	**1FFF**	**4000**	**5FFF**	**7FFF**	**9FFF**	**C000**	**DFFF**	**FFFF**

To make the application of this positioner flexible, two distinct modes of execution of stored profiles have been introduced. They can be used separately but also in combination with each other as will be explained later, they are:

1. RUNNING CONCATENATED PROFILES

2. RUNNING INDIVIDUAL PROFILES BY SOFTWARE SELECTION

1) Execution of concatenated profiles

The positioning cycle with concatenated profiles includes the execution of a maximum of eight individual profiles chosen from the fifteen available (from the first to the fifteenth). It is possible to repeat the same profile several times in the sequence, or, if the case requires it, set a sequence of less than eight in length.
Once the individual profiles have been programmed, to carry out the positioning cycle it is necessary to define in which succession you want them to be performed. The P54 and P55 parameters are used for this purpose. They are considered four-digit hexadecimal numbers, each hexadecimal digit corresponds to a profile to be realized; therefore, one will correspond to the first profile while to F the fifteenth.
For example, if the placement cycle consists of profiles 4, 10, 11, 2, 15, 1, 7, 13, the two parameters will have the following value:

P54 = 4AB2 hex
P55 = F17D hex.

To create a sequence of profiles less than eight in length, you must set the figure following the last profile you want to perform to 0. Any figures after 0 are not taken into account. For example, to stop the execution to the fifth profile of the previous list just put a zero instead of the sixth profile, any subsequent digits are not considered, it will turn out:

P54 = 4AB2 hex
P55 = F10* hex

Once a profile has been finished, the transition to the execution of the next one can take place automatically or it may be necessary to give a hardware enablement to continue the trajectory.
To select one of the two types of operation, the P56 parameter is used. It is organized in bits, as shown in the next figure.
When the bit relative to a profile is at 1 this profile is started automatically (software consent), if the bit is at 0 the execution of the profile begins only when the hardware consent is given.
The consent bit for the first profile is always considered 1 (software consent) regardless of the value set. The next figure shows the word consents and the references of the bits to the respective profiles.

P1		P2		P3		P4		P5		P6		P7		P8	
X	1	X	1/0	X	1/0	X	1/0	X	1/0	X	1/0	X	1/0	X	1/0

X bit riservato
1 consenso software
0 consenso hardware

No.B. If the sequence of profiles has a length of less than eight, that is, a 0 appears in the parameters P54 or P55, all the consent bits starting from the profile number to

which you must stop onwards must be placed at 1 for the correct management of the sequence.

Also in this case it is necessary to transform the string of consent bits into hexadecimal format. Binary-hexadecimal conversion is immediate if you group binary digits into groups of four and refer to the following table:

0000	0001	0010	0011	0100	0101	0110	0111
0	***1***	***2***	***3***	***4***	***5***	***6***	***7***

1000	1001	1010	1011	1100	1101	1110	1111
8	***9***	***A***	***B***	***C***	***D***	***And***	***F***

So if, for example, we want to run eight concatenated profiles and remove the consent to even profiles (2nd, 4th, 6th, 8th), the word *consent* will be of the type:

P1		P2		P3		P4		P5		P6		P7		P8	
1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0

Following the rules of the conversion table you get the following hexadecimal number:

1100	1100	1100	1100
C	**C**	**C**	**C**

For each profile, it is best to enforce the reserved bit (X) equal to the value set for the consent bit. So, the consensus at P1 was set to 1 1 that of P2 at 0 0.

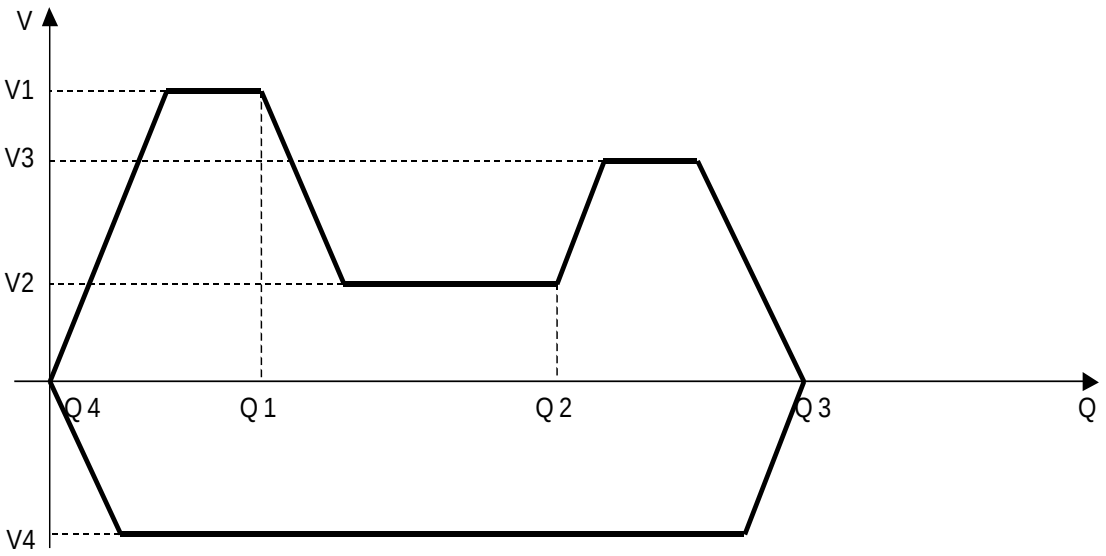
By placing the word *consents* at FFFF, the profiles are executed in a concatenated way, that is, the transition between the speed of the previous profile and that of the next is performed without going through the null speed. Any speed reversals or speeds set too high for the profile to be performed will be automatically reset by the positioner software, which keeps the achievement of the set dimensions as a priority. The software, during the execution, also takes into account the next profile to be performed and, if necessary, imposes the zero speed at the arrival of the current profile to ensure the arrival at the right altitude of the next. Any ***anomalous behavior*** of the positioning cycle will be attributable, therefore, to the incorrect setting of the parameters relating to the profiles and to the execution speeds.
The three parameters relating to each profile define its shape indicating the dimensions to be reached and the speeds of movement between one dimension and the next.
All dimensions are absolute (The value of the quota at the end of the homing procedure is equal to the value set in the parameters P50 and P51).

Assuming now that you want to run **four profiles concatenated with the last profile returning to the starting dimension**, for simplicity we will consider the profiles ranging from the 1st to the 4th.

No.B. For the positioner the parameters P45, P46, P47, P48 representing the acceleration and deceleration ramps must be set equal to each other. To indicate the acceleration or deceleration times we will refer to only one of the four parameters that is P45.

1) Start with zero speed and acceleration according to the ramp set in P45 until the V1 speed set in P57 is reached.
2) Reaching the altitude Q1 at constant speed V1. Q1 is expressed in number of revolutions (P58) and fractions of revolution (P59).
   N.B. if the set speed is too high it is automatically reduced.
3) Speed variation until speed is reached V2 (P60) following the set acceleration or deceleration ramps (P45).
4) Achievement of the Q2 altitude at constant speed V2. Q2 is expressed in number of revolutions (P61) and fractions of revolution (P62).
5) Speed variation until speed is reached V3 (P63) following the set acceleration or deceleration ramps.
6) Achievement of the Q3 quota. Having the next negative speed profile at altitude Q3 the positioner arrives at zero speed to ensure correct positioning. Q3 is expressed in number of revolutions (P64) and fractions of revolution (P65).
7) Start speed reversal to reach the starting altitude. Variation of speed, from zero speed, until reaching the speed V4 (P66) following the acceleration or deceleration ramps set (P45).
8) Rotation at constant speed V4 for a time dependent on the speed, ramps and altitude to be reached Q4.
9) Decrease of speed up to zero following the deceleration ramp P45 and simultaneous achievement of the Q4 altitude of arrival. Q4 is expressed in number of revolutions (P67) and fractions of revolution (P68).

The figure represents the execution of the four set profiles, it is good to remember that it is possible to reverse the speed at each profile by setting the dimensions appropriately.



Running the Placement Cycle

To start the positioning cycle, it is necessary to give the enabling command by bringing to +24V the terminals 2 and 3 of J3 (V_ENABLE and T_ENABLE) compared to the terminal 6 (0_EN). In this situation the engine remains stationary in pairs. To enable the execution of the profile you must give a front of ascent on the entrance D_AUX1 (Pin 4 of J3). The execution of the profile can also start through a software enablement by putting the bit "Enable profile" in the word "status" at 1.
When running a profile or during a homing operation, the switches between pins 7-8 and 9-10 of the J3 close to indicate the execution of the profile, and the second bit of the word "input" is set to 1 by the converter.

2) Execution of individual profiles by software selection

The seven stored profiles ranging from 17 to 23 can be managed individually via serial.

N.B. put the enablement at zero. hardware profiles bringing to 0V the Clamps 2 and 3 of J3.

To run a single profile in this mode it is necessary to introduce the profile number (in binary format of three bits) in the last three bits of the word state named respectively *flag16*, *flag15*, *flag14* and set to one also the third bit (Enable Profile) finally send the start through the *out* button located under the word status. The table below displays the bits reserved for selecting individual profiles in the status word. It should be remembered that the achievement of the altitude is performed by making a speed trapezoid, if the set altitude is lower than allowed the profile speed will be reduced automatically.

1	
2	
3	Enable Profile
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	Flag 14
15	Flag 15
16	Flag 16

In **Out**

Example: placing *flag16=1*, *flag15=0*, *flag14=0,* the binary number 100bin=4dec, the profile chosen is **16**+**4**=**20**, if you now set the bit Abilita_ Profile to one and give the ok with *out*: profile 21 will start and will go to Q21 at speed V21.
To run the seventeenth profile you will need to set the value *flag16=0*, *flag15=0*, *flag14=1,* the binary number 001bin=1dec, then **16**+**1**=**17**, as above to run the profile just set the bit of Enable Profile to one and send the start with *out*.

N.B: The software-enabled single profile feature is useful in case you want to use some particular profiles to perform zero return operations or game recovery.

Position acquisition via serial line

Using the RS485 serial line it is possible to read the position reached by the motor at the end of the positioning. To do this you need to use the parameters P52 and P53.
These two parameters enjoy a "Sample & Hold" function. To perform the acquisition correctly, therefore, it is necessary to:

1. First read the parameter P52 showing the position in laps.
2. After reading the parameter P52 you have to read the parameter P53 showing the fractions of revolution.

Reversing the direction of rotation

During commissioning it may be necessary to reverse, at the same set dimensions, the direction of rotation of the engine. To do this it is enough to set to 1 in fifth bit of the word "Status".

SERIAL COMMUNICATION PROTOCOL BSD 300 SS

Command strings

The bytes sent by the PC consist of one bit of start, 8 bit of data, one bit of parity and one bit of stop.
To begin communication with the converter the PC sends a byte containing the converter identifier at the rate of **9600 BAUD**. The parity bit of this byte must be set to 1. The maximum value for the identifier is 32.
After sending the byte with the identifier, at least 500us must elapse before the PC sends the actual command. During this period, the converter that recognizes its identifier prepares to capture the message.
The command sent later by the PC consists of 8 bytes having all the parity bits equal to 0. The sequence to be sent is as follows:

	NAME	DESCRIPTION
Byte	START	Report the beginning of the message, always worth 127 (7Fhex)
Byte	IDE	Repeats the converter identifier. The identifier varies between 1 and 32
Byte	ADR_L	Address of the data to be modified or read
Byte	ADR_H	Code of the command to be executed
Byte	DATA_L	Byte less significant than the value to be assigned to the data
Byte	DATA_H	Byte more significant than the value to be assigned to the data
Byte	CK_XOR	The control byte. It is equal to the XOR of the previous bytes
Byte	STOP	Report the end of the message, always worth 187 (BBhex)

ADR_H

The command codes (bytes ADR_H) are as follows:

CODE DEC.	TAILS FORMER.	DESCRIPTION
85	(55hex)	The converter ships all 32 parameters of the page ADR_L
102	(66hex)	The converter sends the address parameter ADR_L
170	(AAhex)	The converter sends the references and feedbacks
187	(BBhex)	The converter sends the reference or address feedback ADR_L
255	(FFhex)	Your PC imposes a value on the address parameter ADR_L
17	(11hex)	The PC imposes a value on the location reference
34	(22hex)	Your PC imposes a value on the speed reference
136	(88hex)	The converter sends 2 characters of address ADR_L
221	(DDhex)	Your PC imposes a value on the 2 characters of address ADR_L

ADR_L

The ADR_L byte indicates which parameter the ADR_H command should be applied to.
To access the single element using commands 102, 187, 255, 136 and 221 you must specify the address of that element in the ADR_L byte. The address is handled by the converter as an offset from the address of the first element of the vector, so if you want to change or read the first parameter ADR_L must be 0; to read the second parameter ADR_L will be 2, for the third it will be 4. In general, to access the *n parameter,* ADR_L must be *n**2-2.

All the quantities necessary for the operation of the converter are organized in vectors:

128	elements in the PARAMETERS vector
6	elements in the DATUMS vector
64	elements in the STRINGHE vector

The PARAMETER vector contains 128 16-bit integers whose meaning is given in the manual.
The REFERENCES vector contains in order:

n°	name	ADR_L
1	Current reference	0
2	Speed reference	2
3	Location reference	4
4	Current feedback	6
5	Speed feedback	8
6	Position feedback	10

The STRINGHE vector contains 64 16-bit integers. This data is exchanged between drive and PC as if they were numerical values and therefore follow the same rules valid for the VECTOR PARAMETERS and REFERENCES. At the level of the software interface supplied with the converter this data is considered 8-bit characters so that each element of the vector corresponds to 2 characters.
To access the *n* element of STRINGS ADR_L must be 2*n-2.

In the case of command **85** (the converter sends 32 parameters) ADR_L takes on a different meaning. Command **85** causes the converter to send a block of 32 PARAMETER elements from the converter to the PC. Depending on the value of ADR_L, the following items are sent:

ADR_L	PARAMETERS
0	1 – 32
2	33 – 64
4	65 – 96
6	97 – 128

Using command **170** (The converter sends all references and feedbacks), **17** (the PC imposes the location reference) and **34** (the PC imposes the speed reference) you do not need to specify ADR_L and this byte can be left at zero.

DATA_L / DATA_H
DATA_L and DATA_H contain the least significant and most significant bytes of the value to assign to the parameter selected by the particular command and index contained in ADR_H and ADR_L, respectively. When you send a read command these bytes can be left at zero. Transmitted and received numbers can vary between -32768 and 32767.

CK_XOR
CK_XOR is the exclusive OR among the previous bytes. It is calculated by running the XOR of the first 2, then the XOR between the result and the third byte, and so on until the byte DATA_H.

Response strings
The response string sent by the converter has the following structure:

NAME		DESCRIPTION
Byte	START	Report the beginning of the message, always worth 127 (7Fhex)
Byte	IDE	The identifier of the converter. The identifier varies between 1 and 32
Byte	ADR_L	Address of the data to be modified or shipped
Byte	ADR_H	Code of the executed command
Byte	DATA_L	Byte less significant than the value assigned to the data or sent to the PC
Byte	DATA_H	Byte more significant than the value assigned to the data or sent to the PC
Byte	ERR	Communication error reporting. Currently it is always 0
Byte	CK_XOR	The control byte. It is equal to the XOR of the previous bytes
Byte	STOP	Report the end of the message, always worth 187 (BBhex)

The first 4 bytes of the response string are always the same as those of the string sent from the PC.
If you have assigned a value to an element of PARAMETERS, VECTORS or STRINGS, this data is repeated in DATA_L and DATA_H.
If, on the other hand, a data reading operation has been performed, it is returned in DATA_L and DATA_H.
In the case of commands **85** (the converter sends all 32 parameters of the page ADR_L) and **170** (the converter sends the references and feedbacks) the sequence DATA_L and DATA_H is repeated as many times as there are the parameters sent.

Changing the identifier

The identifier of a drive is stored in element 38 of PARAMETERS and can therefore be changed using command **255**.

If you do not know the identifier of the converter to which to send the command, you must use the value 255 (FFhex) for the IDE byte. This particular IDE value is accepted by all drives; they execute the sent command without providing a response.

If you have multiple drives connected to a network you can use this property, for example, to assign all drives the same value for a certain parameter.

WARNING: When you change the identifier of a drive to 255 the IDE byte, only one drive must be connected otherwise all the others will assume the same identifier.

The information contained in this document may be modified without notice by ES-TECHNOLOGY S.R.L.

In the event of errors of any kind within this manual, please let us know in order to make the necessary changes, thus improving the service relationship of ES-TECHNOLOGY towards its customers.

ES TECHNOLOGY S.R.L.

VIA S. BOCCONCELLO N°13/15 - 36040 MELEDO DI SAREGO (VI)

PHONE NUMBER +39 0444821372 WEB: WWW.ES-TECHNOLOGY.COM
E-MAIL: INFO@ES-TECHNOLOGY.COM