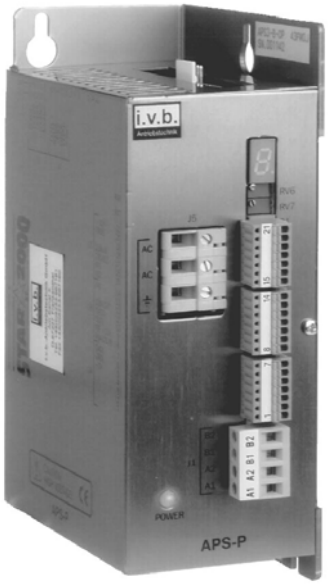
Manual for the APS with PROFIBUS - DP

ACP & D Limited



SCHRITTMOTOR ENDSTUFE

SERIES

STAR 2000

Version

APS x-B-PP

ver. 04/03

RELEASE: 77FW3I

Date: 12.10.2003

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INDEX:

1. TECHNICAL DATA

1.1 POWER SUPPLY/OUTPUT CURRENT

SIZE	APS1-P	APS2-P	APS3-P	APS4-P
Vac nom. [V]	From 28 to 56	From 28 to 56	From 28 to 56	From 57 to 100
Vac max. [V]	63	63	63	110
Vac min. [V]	22	22	22	53
I max. [A]	4	6	10	12
Transformer power [VA]	150	250	400	700

PARAMETERS DESCRIPTION

Vac nom.: Rated value of voltage by which the drive can be powered.

Vac max.: Maximum voltage at which the drive can operate. Over this limit, the protection of maximum voltage inhibits the drive.

Vac min.: Minimum voltage at which the drive can operate. Under this limit, the protection of minimum voltage inhibits the drive.

I max.: Maximum value of phase current.

Transformer power: Recommended transformer power

1.2 COMMUNICATION INTERFACE

Drives are supplied with PROFIBUS-DP communication interface.

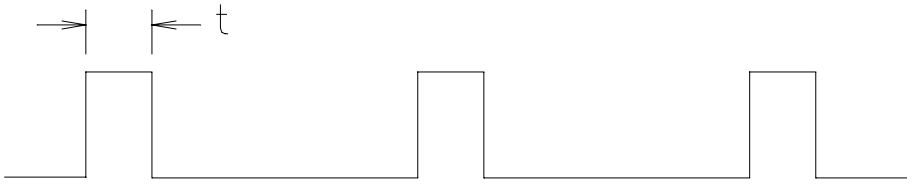
1.3 INPUTS AND OUTPUTS

Inputs are PNP or NPN, outputs are PNP open collector optoisolated (10mA max).

INPUTS FEATURES:

INPUT VOLTAGE	IN1 HIGH SPEED INPUT	IN2, IN3, ENABLE INPUTS
LOW LEVEL	From 0 V to 8 V	From 0 V to 2.5 V
HIGH LEVEL	From 11 V to 30 V	From 4.6 V to 30 V

INPUT SIGNALS:



HIGH SPEED INPUT : Max. frequency 50 KHz
Min. impulse width t=10 μsec

INPUTS : Max. frequency 5KHz
Min. impulse width t=100 μsec

OUTPUTS FEATURES:

OUTPUT VOLTAGE	Load 5mA	Load 10mA
OUT ON COM.OPTO-OUT=12V COM.OPTO-OUT=24V	 11.5 V 23.5 V	 11.2 V 23.2 V
OUT OFF	0 V	0 V

1.4 PROTECTIONS AND LEDS

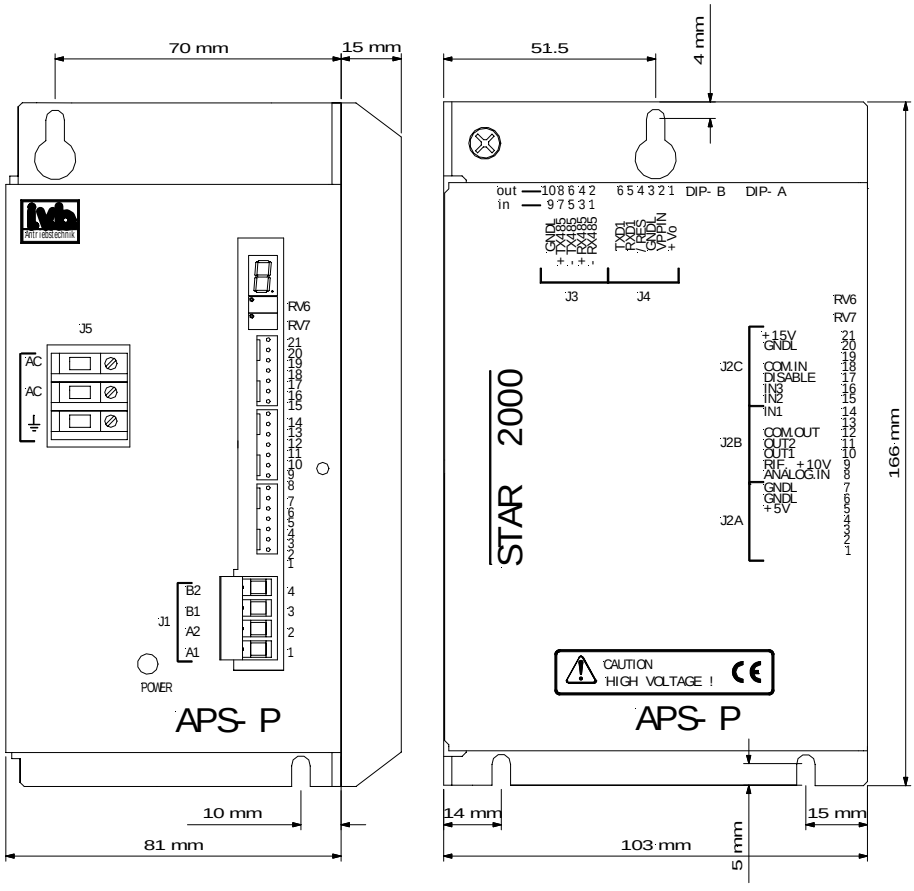
Drive is provided with protections against overtemperature, overvoltage, undervoltage, short-circuits among outputs and also among outputs and the positive power pole. If one of the mentioned conditions occurs, drive disables the power bridge and shows an error condition on the display.

'u' - Power supply volts out of correct limits
't' - Thermic protection event occurred
'c' - Overcurrent protection event occurred

If drive is ready, display shows the letter 'r' (ready).

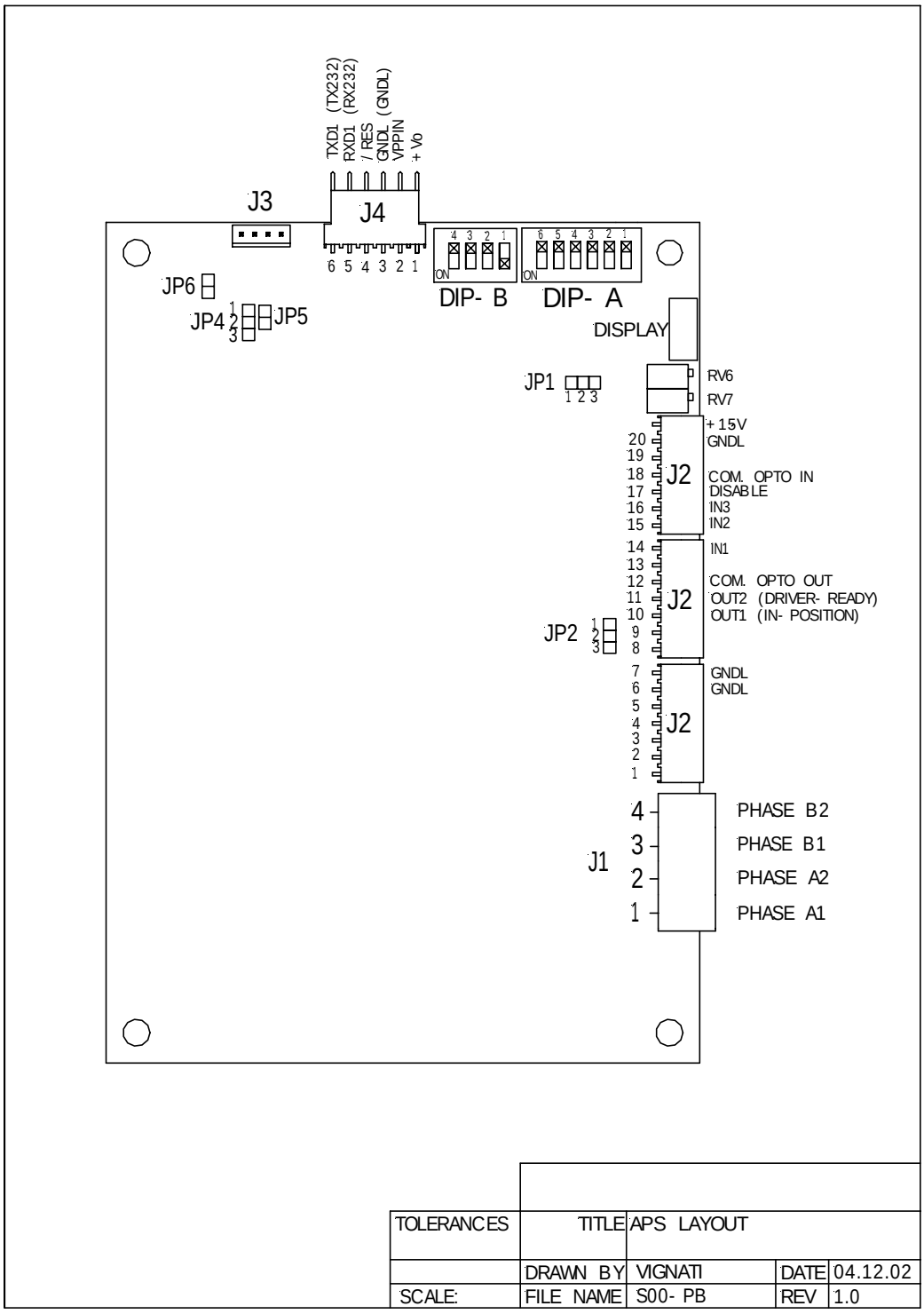
The leds on PCB2 (see pag.6) indicates PROFIBUS-DP status:
DL1 – Power on
DL4 – PROFIBUS-DP active
DL2, DL3 – Internal diagnostic. When PROFIBUS-DP is OK the leds are OFF

1.5 MECHANICAL DIMENSIONS



2. DRIVE CONNECTION

2.1 DRIVE LAYOUT PCB 1



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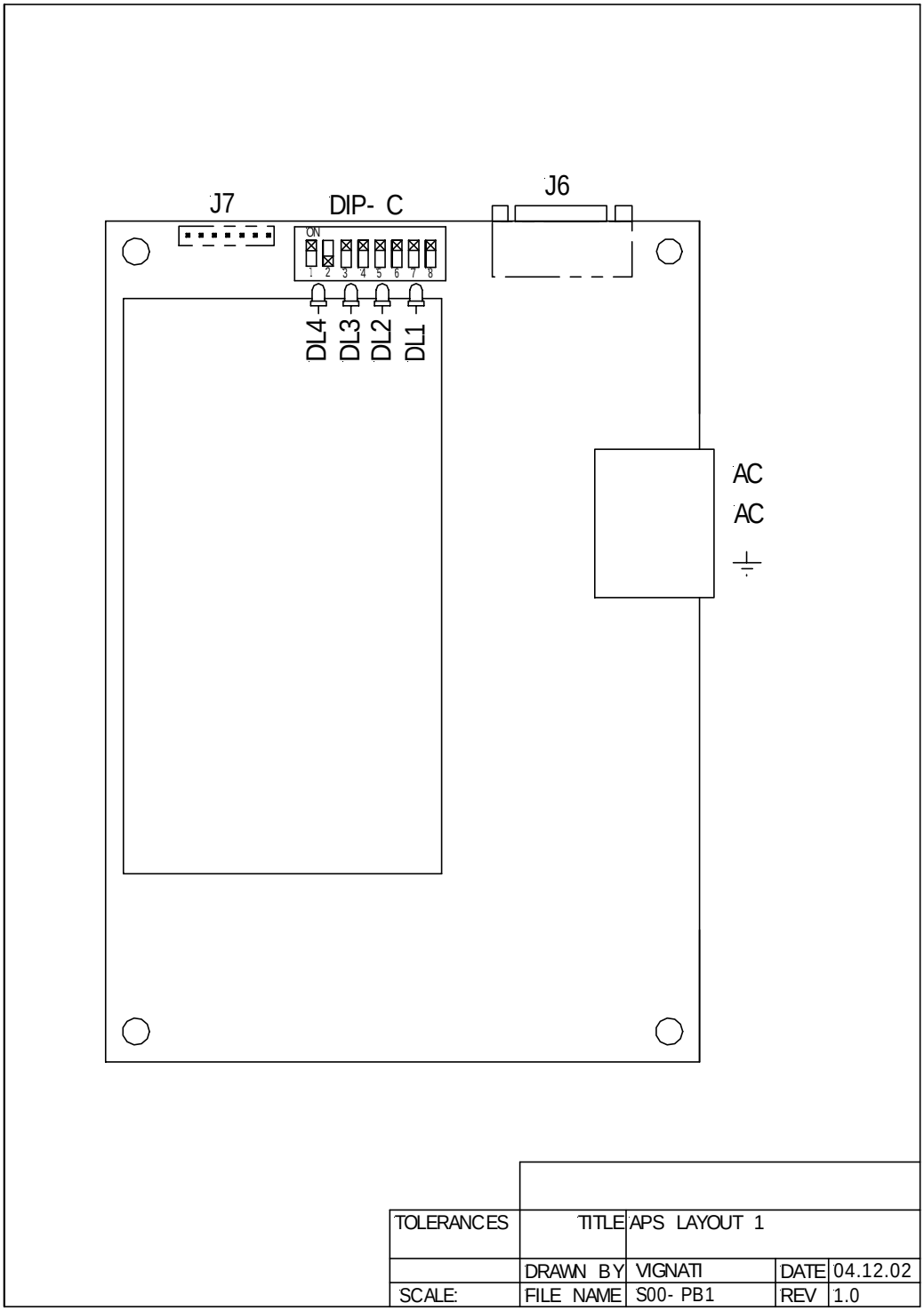
2.2 DRIVE LAYOUT PCB 2



2.3 INSTALLATION NOTES:

WARNING

DANGER OF ELECTRICAL SHOCK . ONLY QUALIFIED INDIVIDUALS SHOULD WORK ON THIS EQUIPMENT. DISCONNECT ALL POWER BEFORE WORKING ON EQUIPMENT. DANGEROUS VOLTAGES MAY EXIST AFTER POWER IS REMOVED! CHECK DC BUS VOLTAGE OF DRIVES EACH TIME POWER IS REMOVED BEFORE WORKING ON EQUIPMENT.

DRIVE CONNECTION

2.4 POWER SUPPLY:

CONNECTION	SIGNAL	FUNCTION
J5 - Pin AC	AC	VAC power supply (see technical data)
J5 - Pin AC	AC	VAC power supply
J5 - Pin ⏚	GND	Ground

2.5 MOTOR CONNECTION:

CONNECTION	SIGNAL	FUNCTION
J1 - Pin 3	PHASE A1	Phase A1 Step motor
J1 - Pin 4	PHASE A2	Phase A2 Step motor
J1 - Pin 5	PHASE B1	Phase B1 Step motor
J1 - Pin 6	PHASE B2	Phase B2 Step motor

2.6 INPUTS/OUTPUTS CONNECTIONS:

Regarding the use of the drive the pins of the connections have different meanings:

CONNECTION	SIGNAL	FUNCTION
J2C - Pin 21	+15V	+15V output
J2C - Pin 20	GNDL	Logic signals GND
J2C - Pin 19	Unassigned	
J2C - Pin 18	COM.IN	Common inputs optocouplers
J2C - Pin 17	DISABLE	DISABLE input
J2C - Pin 16	IN3	IN3, programmabile input
J2C - Pin 15	IN2	IN2, programmabile input
J2B - Pin 14	IN1	IN1, programmabile input
J2B - Pin 13	Unassigned	
J2B - Pin 12	COM.OUT	Common outputs optocouplers
J2B - Pin 11	OUT2	DRIVE-READY output
J2B - Pin 10	OUT1	IN-POSITION output
J2B - Pin 9	RIF. +10V	Unassigned
J2B - Pin 8	ANALOG.IN	Unassigned
J2A - Pin 7	GNDL	Logic signals GND
J2A - Pin 6	GNDL	Logic signals GND
J2A - Pin 5	+5V	Unassigned
J2A - Pin 4	Unassigned	
J2A - Pin 3	Unassigned	
J2A - Pin 2	Unassigned	
J2A - Pin 1	Unassigned	

2.7 INPUTS/OUTPUTS DIAGRAM

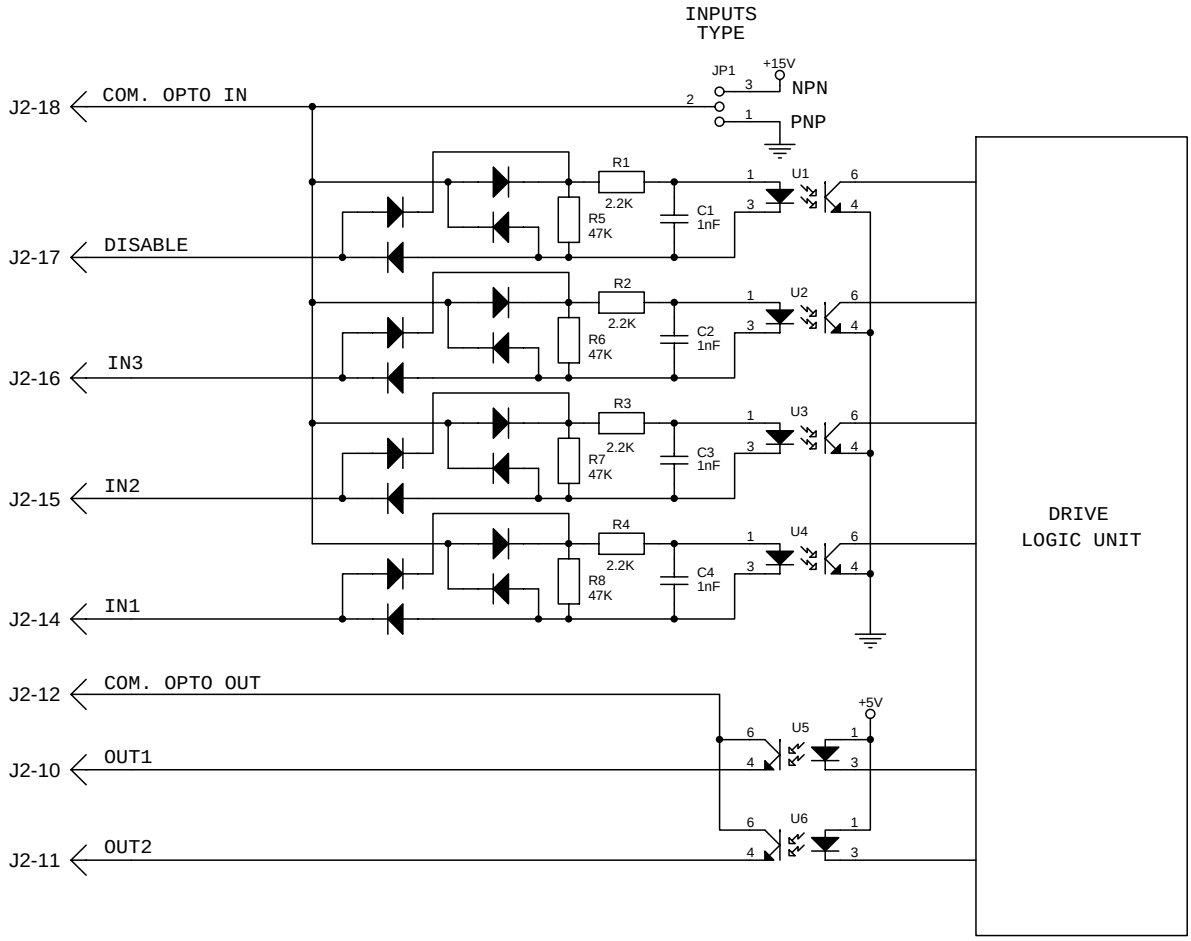


FIG.1

INPUT/OUTPUTS CONNECTION NOTES:

JP 1 - When inserted in 1-2 position, it associates the input common pole with GND of the drive (non-optoisolated PNP inputs)

JP 1 - When inserted in 2-3 position, it associates the input common pole with +15V of the drive (non-optoisolated NPN inputs)

JP 1 - When not inserted, it associates the input optoisolated. In this case, you must connect the GND of the external logic power supply to the connector J2 - pin 18 for PNP inputs, or the positive (+12VDC/+24VDC) of external logic power supply for NPN inputs.

Outputs are always optoisolated. Therefore, an external powering (from 12VDC to 24VDC) must be connected to the common pole of the optoisolators (Pin 12, conncector J2)

2.8 INPUTS/OUTPUTS FUNCTION

INPUTS:

SIGNAL	FUNCTION
IN1 (J2-14)	Programmable via serial PROFIBUS-DP command.
IN2 (J2-15)	Programmable via serial PROFIBUS-DP command.
IN3 (J2-16)	Programmable via serial PROFIBUS-DP command.
DISABLE (J2-17)	It disables the power bridge

OUTPUTS:

SIGNAL	FUNCTION
OUT 1 (J2-10)	IN-POSITION output: Motor is holding : OUT OFF (Low level) Motor running : OUT ON (High level) The levels shown are the default levels. They can be inverted through a serial command (see 0x2B)
OUT 2 (J2-11)	DRIVE-READY output: Drive in protection: OUT OFF (Low level) Drive ready : OUT ON (High level)

2.9 RS232 SERIAL INTERFACE:

J4 has two function as the follow way: One for RS232 connection and the other for firmware upgrade.
For firmware upgrade refer to “STAR 2000 UPGRADE MANUAL”.

LEAD	SIGNAL	FUNCTION
J4 – Pin 6	TXD1	RS232 TX signal
J4 – Pin 5	RXD1	RS232 RX signal
J4 – Pin 4	/RES	*RESET signal – ONLY FOR FIRMWARE UPGRADE*
J4 – Pin 3	GNDL	RS232 signals GND
J4 – Pin 2	VPPIN	*VPP input – ONLY FOR FIRMWARE UPGRADE*
J4 – Pin 1	+Vo	*Vo output – ONLY FOR FIRMWARE UPGRADE*

2.10 RS232 CONNECTIONS DIAGRAM:

Connectione diagram between STAR 2000 and RS232 standard connector.

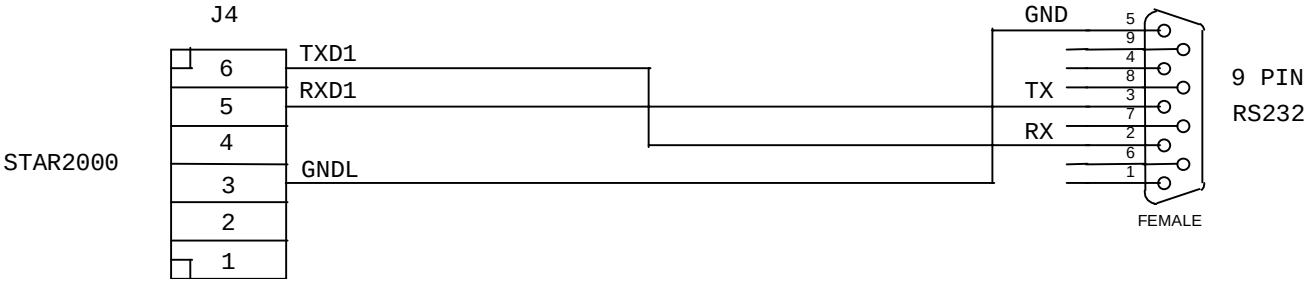


FIG.2

2.11 PROFIBUS-DP INTERFACE:

For PROFIBUS-DP interface use J5 connector

CONNECTION	SIGNAL	FUNCTION
J6 - Pin 9		
J6 - Pin 8	RxD/TxD-N	Receive/Transmit data N
J6 - Pin 7		
J6 - Pin 6	VP	Out +5V
J6 - Pin 5	DGND	Data ground
J6 - Pin 4		
J6 - Pin 3	RxD/TxD-P	Receive/Transmit data P
J6 - Pin 2		
J6 - Pin 1		

3. JUMPERS AND DIPS SETTINGS

JP 1 - When inserted in 1-2 position, it associates the input common pole with GND of the drive (non-optoisolated PNP inputs)

JP 1 - When inserted in 2-3 position, it associates the input common pole with +15V of the drive (non-optoisolated NPN inputs)

JP 1 - When not inserted, it associates the input optoisolated. In this case, you must connect the GND of the external logic power supply to the connector J2 - pin 18 for PNP inputs, or the positive (+12VDC/+24VDC) of external logic power supply for NPN inputs.

JP 2, JP 4 - unassigned

JP 5, JP 6 - unassigned

Factory configuration: JP1 inserted in 1-2 position; JP2 not inserted; JP4, JP5, JP6 not inserted;

DIP SWITCH A		
DIP	**ON**	**OFF**
6	Unassigned	Must be set to OFF position
5	Unassigned	Must be set to OFF position
4	Unassigned	Must be set to OFF position
3	Unassigned	Must be set to OFF position
2	Don’t stop motor on profibus fault	Stop motor on profibus fault
1	Send refresh bit	Dont’send refresh bit

DIP SWITCH B		
DIP	**ON**	**OFF**
4	Unassigned	Unassigned
3	Unassigned	Unassigned
2	Unassigned	Unassigned
1	Must be set to ON position	Unassigned

4. CURRENT REGULATION

For setting current proceed as follows:

- Set dip-switch B-4 to ON (current regulation mode).

- Turn RV6 trimmer until display shows the required current (CW to increase).

- Regulation field: from 1A to 10 A at steps of 0.5A for APS3/APS5 drive.
  Regulation field: from 1A to 12 A at steps of 0.5A for APS4 drive.
  Regulation field: from 1A to 6 A at steps of 0.5A for APS2 drive.
  Regulation field: from 0.4A to 4 A at steps of 0.2A for APS1 drive.

- Set dip-switch B-4 to OFF (Run mode).

Table for setting current values and relating values shown on the display of drive APS:

DISPLAYED VALUE	SETTING CURRENT APS 1	SETTING CURRENT APS 2	SETTING CURRENT APS4	SETTING CURRENT APS 3 / APS5
1	0.4 A	1.0 A	1.0 A	1.0 A
1.	0.6 A	1.5 A	1.5 A	1.5 A
2	0.8 A	2.0 A	2.0 A	2.0 A
2.	1.0 A	2.5 A	2.5 A	2.5 A
3	1.2 A	3.0 A	3.0 A	3.0 A
3.	1.4 A	3.5 A	3.5 A	3.5 A
4	1.6 A	4.0 A	4.0 A	4.0 A
4.	1.8 A	4.5 A	4.5 A	4.5 A
5	2.0 A	5.0 A	5.0 A	5.0 A
5.	2.2 A	5.5 A	5.5 A	5.5 A
6	2.4 A	6.0 A	6.0 A	6.0 A
6.	2.6 A	-	6.5 A	6.5 A
7	2.8 A	-	7.0A	7.0A
7.	3.0 A	-	7.5 A	7.5 A
8	3.2 A	-	8.0 A	8.0 A
8.	3.4 A	-	8.5 A	8.5 A
9	3.6 A	-	9.0 A	9.0 A
9.	3.8 A	-	9.5 A	9.5 A
0	4.0 A	-	10.0 A	10.0 A
0.	-	-	10.5 A	-
a	-	-	11.0 A	-
a.	-	-	11.5 A	-
b	-	-	12.0 A	-

NOTE: ADJUST CURRENT WHEN MOTOR IS HOLDING.

Motor current can be set by on board available RV6 trimmer, as described previous: besides this value can be changed through a PROFIBUS-DP command.

RV6 trimmer setting value is acquired by the processor at ‘power on’ or at current regulation setting.

Current setting through PROFIBUS-DP command will remain available only until drive will be unpowered or until current regulation will be set through the trimmer.

Therefore trimmer can be used for setting a default current at ‘power on’, subsequently current can be set to a different value through PROFIBUS-DP command.

5. PROFIBUS-DP ADDRESS SETTING

DRIVE IDENTIFICATION ADDRESS SETTINGS ON DIP-SWITCH C:

DIPC-7 (BIT7)	DIPC-6 (BIT6)	DIPC-5 (BIT5)	DIPC-4 (BIT4)	DIPC-3 (BIT3)	DIPC-2 (BIT2)	DIPC-1 (BIT1)	DIPC-0 (BIT0)	ADDRESS
OFF=128 ON=0	**OFF=64 ON=0**	**OFF=32 ON=0**	**OFF=16 ON=0**	**OFF=8 ON=0**	**OFF=4 ON=0**	**OFF=2 ON=0**	**OFF=1 ON=0**	Sum of bits value (from 1 to 255)

DRIVE IDENTIFICATION ADDRESS UP TO ADDRESS 31:

DIPC-7 (BIT7)	DIPC-6 (BIT6)	DIPC-5 (BIT5)	DIPC-4 (BIT4)	DIPC-3 (BIT3)	DIPC-2 (BIT2)	DIPC-1 (BIT1)	DIPC-0 (BIT0)	ADDRESS
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	0 (not set)
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	1
ON	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	**ON**	2
ON	**ON**	**ON**	**ON**	**ON**	**ON**	OFF	OFF	3
ON	**ON**	**ON**	**ON**	**ON**	OFF	**ON**	**ON**	4
ON	**ON**	**ON**	**ON**	**ON**	OFF	**ON**	OFF	5
ON	**ON**	**ON**	**ON**	**ON**	OFF	OFF	**ON**	6
ON	**ON**	**ON**	**ON**	**ON**	OFF	OFF	OFF	7
ON	**ON**	**ON**	**ON**	OFF	**ON**	**ON**	**ON**	8
ON	**ON**	**ON**	**ON**	OFF	**ON**	**ON**	OFF	9
ON	**ON**	**ON**	**ON**	OFF	**ON**	OFF	**ON**	10
ON	**ON**	**ON**	**ON**	OFF	**ON**	OFF	OFF	11
ON	**ON**	**ON**	**ON**	OFF	OFF	**ON**	**ON**	12
ON	**ON**	**ON**	**ON**	OFF	OFF	**ON**	OFF	13
ON	**ON**	**ON**	**ON**	OFF	OFF	OFF	**ON**	14
ON	**ON**	**ON**	**ON**	OFF	OFF	OFF	OFF	15
ON	**ON**	**ON**	OFF	**ON**	**ON**	**ON**	**ON**	16
ON	**ON**	**ON**	OFF	**ON**	**ON**	**ON**	OFF	17
ON	**ON**	**ON**	OFF	**ON**	**ON**	OFF	**ON**	18
ON	**ON**	**ON**	OFF	**ON**	**ON**	OFF	OFF	19
ON	**ON**	**ON**	OFF	**ON**	OFF	**ON**	**ON**	20
ON	**ON**	**ON**	OFF	**ON**	OFF	**ON**	OFF	21
ON	**ON**	**ON**	OFF	**ON**	OFF	OFF	**ON**	22
ON	**ON**	**ON**	OFF	**ON**	OFF	OFF	OFF	23
ON	**ON**	**ON**	OFF	OFF	**ON**	**ON**	**ON**	24
ON	**ON**	**ON**	OFF	OFF	**ON**	**ON**	OFF	25
ON	**ON**	**ON**	OFF	OFF	**ON**	OFF	**ON**	26
ON	**ON**	**ON**	OFF	OFF	**ON**	OFF	OFF	27
ON	**ON**	**ON**	OFF	OFF	OFF	**ON**	**ON**	28
ON	**ON**	**ON**	OFF	OFF	OFF	**ON**	OFF	29
ON	**ON**	**ON**	OFF	OFF	OFF	OFF	**ON**	30
ON	**ON**	**ON**	OFF	OFF	OFF	OFF	OFF	31

NOTE: If several drives are connected on PROFIBUS-DP line, make sure that all drives have a different address.

5.1 SETTING ON THE PROFIBUS-DP MASTER

Use the device master file SHS_02.GSD to configure your communication software on the master.

5.2 DATA COMMUNICATION VIA PROFIBUS-DP

PROFIBUS-DP structure:

Protocol frame (Header)	User data Parameter (PKW) - Process data (PZD)	Protocol frame (trailer)

User data structure from MASTER to SLAVE (APS drive):

PKW				**PZD**	
PKE	**IND**	**PWE**		**STW**	**HSW**
1st word	**2nd word**	**3rd word**	**4th word**	**1st word**	**2nd word**

PKW: Parameter identifier value
PZD: Process data

PKE: Parameter idetifier
IND: Index (not used. Set to 0)
PWE: Parameter value

STW: Control word 1 (see pag.16)
HSW: Main setpoint (not used. Set to 0)

Parameter Identifier (PKE) (1st Word):

The parameter identifier (PKE) is always a 16-bit value.
Bits 0 to 10 contain the number of the desired parameter (PNU). Refer to the parameter listing (Chapter 5.4)
Bits 12 to 15 contain the task or reply identifier (AK).

PKE		
Bit 15…12	Bit 11	Bit 10…0
AK	**Not used**	**PNU**

AK: Task or reply identifier
PNU: Parameter number

AK VALUE	**MEANING**
0	No task
1	Request parameter value
2	Change parameter value

User data structure from SLAVE (APS drive) to MASTER:

PKW				PZD	
PKE	**IND**	**PWE**		**ZSW**	**HIW**
1st word	**2nd word**	**3rd word**	**4th word**	**1st word**	**2nd word**

PKW: Parameter identifier value
PZD: Process data

PKE: Parameter idetifier
IND: Index (not used)
PWE: Parameter value

ZSW: Status word (see pag.16)
HIW: Main actual value (not used)

Parameter Identifier (PKE) (1st Word):

The parameter identifier (PKE) is always a 16-bit value.
Bits 0 to 10 contain the number of the desired parameter (PNU). Refer to the parameter listing (Chapter 5.4)
Bits 12 to 15 contain the task or reply identifier (AK).

PKE		
Bit 15…12	Bit 11	Bit 10…0
AK	**Not used**	**PNU**

AK: Task or reply identifier
PNU: Parameter number

AK VALUE	MEANING
0	No task
2	Transmit parameter value
7	Task not executable (with error number on word 4)

ERROR (WORD 4)	MEANING
0	No task
1	Parameter value cannot be changed

5.3 PROFIBUS-DP CONTROL BITS

BITS STW – MASTER → SLAVE

BIT	VALUE	FUNCTION	REMARKS
0	1 - ON 0 - OFF	ON - Start RELATIVE positioning OFF - Stop RELATIVE positioning	This bit is ignored when absolute positioning or JOG function is active
1	1 - ON 0 - OFF	ON - Start ABSOLUTE positioning OFF - Stop ABSOLUTE positioning	This bit is ignored when relative positioning or JOG function is active
2			
3	1 - ON 0 - OFF	ON - Drive enable OFF - Drive disable (motor current=0)	To execute every postitioning command this bit must be set to 1
4			
5			
6			
7			
8	1 - ON 0 - OFF	ON - START Jog cw (infinite motion) OFF - Stop	This bit is ignored when relative/absolute positioning or JOGCCW function is active
9	1 - ON 0 - OFF	ON - START Jog ccw (infinite motion) OFF - Stop	This bit is ignored when relative/absolute positioning or JOGCW function is active
10			
11			
12	1 - ON 0 - OFF	ON - Enable outputs force OFF - Disable outputs set (Standard function on outputs)	This bit disable standard outputs functions and permit to force outputs through bits 13 and 14 of this word (STW)
13	1 - ON 0 - OFF	ON - Set OUT1 OFF – Reset OUT1	Set/reset OUT1. To use this function bit 12 must be set to 1
14	1 - ON 0 - OFF	ON - Set OUT2 OFF – Reset OUT2	Set/reset OUT2. To use this function bit 12 must be set to 1
15		Refresh Bit	

BITS ZSW – SLAVE → MASTER

BIT	VALUE	FUNCTION	REMARKS
0	1 - ON 0 - OFF	ON - Drive ready OFF - Drive fault or disable	
1	1 - ON 0 - OFF	ON - Motor running OFF - Motor stop	
2	1 - ON 0 - OFF	ON - Drive disable OFF - Drive enable	
3	1 - ON 0 - OFF	ON - Protection active OFF - Protection not active	
4	1 - ON 0 - OFF	ON - IN1 active OFF - IN1 not active	
5	1 - ON 0 - OFF	ON - IN2 active OFF - IN2 not active	
6	1 - ON 0 - OFF	ON - IN3 active OFF - IN3 not active	
7	1 - ON 0 - OFF	ON - OUT1 active OFF - OUT1 not active	
8	1 - ON 0 - OFF	ON - OUT2 active OFF - OUT2 not active	
9	1 - ON 0 - OFF	ON - Rotation CW OFF - Rotation CCW	
10	1 - ON 0 - OFF	ON - Maximum frequency reached OFF - Maximum frequency not reached	
11	1 - ON 0 - OFF	ON - Positioning completely executed OFF - Positioning not completely executed	
12	1 - ON 0 - OFF	ON - Axis zeroing executed OFF - Axis zeroing not executed	
13	1 - ON 0 - OFF	ON - EXTRA-SWITCH reached OFF - EXTRA-SWITCH not reached	
14			
15		Refresh bit	

5.4 PARAMETERS

PNU	FUNCTION	PARAMETER
0	**Setting of minimum frequency** Motor rotation start frequency	From 1 to 10000 Hz
1	**Setting of maximum frequency** Motor rotation working frequency	From 1 to 20000 Hz
2	**Setting of ramp inclination** If motor is running, this parameter will be acquired to the next motion command.	From 1 to 255 expressed in ms * 10
3	**Setting of motor resolution** If motor is running, this parameter will be acquired to the next motion command.	If the sent = 128 → full step mode = 64 → 1/2 step mode = 32 → 1/4 step mode = 16 → 1/8 step mode = 8 → 1/16 step mode
4	**Mode setting of electric current reduction** Set % or current reduction when motor is stopped	If the sent = 0 → current = 0 (max reduction) = 1 → no reduction = 2 → reduction to 25% = 3 → reduction to 50%
5	**Time setting of electric current reduction** Time after which current reduction (from 0 to 255) must occur on a time basis of 32 ms	From 0 to 255
6	**Current setting** Set motor current	From 0 to 10000 mA
7	**Setting of relative quote** Indicate the relative positioning with respect to the present position of the motor to be carried out at the next START (with control bit) or TRIGGER START expressed in 1/128 step	From -2147483647 to 2147483647
8	**Setting of absolute quote** Indicate the absolute positioning with respect to home position to be carried out at the next START (with control bit) or TRIGGER START expressed in 1/128 step	From -2147483647 to 2147483647
9	**Setting of home position** Drive associates the entered value to home position of the motor	From -2147483647 to 2147483647
10	**Present position** Position register, you can read or write this value. (expressed in 1/128 step)	From -2147483647 to 2147483647
11	**Present frequency** Motor rotation frequency	READ ONLY REGISTER
12	**Final position** Motor destionation quote	READ ONLY REGISTER

PNU	FUNCTION	PARAMETER
13	**Trigger start (logic AND)** It defines the Input or the inputs and the respective Levels, which must be enabled for carrying out the START by an external command.	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for START (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
14	**Trigger stop (logic AND)** It defines the Input or the inputs and the respective Levels, which must be enabled for carrying out the STOP by an external command.	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for STOP (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
15	**Trigger stop (logic OR)** It defines the Input or the inputs and the respective Levels, which must be enabled for carrying out the STOP by an external command.	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for STOP (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
16	**Trigger home (logic AND)** It defines the Input or the inputs and the respective Levels, which must be enabled for carrying out the HOME by an external command.	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for HOME (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
17	**Trigger zerofly (logic AND)** It defines the input or the inputs and the respective levels, which must be enabled for carrying out zeroing of the value in the present motor position, when this condition occurs, and the value to be done on occasion of this condition. You must be set also ZEROFLY QUOTE (parameter 21) and/or MASK ZEROFLY QUOTE (parameter 20)	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for ZERO AT FLIGHT (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
18	**Axis zeroing** It defines the input and relative level where zero switch will be connected and it carries out axis zeroing. The zeroing phase includes: CCW motor start; the search of zero switch with rotation at max speed; stop on zero switch; disengagement of zero switch at min. speed and zeroing of absolute position.	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for AXIS ZEROING (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)
19	**Limit switch** It defines the input and the relative level where the limit switch will be connected. When the switch will be intercepted, it will cause the immediate motor stop and it allow only the opposite wise motion. The command activates this function until its disengagement through a new command with no specified input (Parameter=0).	Use only less significant byte: The 4 less significant bits indicate the input or the inputs, which must be enabled for LIMIT SWITCH (1= enabled input). The next 4 bits indicate the level of these inputs (1=input active at high level)

PNU	FUNCTION	PARAMETER
20	**Mask zerofly quote** Indicate the mask positioning to be done in the same rotation direction to enable zerofly trigger	From 0 to 2147483647
21	**Zerofly quote** Indicate the positioning to be done in the same rotation direction since when the condition expressed on the trigger zerofly byte	From 0 to 2147483647
22	**Low noise mode**	If the sent = 2 → enable = 0 → disable
23	**Protection type**	If read = 0 → drive ready = 1 → power supply out of range = 2 → thermal protection = 3 → short circuit

6. GSD FILE

```
;* ========================================================================== *
;* File:   SHS_02.gsd                                                         *
;* Function:       SHS Profibus I/F for stepper motor                         *
;*                 12 Byte input data; 12 Byte output data                    *
;*                                                                            *
;* -------------------------------------------------------------------------- *
;* author: MG                      date: 20/03/02                             *
;* rev.:   1.0                                                                *
;* -------------------------------------------------------------------------- *
;*                                                                            *
;* history                                                                    *
;* ========================================================================== *
;* 20/03/02        created                                                    *
;*                                                                            *
;* -------------------------------------------------------------------------- *
;*                                                                            *
;****************************************************************************
;
;
#Profibus_DP
;
;
; <Unit-Definition-List>
GSD_Revision = 1
Vendor_Name = "SHS"
Model_Name = "APSP"
Revision = "1.0"
Ident_Number = 0xaffd
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = "1.00"
Software_Release = "1.00"
;
9.6_supp = 1
19.2_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 450
MaxTsdr_12M = 800
;
Redundancy = 0
Repeater_Ctrl_Sig = 2
24V_Pins = 0
Implementation_Type = "VPC3"
;
Unit_Diag_Bit(0)= "Error: Parameter Data Length"
```

```
Unit_Diag_Bit(1)= "Error: Parameter Data Entry"
Unit_Diag_Bit(2)= "Error: Configuration Data Length"
Unit_Diag_Bit(3)= "Error: Configuration Data Entry"
;
Freeze_Mode_supp = 1
Sync_Mode_supp = 1
Auto_Baud_supp = 1
Set_Slave_Add_supp = 0
Min_Slave_Intervall = 10
Modular_Station = 0
Max_Module = 1
Max_Input_Len = 12
Max_Output_Len = 12
Max_Data_Len = 24
Fail_Safe = 1
;
Max_Diag_Data_Len = 16
Modul_Offset = 0
Slave_Family=1@SHS
;
; <Parameter-Definition-List>
User_Prm_Data_Len = 5
User_Prm_Data = 0x00,0x01,0x02,0x03,0x04
Ext_User_Prm_Data_Const(0)=0x00,0x01,0x02,0x03,0x04
;
; <Module-Definition-List>
Module = "12 byte in / 12 byte out" 0x1B,0x2B
EndModule
```