

# User Guide

STEPPING MOTOR DRIVE

Series

# HT7

Models

# PROFINET

HT7\_PROFINET\_rev8\_eng





## Safety notes

**The SHS automation products should be handled, installed and maintained by qualified personnel trained on installation of automation components, and only for the purposes described in the user manual. Installers must pay particular attention to the potential risks caused by mechanical and electrical equipment.**

It is very important that applications and installations meet all applicable safety requirements.

Each installer has an obligation to take responsibility to verify their knowledge and understanding of all applicable safety standards.

**Any use which does not meet the safety requirements can damage equipment and injure the user. SHS s.r.l. does not consider itself responsible for, and assumes no liability for damage caused by handling products and / or improperly installed, or in cases where the customer has allowed, or executed, modifications and / or repairs not authorized by SHS s.r.l.**

The SHS drives are devices for automation high performance capable of generating rapid movements and high forces.

Pay high attention, especially during installation and application development.

Only use equipment properly sized for the application..

The SHS devices are considered components for automation and are sold as finished products to be installed only by qualified personnel and in accordance with all local safety regulations.

The technicians must be able to recognize possible dangers that may result from programming, by changing parameter values and generally by the mechanical, electrical and electronic.

SHS s.r.l. recommends to always follow basic safety rules. Failure to heed them can result in injury to persons and / or property.

### *General precautions:*

This manual is subject to change due to product improvement, specification changes or improvements of the manual

SHS s.r.l. is not responsible for damage to property and / or persons caused by faulty installation and / or unauthorized modifications of the product.



*The damaged drive systems must not be installed or put into operation in order to avoid injury persons and damage to property. Changes or modifications made to the drive systems is prohibited and It involves the extinction of any right to warranty or of any obligation of responsibility.*

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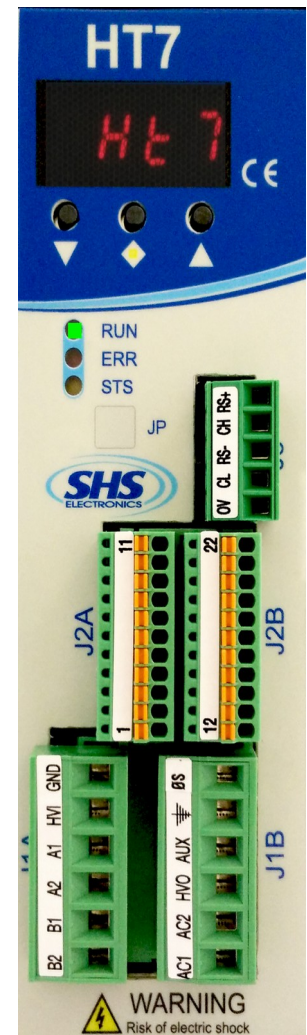
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# 1. TECHNICAL DATA

## 1.1 Power supply / Motor connector

J1A ( Left )	
SIGNAL	FUNCTION
B2	Phase B2 of the motor
B1	Phase B1 of the motor
A2	Phase A2 of the motor
A1	Phase A1 of the motor
HVI	Power supply input DC (connect to HV0 or use as input DC power)
GND	0V power supply

J1B ( Right )	
SIGNAL	FUNCTION
AC1	Power supply Vac
AC2	Power supply Vac
HV0	Rectified output
AUX	Logic power supply input 24Vdc
SHIELD	Shield
0S	0V power supply Aux



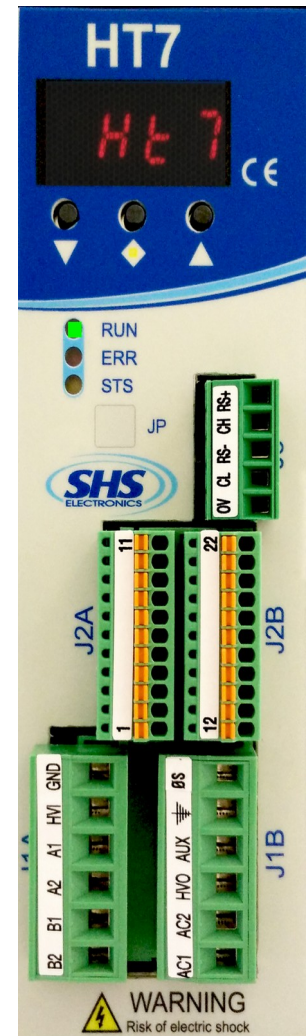
## 1.2 FIELDBUS Connector

J3	SIGNAL	FUNCTION
1	0V	Used only upgrade firmware
2	CL (CANL)	
3	RS- (RS485-)	
4	CH (CANH)	
5	RS+ (RS485+)	

## 1.3 Input / Output Connectors

J2A (Left)	SIGNAL	FUNCTION
1	ENC_AH	Encoder A+
2	ENC_AL	Encoder A-
3	ENC_BH	Encoder B+
4	ENC_BL	Encoder B-
5	ENC_ZH	Encoder Z+
6	ENC_ZL	Encoder Z-
7	ENC_COM	Encoder common (don't se in differential mode)
8	ENA/DIS	Input ENABLE/DISABLE
9	IN3	Input IN3 – (CURRENT REDUCTION)
10	IN2	Input IN2 - (DIRECTION)
11	IN1	Input IN1 – (STEP IN)

J2B (Right)	SIGNAL	FUNCTION
12	OUT_COM	Output common (OUT1, OUT2, OUT3)
13	OUT1	Output OUT1 - (default motor run)
14	OUT2	Output OUT2 - (default Drive Ready)
15	OUT3	Output OUT3 - (default unused)
16	IN_COM	Input common (IN1, IN2, IN3, ENA/DIS)
17	AN_IN0	Analog Input IN0
18	AN_IN1	Analog Input IN1
19	AN_IN2	Analog Input IN2
20	AN_OUT	Analog Output
21	GND_SIGNAL	0V (relative at EXT_12V, AN_IN, AN_OUT)
22	EXT_12V	Output +12V (relative at GND_SIGNAL)



## 1.4 DIP SWITCH

DIP1	ON	OFF
1	Insert termination CAN	Not used
2	Insert termination RS485	Not used
3	Not used	Not used
4	Input function En / Dis = ENABLE	Input function En / Dis = DISABLE



Only HT7xx PN, EC, EI model is supplied of double RJ45 interface ( upper pictures ).  
The RJ45 connections can be used interchangeably in PN and EI model.

Phisical Features	Connection Type	Cable / Transmission type	Speed	Max Cable Lenght
Electrical	RJ45 Connector	100base-TX Shield cable CAT5 IEEE 802.3	100Mbit/s full duplex	100 mt

## 1.5 Status LEDS

LED	FUNCTION	
RUN	Drive OK	Light ON
	Drive Error	Light OFF
ERR	Drive Error	Light OFF
	Drive OK	Light ON
STS	Drive OK	Light fast blinking
	Drive Error	Light slow blinking



## 1.6 Protection / Display messages



DISPLAY	DESCRIPTION
rdY	Drive OK at STOP motor
run	Motor in movement
dis	Drive DISABLE
ocur	Overcurrent Error
tenP	Overtemperature Error
uuoL	Undervoltage Error
ouoL	Overvoltage Error
rSt	Reset phase
Onet	No connected

Drive is provided with protections against overtemperature, overvoltage, undervoltage, short-circuits among outputs and among outputs and the positive power pole, no-phase motor connection.

If one of the mentioned conditions occurs, drive disables the power bridge and shows an error condition on the display.

To restore overcurrent protection you must restart the unit.

The decimal point to the left indicates the status RX, while the one on the right indicates the status of the communication interface TX.



## 1.7 Parameters setting

By using the buttons below the display (hereinafter referred to as [V], [◁], [^]) you can parameterize the drive:

To access to main menù, press [V] + [◁], it will visualized “ **menu** ” for 1 sec, after the parameter “ **p001** ”

From the main menu to select the parameter to be changed press the button [V] or [^].

From main menù to visualize the actual value of parameter press [◁].

From the parameter to change the value press [V] or [^]

From the parameter to store the value press the button [◁] for 1 sec and it will appear “ **memo** ”

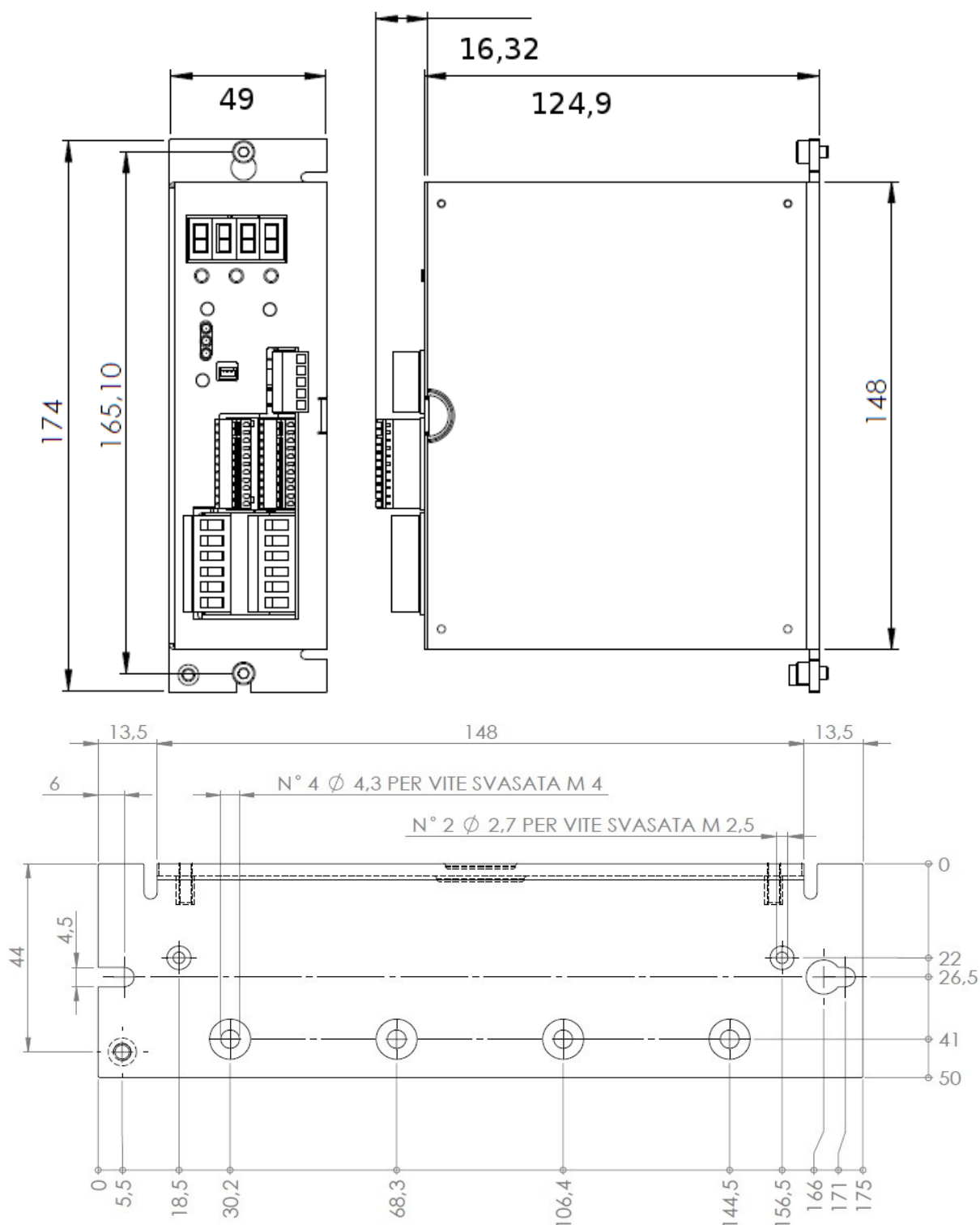
From the parameter to come back at main menù without modify any conditions, press [◁] less than 1 sec (don't will appear “ **memo**”).

From the main menù to go out press [◁] + [^].

PARAMETER	FUNCTION
p001	Opac: when this parameter is stored, all parameters will be set to default value and it will appear “rst” then restart the driver
p003	Current setting [A]
p006	Setting step resolution ( 1/2, ..., 1/20 )
p007	Setting stand-by current ( 0, 25, 50, 100% )
p008	Setting parameter resonance1 reduction ( fd0, ..., fd4 )
p009	Setting parameter resonance2 reduction ( small, big )
p010	Setting wave mode ( wav0, wav1 )
p011	Setting to operate high frequency
p013	Setting toggle bit ( 0 - 1 )
p014	Enable refresh for the last polled parameter
p015	Enable refresh status word
p016	Motor Stopped when the driver communication fault



## 1.8 Mechanical dimension



MODEL HT7 xx-	WEIGHT [ gr ]
WS-MB-CO-PB	655
PN-EC-EI	720

## 2. CONNECTIONS

### 2.1 INSTALLATION NOTES



#### **DANGER OF ELECTRICAL SHOCK**

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

### 2.2 AC Power Supply

The transformer power is  $P = Vac * (Inf(tot) + 1)$

Where  $P$  is VA power,  $Vac$  is secondary voltage in Volts and  $Inf(tot)$  is the sum of all nominal currents set in all the drive to be supplied.

**NOTE:** use a transformer with an isolated secondary, don't connect the secondary at ground.

	Unit	HT710	HT720	HT730	HT740
<b>Vac nom</b>	[V]	From 18 to 60	From 18 to 60	From 18 to 60	From 18 to 90
<b>Vac max</b>	[V]	75	75	75	110
<b>Vac min</b>	[V]	15	15	15	15
<b>I max</b>	[A]	4	7	12	12
<b>I min</b>	[A]	1	1	1	1
<b>Operation Temperature</b>	[°C]	0 - 45	0 - 45	0 - 45	0 - 45
<b>Vdc aux</b>	[V]	24	24	24	24

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

**Vac max**: Operative Maximum voltage. Over this limit, the protection of maximum voltage inhibits the drive.

**Vac min**: Operative Minimum voltage. Under this limit, the protection of minimum voltage inhibits the drive.

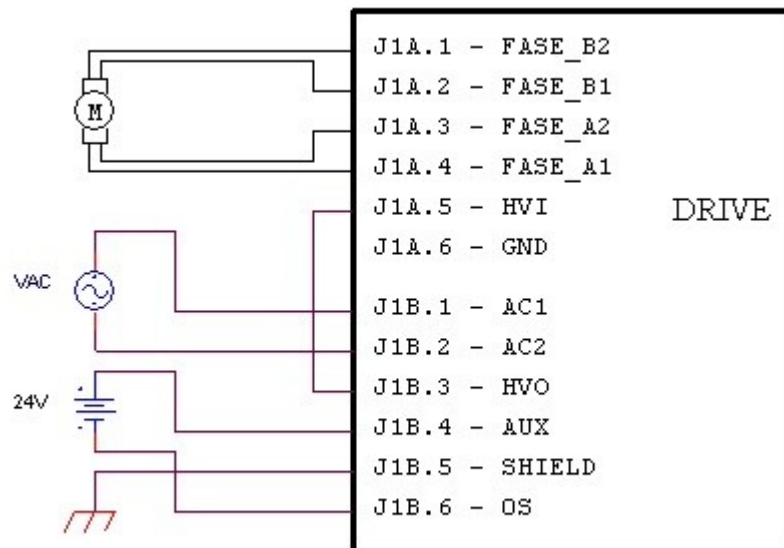
**I max**: Maximum value of phase current.

**I min**: Minimum value of phase current.

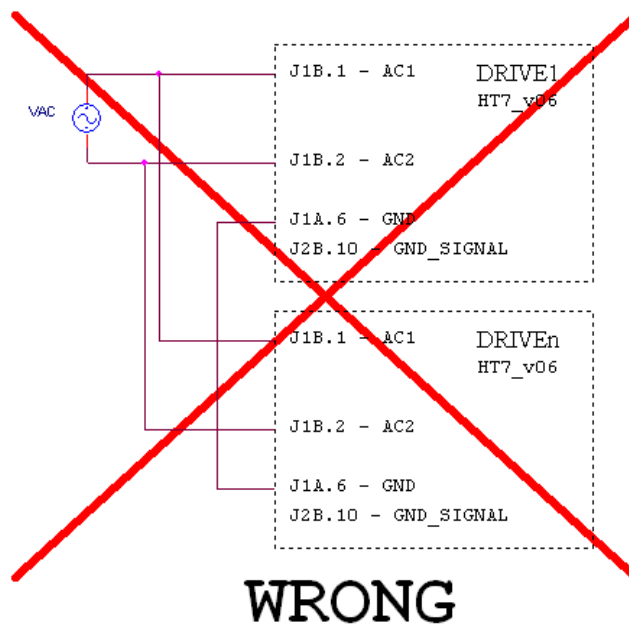
**Operating temperature**: For any temperature over 45°C and any current over 6A a forced ventilation is necessary.

**Vdc aux**: Logic power supply.

## WIRING DIAGRAM:



In AC power mode do not connect GND signals between two or more HT7 drives:



## 2.3 DC POWER SUPPLY

	Unit	HT710	HT720	HT730	HT740
<b>Vac nom</b>	[V]	From 24 to 90	From 24 to 90	From 24 to 90	From 24 to 125
<b>Vac max</b>	[V]	110	110	110	160
<b>Vac min</b>	[V]	20	20	20	20
<b>I max</b>	[A]	4	7	12	12
<b>I min</b>	[A]	1	1	1	1
<b>Operation Temperature</b>	[°C]	0 - 45	0 - 45	0 - 45	0 - 45
<b>Vdc aux</b>	[V]	24	24	24	24

**Vdc nom** : Range value of voltage by which the drive can be powered.

**Vdc max**: Operating Maximum voltage. Over this limit, the protection of maximum voltage inhibits the drive.

**Vdc min**: Operating Minimum voltage. Under this limit, the protection of minimum voltage inhibits the drive.

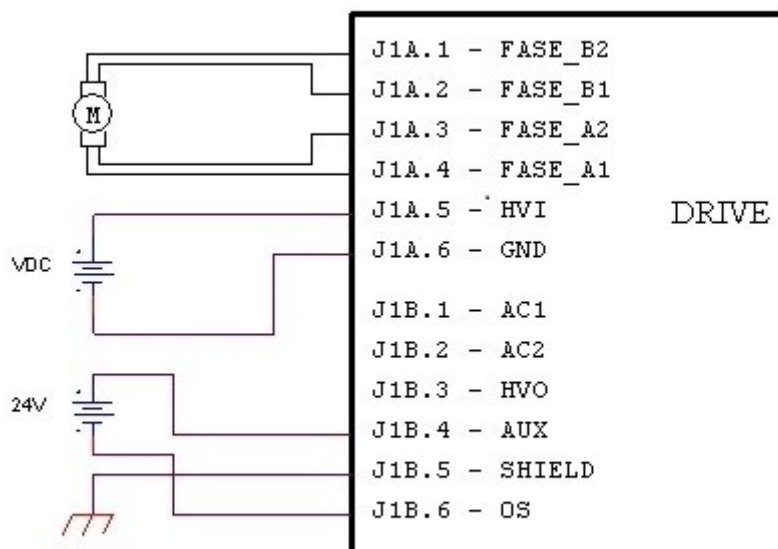
**I max**: Maximum value of phase current.

**I min**: Minimum value of phase current.

**Operating temperature**: For any temperature over 45°C and any current over 6A a forced ventilation is necessary.

**Vdc aux**: Logic power supply.

### WIRING DIAGRAM:



## 2.4 Inputs / Outputs

Digital inputs and outputs pins are isolated from power.

- Single Ended inputs are NPN/PNP type selectable through COM-IN pin.
- Differential input are TTL compatible, and can be 24V compatible PNP through COM-ENC pin.
- Outputs are NPN/PNP type selectable through COM-OUT (10mA max for OUT1, 100mA max for OUT2 and OUT3). On request the outputs can be equipped with OptoMOS devices (maximum current 400mA, 60V).

Analog inputs and outputs pins are not isolated from power, they have range 0 to 10V.

### INPUTS FEATURES:

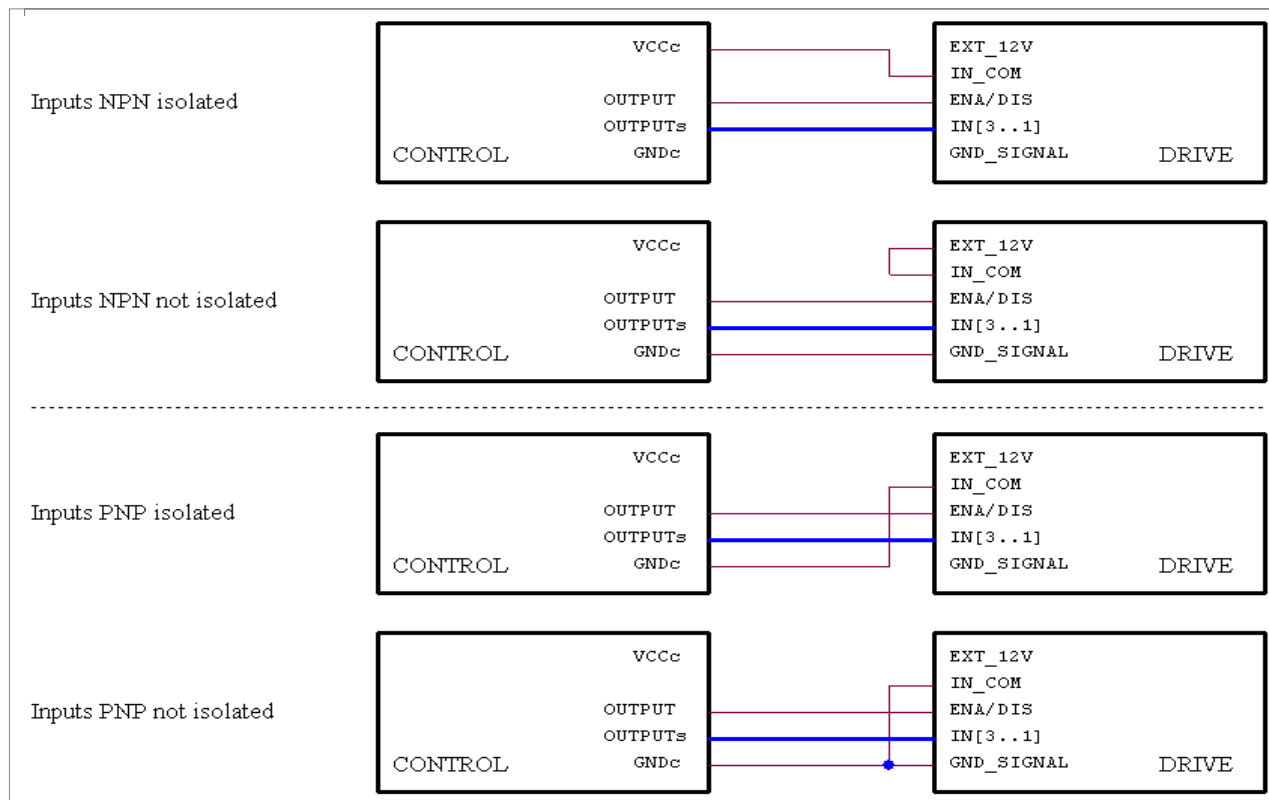
(IN1, IN2, IN3, ENABLE)	VOLTAGE LEVEL
LOW LEVEL	FROM 0 TO 7V
HIGH LEVEL	FROM 10 TO 24V
MAX CURRENT	13mA

DIFFERENTIAL INPUTS (ENCAx, ENCBx, ENCZx)	TTL	SINGLE ENDED 24V
LOW LEVEL	FROM 0 TO 2V	FROM 0 TO 6V
HIGH LEVEL	FROM 4 TO 5V	FROM 9 TO 24V
MAX CURRENT	5mA	13mA

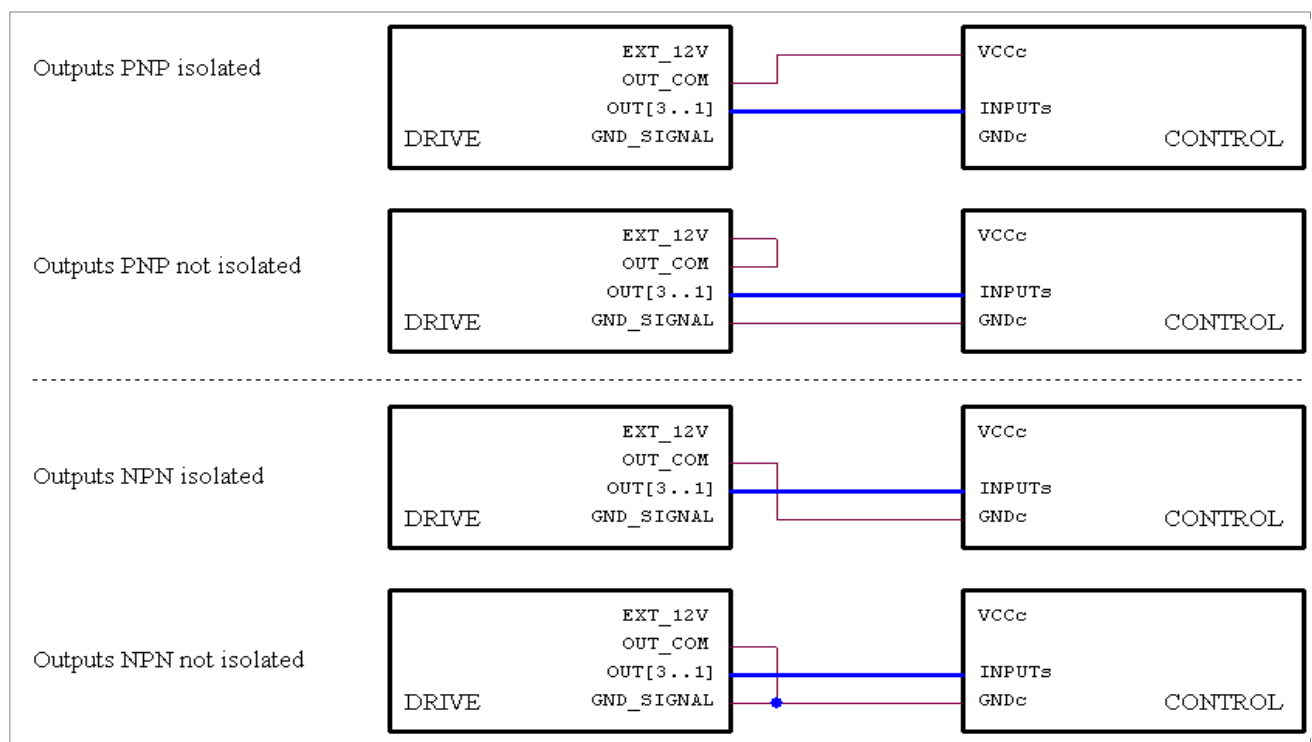
OUTPUTS		VOLTAGE LEVEL
PNP OUT	OUT ON	COM_OUT VOLTAGE -2V
	OUT OFF	0V
NPN OUT	OUT ON	2V
	OUT OFF	COM_OUT VOLTAGE

ANALOG INPUTS	VOLTAGE LEVEL
INPUT	FROM 0 TO 10V
OUTPUT	FROM 0 TO 10V

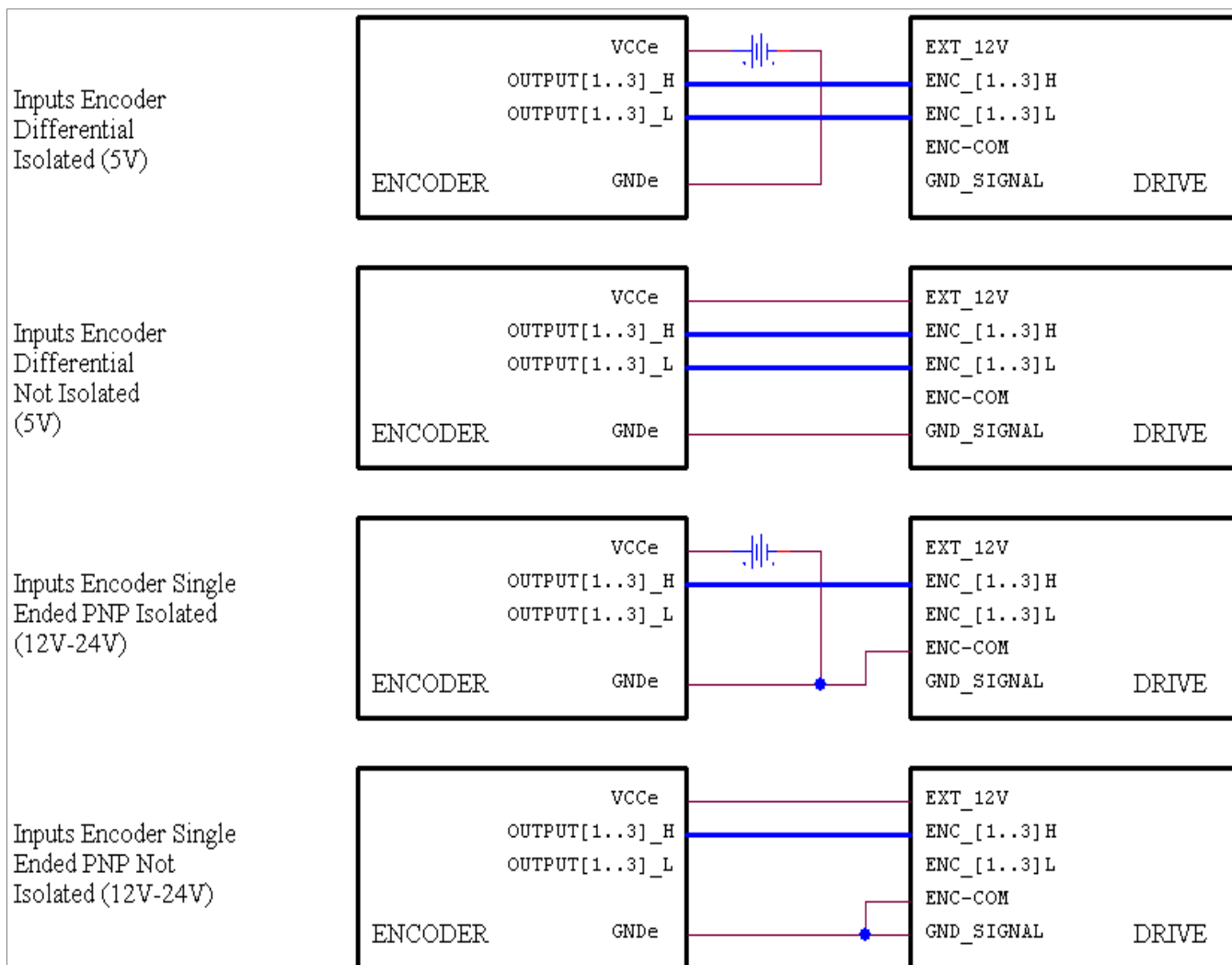
## 2.5 Digital Inputs



## 2.6 Digital Outputs

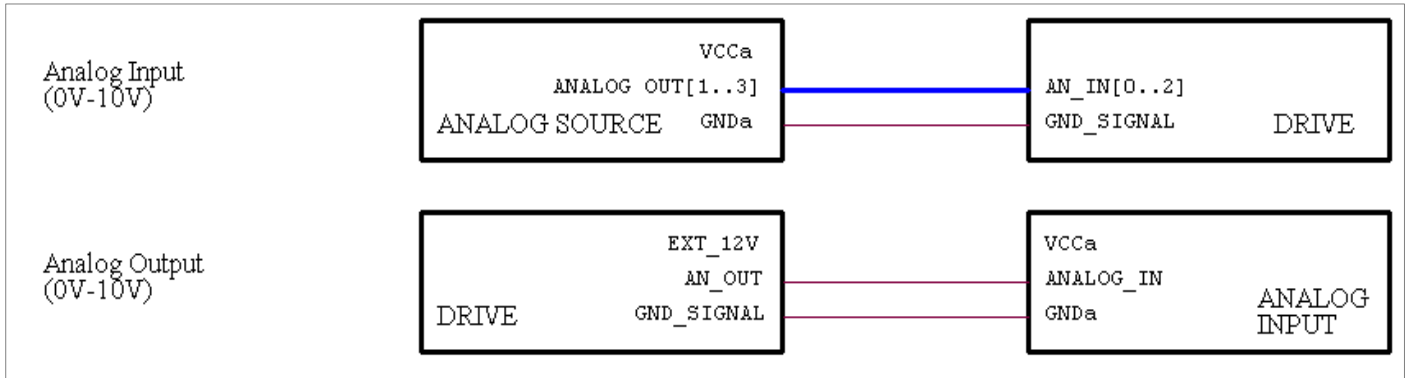


## 2.7 Encoder Inputs





## 2.8 Analog Inputs / Outputs



**Note: we suggest to use isolated inputs scheme, no electrical connections between control and drives.**

## 3. OPERATING MODE

The driver can be operated in the following modes:

- PROFINET

## 3.1 SETTING ON THE PROFINET MASTER

Use the device master file “GSDML-v2,31-SHS-HT7-20160125.xml” to configure your communication software on the master.

## 3.2 DATA COMMUNICATION VIA PROFINET

The data format used is Motorola (“Big Endian”).

PROFINET structure:

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

User data structure from MASTER to SLAVE (HT7 drive):

PKW				PZD	
PKE	IND	PWE		ZSW	HSW
1 <sup>st</sup> word	2 <sup>nd</sup> word	3 <sup>rd</sup> word (H)	4 <sup>th</sup> word (L)	1 <sup>st</sup> word	2 <sup>nd</sup> word

PKW: Parameter identifier value

PZD: Process data

PKE: Parameter identifier

IND: Index (not used. Set to 0)

PWE: Parameter value

ZSW: 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(H)...12	Bit11	Bit 10...0(L)
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 (HT7 drive) to MASTER:

PKW				PZD	
PKE	IND	PWE		STW	HIW
1 <sup>st</sup> word	2 <sup>nd</sup> word	3 <sup>rd</sup> word (H)	4 <sup>th</sup> word (L)	1 <sup>st</sup> word	2 <sup>nd</sup> word

PKW: Parameter identifier value

PZD: Process data

PKE: Parameter identifier

IND: Index (not used)

PWE: Parameter value

STW: Status word 1 (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(H)...12	Bit11	Bit 10...0(L)
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

### 3.3 PROFINET CONTROL BITS

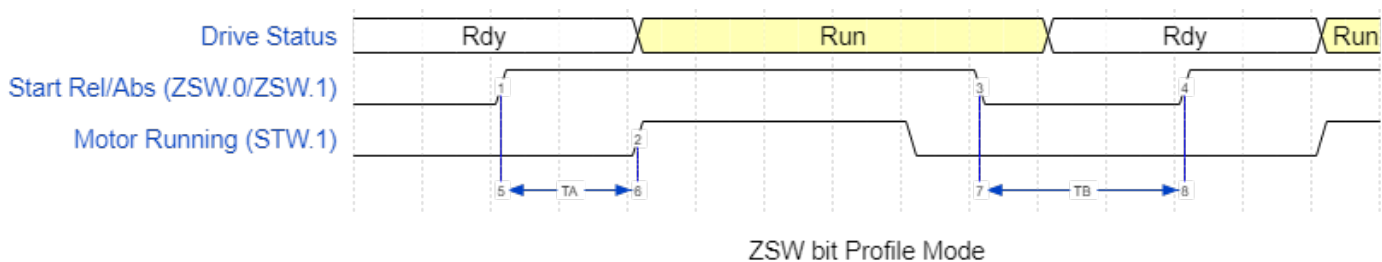
#### ***BITS ZSW – MASTER ⇒ SLAVE***

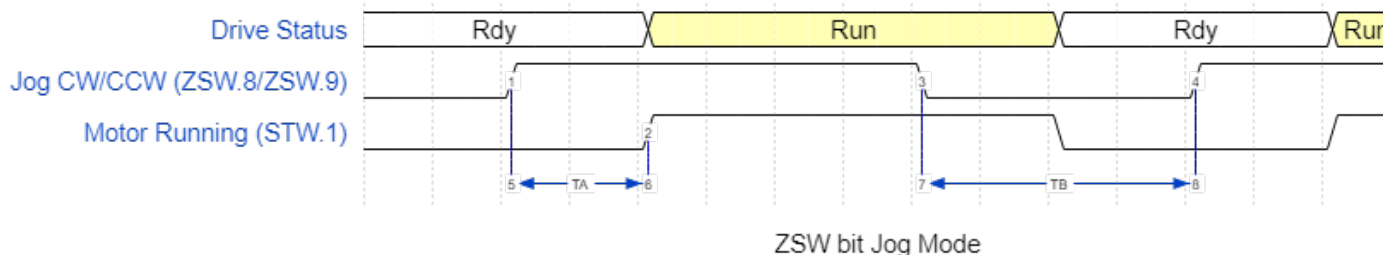
<b>BIT</b>	<b>VALUE</b>	<b>FUNCTION</b>	<b>REMARKS</b>
0 (L)	1 – ON 0 – OFF	ON - Start RELATIVE positioning OFF - Stop RELATIVE positioning	This bit is ignored when absolute positioning or JOG function is active
1	1 – ON 0 – OFF	ON - Start ABSOLUTE positioning OFF - Stop ABSOLUTE positioning	This bit is ignored when relative positioning or JOG function is active
2			
3	1 – ON 0 – OFF	ON - Drive enable OFF - Dive disable (motor current=0)	To execute every positioning command this bit must be set to 1
4	1 – ON 0 – OFF	ON - Reset Alarm	
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	1 – ON 0 – OFF	ON - Set OUT3 OFF – Reset OUT3	Set/reset OUT3 To use this function bit 12 must be set to 1
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 (ZSW)
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 (H)		Reserved for refresh Bit	

### ***BITS STW – SLAVE ⇒ MASTER***

BIT	VALUE	FUNCTION	REMARKS
0 (L)	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 - Max frequency reached OFF - Max 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 notreached	
14	1 - ON 0 - OFF	ON - Error durig encoder positioning OFF - OK	
15 (H)	1 - ON 0 - OFF	Reserved for refresh Bit	

## 3.4 ZSW BITS POSITIONING TIMING





TA = time to START motor: **maximum 30 ms**

TB = time between falling edge and rising edge of start signal: **minimum 50 ms**

## COMMAND SEQUENCE TO EXECUTE A POSITIONING:

### RELATIVE POSITIONING:

- Enable driver (ZSW BIT 3)
- Set relative quote (PNU 7)
- Set start relative positioning bit (ZSW BIT 0) to 1
- Wait TA time to START motor (minimum 30ms) or front 0-1 of motor running bit (STW BIT 1)
- Wait end of positioning (front 1-0) or zero level of motor running bit (STW BIT 1)
- Set start relative positioning bit (ZSW BIT 0) to 0
- Wait TB time (minimum 50ms) and start new positioning. If TB is not respected motor may be not start

### ABSOLUTE POSITIONING:

- Enable driver (ZSW BIT 3)
- Set absolute quote (PNU 8)
- Set start absolute positioning bit (ZSW BIT 1) to 1
- Wait TA time to START motor (minimum 30ms) or front 0-1 of motor running bit (STW BIT 1)
- Wait end of positioning (front 1-0) or zero level of motor running bit (STW BIT 1)
- Set start absolute positioning bit (ZSW BIT 1) to 0
- Wait TB time (minimum 50ms) and start new positioning. If TB is not respected motor may be not start

### JOG CW / JOG CCW:

- Enable driver (ZSW BIT 3)
- Set JOG CW (ZSW BIT 8) or JOG CCW (ZSW BIT 9) to 1 (start motor)
- Wait TA time to START motor (minimum 30ms) or front 0-1 of motor running bit (STW BIT 1)
- Set JOG CW (ZSW BIT 8) or JOG CCW (ZSW BIT 9) to 0 (stop motor)
- Wait zero level of motor running bit (STW BIT 1)
- Wait TB time (minimum 50ms) to start new JOG. If TB is not respected motor may be not start

#### HOMING:

- Connect switch or proximity sensor (NO or NC) to IN1
- Enable driver (ZSW BIT 3)
- Set maximum frequency - PNU 1 (in homing function it represents home search speed)
- Set minimum frequency - PNU 0 (in homing function it represents sensor disengage speed)
- Start homing (PNU 18) with a parameter 0x01 (HEX) for NC sensor or 0x11 (HEX) for NO sensor on IN1

#### Sensor not engaged:

When you write PNU 18 the motor starts immediately in CCW direction with maximum speed, then it stops on sensor and starts in CW direction with minimum speed to disengage sensor then stops and set position register (PNU 10) to 0.

It's very important that the motor stops with sensor engaged without get over it. To avoid this it is possible reduce maximum frequency or reduce ramp (PNU 2)

#### Sensor engaged:

When you write PNU 18 the motor starts immediately in CW direction with minimum speed to disengage the sensor then it stops and set position register (PNU 10) to 0.

NOTE: If motor starts in wrong direction during homing you must change motor phases connection (swap A1 with A2 clamps).



## 3.5 PARAMETERS

PNU	FUNCTION	PARAMETER
0	<b>Setting of minimum frequency</b> Motor rotation start frequency	From 1 to 10000 Hz
1	<b>Setting of maximum frequency</b> Motor rotation working frequency	From 1 to 20000 Hz
2	<b>Setting of ramp inclination</b> If motor is running, this parameter will be acquired to the next motion command.	From 1 to 255 expressed in ms * 10
3	<b>Setting of motor resolution</b> 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 1/32 step mode = 2 1/64 step mode = 1 1/128 step mode  = 1040 1/2.5 step mode = 1020 1/5 step mode = 1010 1/10 step mode = 1005 1/20 step mode = 1002 1/50 step mode = 1001 1/100 step mode
4	<b>Mode setting of electric current reduction</b> 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	<b>Time setting of electric current reduction</b> Time after which current reduction (from 0 to 255) must occur on a time basis of 32 ms	From 0 to 255
6	<b>Current setting</b> Set motor current	From 0 to 10000 mA
7	<b>Setting of relative quote</b> 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

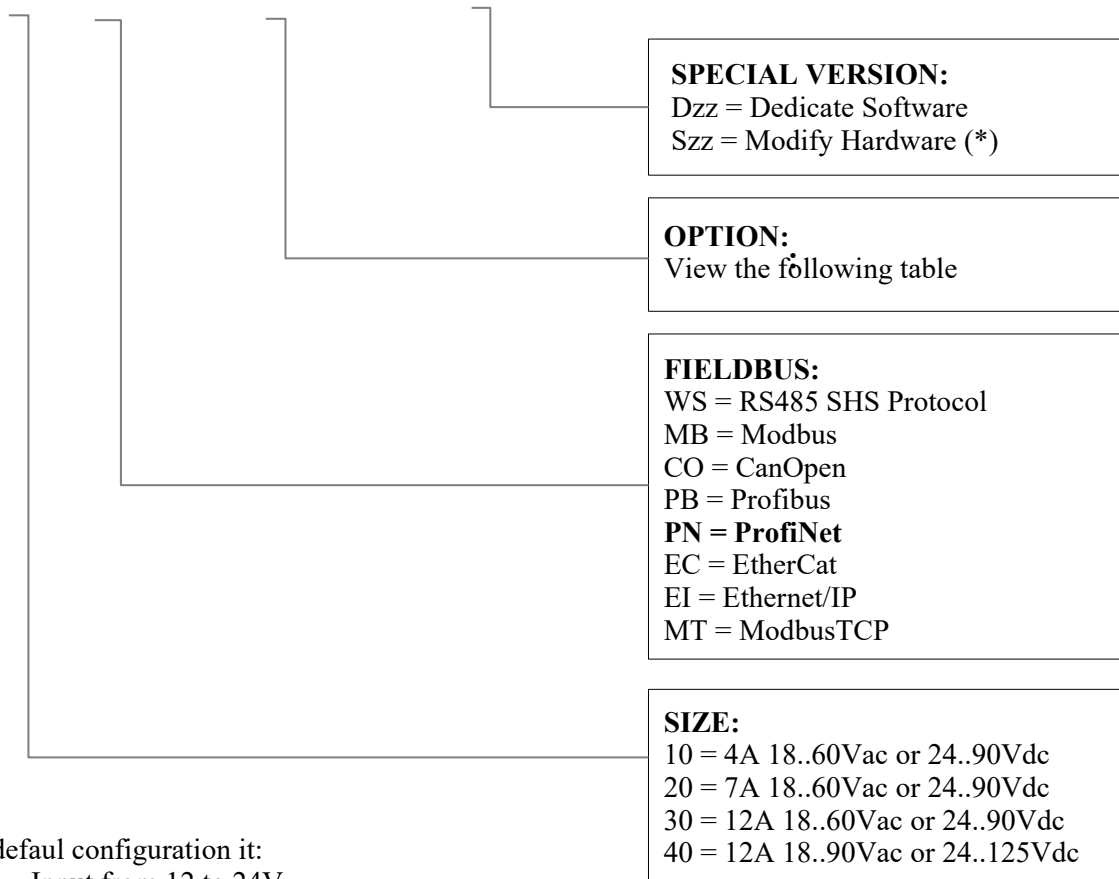
PNU	FUNCTION	PARAMETER
8	<b>Setting of absolute quote</b> Indicate the absolute positioning with respect to home position to be carried out at the next START (with control bit) or TRIGGER START expressed in 1/128 step	From -2147483647 to 2147483647
9	<b>Setting of home position</b> Drive associates the entered value to home position of the motor	From -2147483647 to 2147483647
10	<b>Present position</b> Position register, you can read or write this value. (expressed in 1/128 step)	From -2147483647 to 2147483647
11	<b>Present frequency</b> Motor rotation frequency	READ ONLY REGISTER
12	<b>Final position</b> Motor destination quote	READ ONLY REGISTER
13	<b>Trigger start (logic AND)</b> 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	<b>Trigger stop (logic AND)</b> 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 ONE TRIGGER STOP AT TIME (PNU 14 OR PNU 15)	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	<b>Trigger stop (logic OR)</b> 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 ONE TRIGGER STOP AT TIME (PNU 14 OR PNU 15)	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	<b>Trigger home (logic AND)</b> It defines the Input or the inputs and the respective Levels, which must be enabled for carrying out the HOME by an external command and stop motor.	

PNU	FUNCTION	PARAMETER
17	<b>Trigger zerofly (logic AND)</b> 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	<b>Axis zeroing</b> 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	<b>Limit switch</b> 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)
20	<b>Mask zerofly quote</b> Indicate the mask positioning to be done in the same rotation direction to enable zerofly trigger	From 0 to 2147483647
21	<b>Zerofly quote</b> 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	<b>Low noise mode</b>	If the sent = 2 → enable = 0 → disable
23	<b>Protection type</b>	If read = 0 → drive ready = 1 → power supply out of range = 2 → thermal protection = 3 → short circuit

PNU	FUNCTION	PARAMETER
24	<b>Protection active / reset</b>	<p>If read</p> <ul style="list-style-type: none"> <li>= 0x00 → drive ready</li> <li>= 0x02 → short circuit</li> <li>= 0x04 → thermal protection</li> <li>= 0x08 → power supply undervoltage</li> <li>= 0x10 → power supply overvoltage</li> </ul> <p>(in previous profibus versions in case of protection this value is set to 1)</p> <p>If write 0 reset permanent protection (short circuit or phase disconnected) the other protections are automatically resetted when the error condition disappear</p>
25	<b>Software release</b>	READ ONLY REGISTER
26	<b>Power supply voltage [Vdc]</b>	READ ONLY REGISTER
27	<b>Drive temperature [°C]</b>	READ ONLY REGISTER
50	<b>Encoder position</b> Encoder position register, you can read or write this value. (expressed in encoder steps) This value counts all fronts of two encoder phases	From -2147483647 to 2147483647
51	<b>Encoder mode</b> Set encoder mode	<p>If Write 0 → no encoder feedback. You can read encoder but the drive don't use it to control position</p> <ul style="list-style-type: none"> <li>1 → encoder enabled without error detection</li> <li>2 → encoder enabled with error detection</li> </ul>
52	<b>Set encoder pulse/revolution</b>	From 0 to 2147483647
53	<b>Set encoder fault steps</b> Set encoder steps to detect positioning error.	From 0 to 2147483647
54	<b>Encoder Index search frequency</b> It defines the search index frequency	From 1 to 5000 Hz
55	<b>Encoder index search mode</b> Indicate 4 modes to search index	0x01= search CW 0x02= search CCW 0x11= search CW and set position to 0 0x12= search CCW and set position to 0

## 4. HT7 MODELS CODE

### HT7xxKK - yyyyyy / Zzz



The default configuration it:

- Input from 12 to 24V

CODE	yyyyyOPTION	
1	Differential Encoder	
2	Encoder TTL	
4	Input TTL	
8	OUT1 PNP OptoRelay	(*)
16	OUT1 NPN/PNP	
32	OUT2 PNP OptoRelay	(*)
64	OUT2 NPN/PNP	
128	EEprom special Firmware	
256	Analog Input	
512	Fieldbus crimp connector	(*)
1024	Fieldbus DB9 connector	(*)
2048	IO crimp connector	(*)

(\*) not available for this drive

EXAMPLE 1: the default configuration will become option 0 ( 00000 )

EXAMPLE 2: TTL Input + OUT1 NPN/PNP relay + EEprom Firmware, will become option 4+16+128 = 148 ( 00148 )



The logo for SHS Electronics features the letters 'SHS' in a large, bold, blue sans-serif font. Below 'SHS', the word 'ELECTRONICS' is written in a smaller, blue, sans-serif font, following the curve of a light blue swoosh that underlines the 'SHS' text. The entire logo is enclosed within a larger, light blue oval shape, which is itself surrounded by a dark blue border.

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