



DC MOTOR CONTROLLER

4Q.BDC.DRV.250S-E



BRUSHLESS
MOTOR DRIVE

www.nesdrive.com



INDEX

WARNING	3
TECNICAL SPECIFICATIONS.....	4
DIMENSIONS	5-6
DEFINITIONS	7
RUNNING AND HARDWARE INFORMATION	8
SHUNT BREAKING RESISTOR.....	9
EXAMPLE OF SHUNT BREAKING RESISTOR GRAPH	10
BASIC DIAGRAM	11
CIRCUIT DIAGRAM	12
P1-18 PIN CONNECTOR INPUT & OUTPUT	13
P1-18 PIN CONNECTOR OUTPUT RELAY CONTACT	14
P1-18 PIN CONNECTOR OUTPUT ANLG & REMOTE LED	15
P1-18 PIN CONNECTOR INPUT FAULT & EMERGENCY STOP	16
P1-18 PIN CONNECTOR CAN BUS & MOD BUS RTU	17
P1-18 PIN CONNECTOR INPUT SPEED LIMIT & TORQUE LIMIT & MOTOR NTC	18
P1-18 PIN CONNECTOR INPUT FORWARD & REVERSE & STOP	19
P3- 6 PIN CONNECTOR INPUT HALL SENSOR & ENCODER	20
P4- 4 PIN CONNECTOR INPUT AUX POWER & BATTERY TEMPERATURE NTC	21
ACT LED NOTIFICATIONS	22
COMPUTER COMMUNICATION	23
P2 - 4 PIN CONNECTOR RS232 COMMUNICATION CIRCUIT	24
COM PORT IDENTIFICATION	25
NES DRIVE STUDIO COM PORT SELECTION	26
COMMUNICATION RS232 & MODBUS RTU ADDRESS TABLE	27-28
NES DRIVE STUDIO HALL SENSOR DETECTION	29
DIGITAL PARAMETERS P1,P2,P3,P4	30-31-32
FAN CONNECTION & OPERATIONG MODE	33
ANALOG PARAMETERS P12 P25	34-35
PID PARAMETERS	36
OPEN AND CLOSE LOOP MODE	37
ALL PARAMETERS	38
GRAPH PAGE ANALYSIS	39-40
REMOTE MANAGEMENT UNIT PAGE	41

WARNING

Date :14.10.2021

TOPICS TO BE CONSIDERED

WARNINGS

To avoid electrical shock and damage to the device, do not remove or install the device cover or control the input-output socket while it is energized.

Contact authorized personnel only for service.

The use of the device other than those specified here creates a hazard.

Please use the device by following the points stated in the user manual.

SAFETY

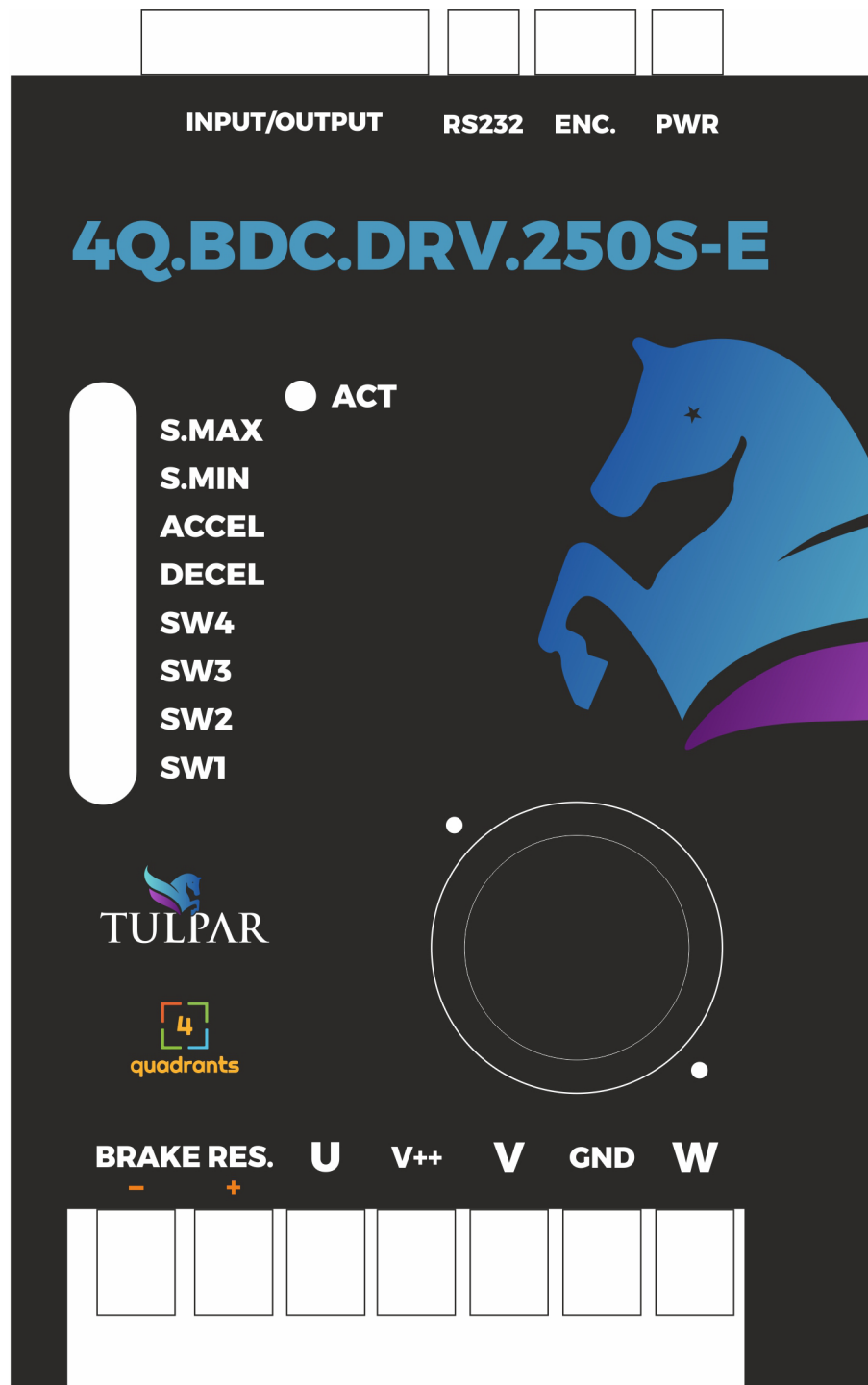
This product has been designed with high safety standards in mind. Any electrical device that is not used correctly can cause fire, electric shock, or personal injury.

For the accident-free operation of the device, follow the instructions below.

- Follow all warnings and instructions.
- The device is manufactured in IP54 Standard. Take necessary precautions without operating in excessively humid or hot places.
- Install the cooler of the device on a full metal surface.
- Use a fuse of sufficient value for the device supply input.
- When the device is energized, check the PWR LED lights up.
- Do not disconnect or plugin any cables while the drive is running.
- Regularly check the BATTERY, MOTOR, and CONTROL cables for damage.
- To run the engine efficiently, use the BATTERY and MOTOR cables according to current needs.
- If the device is operating abnormally, making unusual noises, or overheating stop immediately.
- Contact authorized service personnel or our company and ask for help.
- Using the device outside the specified conditions creates a hazard and in the event of a malfunction, the device will be out of warranty

Operating Voltage	10VDC - 72VDC
Start Current (2sn) :	120 Amper
Continuous Output Current	25-50-75 A
Current Limit	3A - 75 A
Current Limit Resolution	0.1A
PWM Frequency	16 kHz
PWM Duty Rate:	% 0.1 ~ 99.0
Braking:	REGENERATIVE
MOSFET Resistance	< 0.5 mΩ
Productivity	> %96
Standby Current	< 50 mA
Speed Reference Input	Pot , 0 - 5V or 0 - 10V
	If SW1 On Pot or 0 - 5 V
	If SW1 Off 0 -10V
Parameter Setting	4 Pot or Internal Parameters
	If SW2 is On External (4 Pot)
	If SW2 is Off Internal
Error Output (IO)	Open Collector (80 Ω)
	External Pull-up Resistance: 2.4 kΩ - 10 kΩ
Motor Voltage Reference Output (0 - 5V)	Motor Voltage / 10
HALL Sensor Input	5VDC U , V , W (Closed Loop) or A , B , Z ENCODER
Indicator LEDs	Constant red : Key Entry is passive , red flash optional : error
	Yellow : ready for forward or reverse motion
	Green: forward movement , blue: backward movement
Braking Resistor	A braking resistor can be installed
Brake Relay	Motor magnetic brake opener
Cooling Fan	Working depending on temperature or current fan speed
Engine , motor , battery , panel temperature measurement	10K NTC (can be connected to alarm)
Parameter Setting	Operating (-20 .+ 40) ° C Rs232 , Modbus RTU , Can bus (optional)
Dimensions	200 x 116,51 x 53 mm

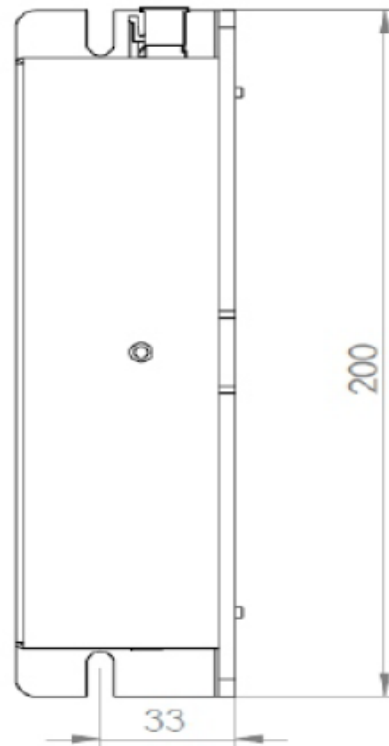
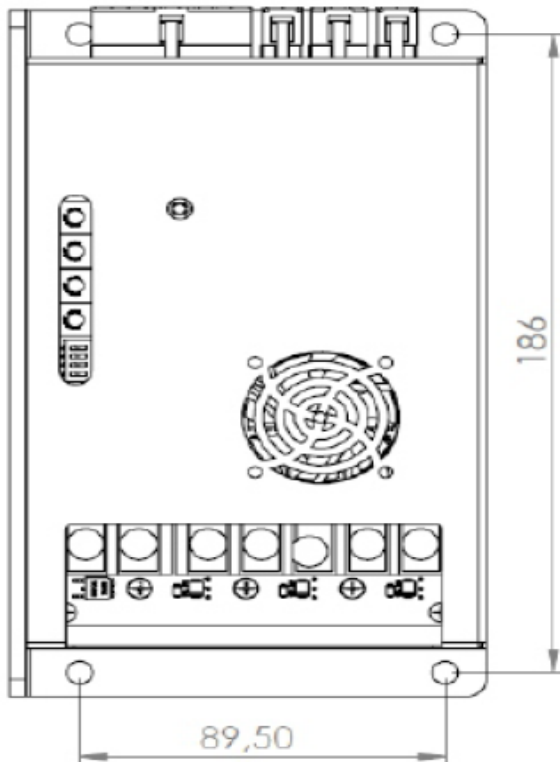
DIMENSIONS



To protect the circuit from external EMC and physical effects and for optimum heat transfer, the PCB design 4 layers and Power / Logic layers are realized separately from each other.

DIMENSIONS

Fixing holes and all dimensions in millimeters.



DEFINITIONS

OPERATION OF THE TULPAR 250 CONTROLLER

The control unit has bidirectional operation and REGENERATIVE braking feature. Microprocessor controlled, real time calculations to be provided to the engine. Fixed parameters can be loaded and read from the computer interface.

Design:

- 10VDC - 72VDC Supply Input
- Ability to work at current 120A starting
- 100A 1min Operation
- 25A-50A-75A 1 Hour Operation
- Current Limit Resolution 0.1 Amper
- PWM Frequency 16kHz
- PWM Ratio 0.1 - 99.0%
- REGENERATIVE Braking Continuous
- Mosfet Resistance <0.5 mOhm
- Standby Current <50mA
- Forward - Reverse - Stop Digital Inputs
- Speed and ramp adjustment with internal or external S.Max , S Min , Accel , Decel Pot
- Low and High Voltage ALARM
- Ability to set or limit motor CURRENT
- EMERGENCY STOP
- FAULT Digital Inputs
- Braking Output and Control System
- Analog Output 0 - 5V Motor Voltage Reference
- RGB Status Indicator LED
- CanBus Communication (Optional)
- Encoder or HALL Sensor Feedback
- Battery, Cooler, Motor, Main board temperature measurement and monitoring
- External Status LED output
- General Purpose Dry Contact - RS232 Data cable sample Motor Voltage, Current monitoring and recording software

RUNNING AND HARDWARE INFORMATION

CIRCUIT DESIGN

To protect the circuit from external EMC and physical effects and for optimum heat transfer , the PCB design has been realized separately from the 4 layers and the Power / Logic layers in design .

OPERATION VOLTAGE

The working voltage of BLDC Drive can work smoothly in the range of 10-72VDC . The “GND” and “V ++” terminals seen above are for supply , while the U , V , W terminals are for motor connection.

The cut-off resistor is terminal connection.
It activates when the Battery Voltage exceeds the specified limit.

Figure - 1 DIGITAL PARAMETERS

 **DIGITAL**

DIGITAL PARAMETERS

P1	Maximum Speed Rate	[%]	99,0	Write	Read	100,0
P2	Minimum Speed Rate	[%]	0,0	Write	Read	0,0
P3	Acceleration Time	[s]	3,000	Write	Read	3,000
P4	Deceleration Time	[s]	3,000	Write	Read	3,000
P5	Maximum Battery Voltage	[V]	55,000	Write	Read	55,000
P6	Minimum Battery Voltage	[V]	12,000	Write	Read	12,000
P7	Current Protection Limit	[A]	50,00	Write	Read	50,00
P8	Time Without Current Protection	[s]	0,100	Write	Read	0,100
P9	Digital Input Type	[0] Level [1] Y Edge	0	Write	Read	0
P10	Driver Protection Limit	[°C]	70,00	Write	Read	70,00
P11	Motor Protection Limit	[°C]	85,00	Write	Read	85,00

OUTPUT CURRENT

The continuous output current of the BLDC Drive is 25A , 50A , 75A . For the driver circuit and motor protection and externally appropriate fuse should be used externally .

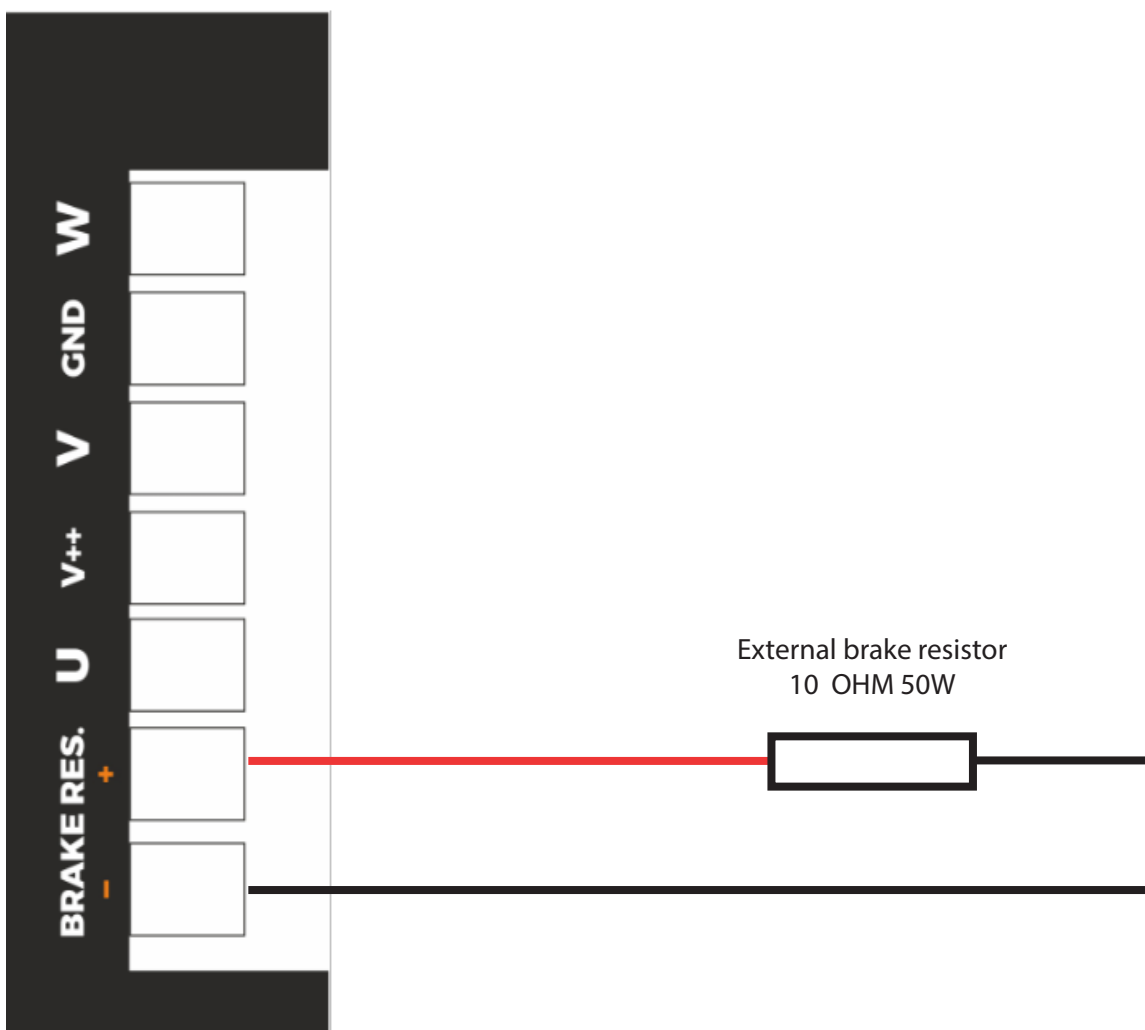
LOGIC DRIVER

DC drive circuit by 72MHz microcontroller is supplied . Thanks to this microcontroller (4-quadrant) PWM signal and all other Analog / Digital measurements are performed hardware

SHUNT BREAKING RESISTOR

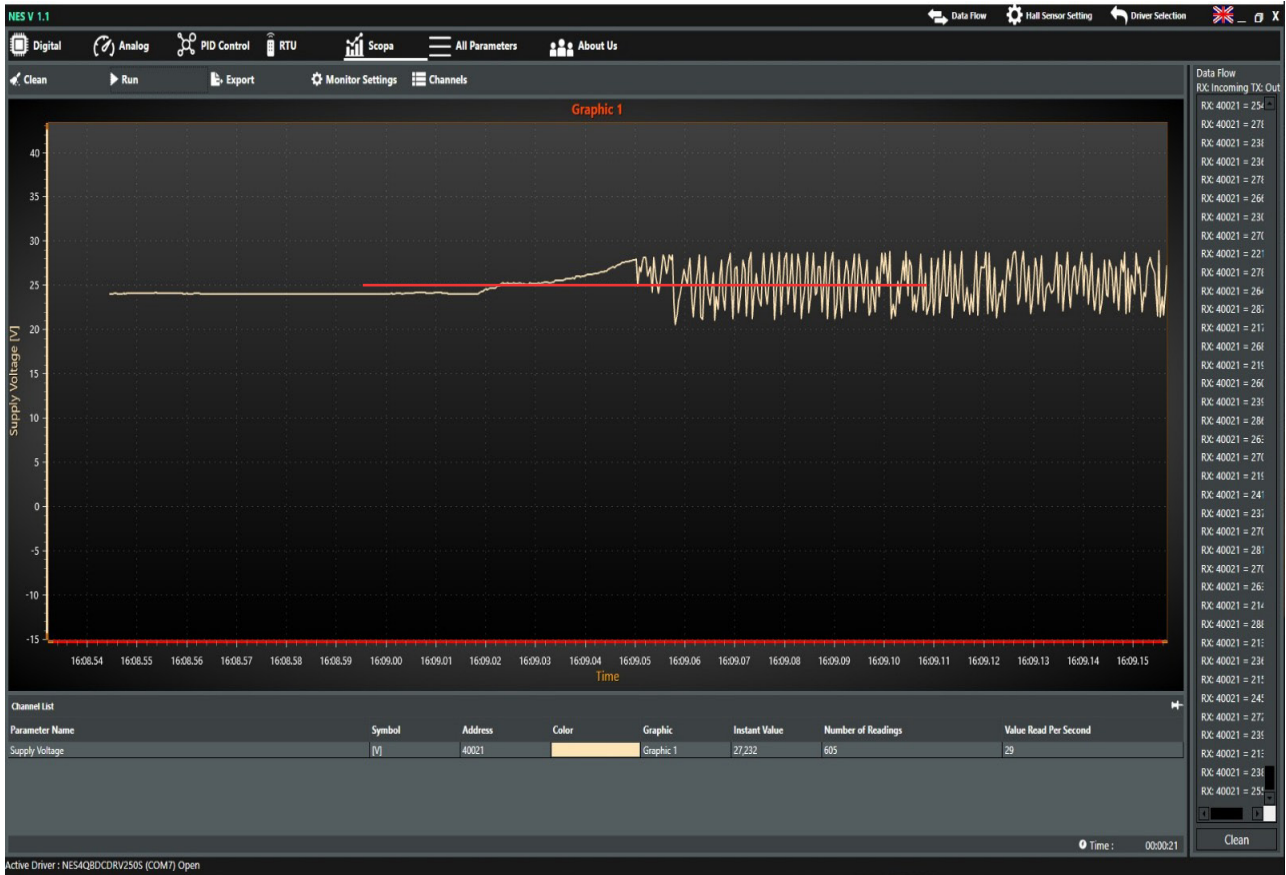
The external braking resistor must be connected to the SHUNT OUTPUT terminals. It activates when the Battery Voltage exceeds the specified limit. (Parameter P5) The drive includes safety against overvoltage.

Figure - 2 EXTERNAL BRAKE RESISTOR



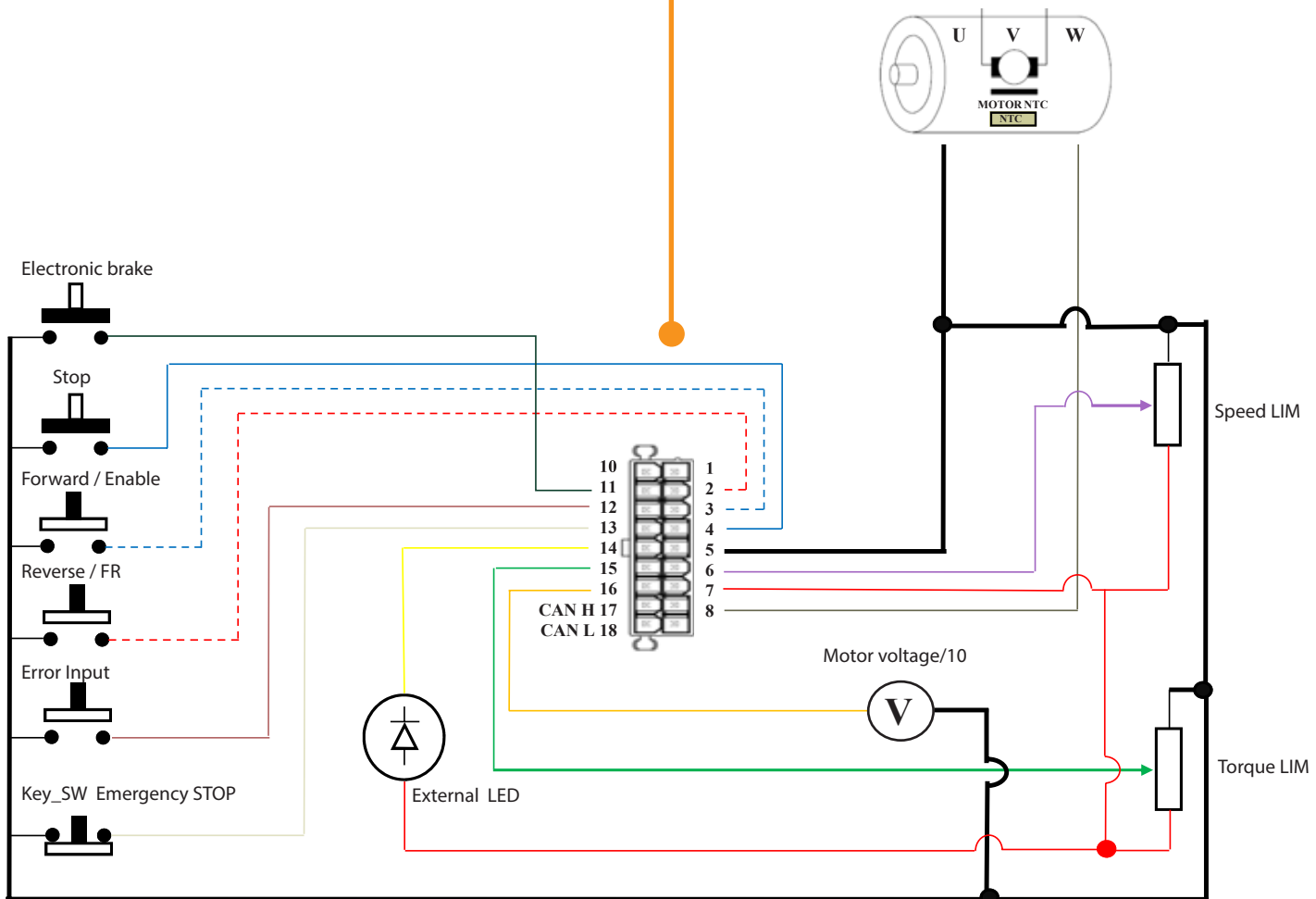
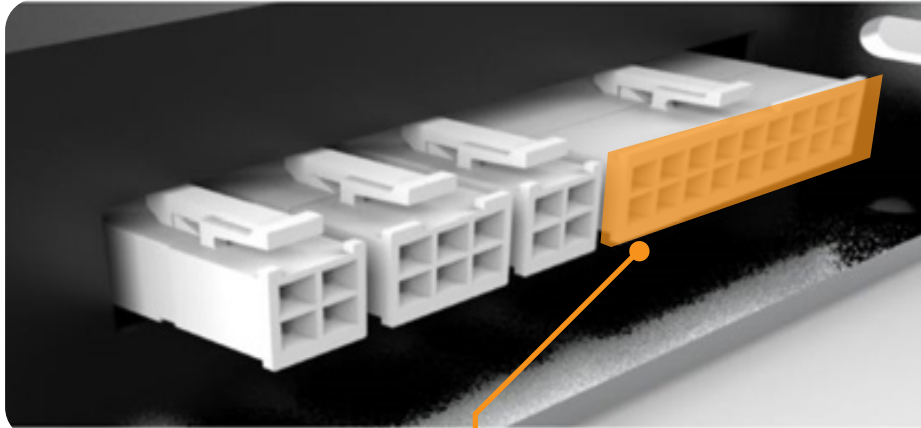
EXAMPLE OF SHUNT BREAKING RESISTOR GRAPH

Figure - 3 EXTERNAL BRAKE RESISTOR RESPONSE GRAPH



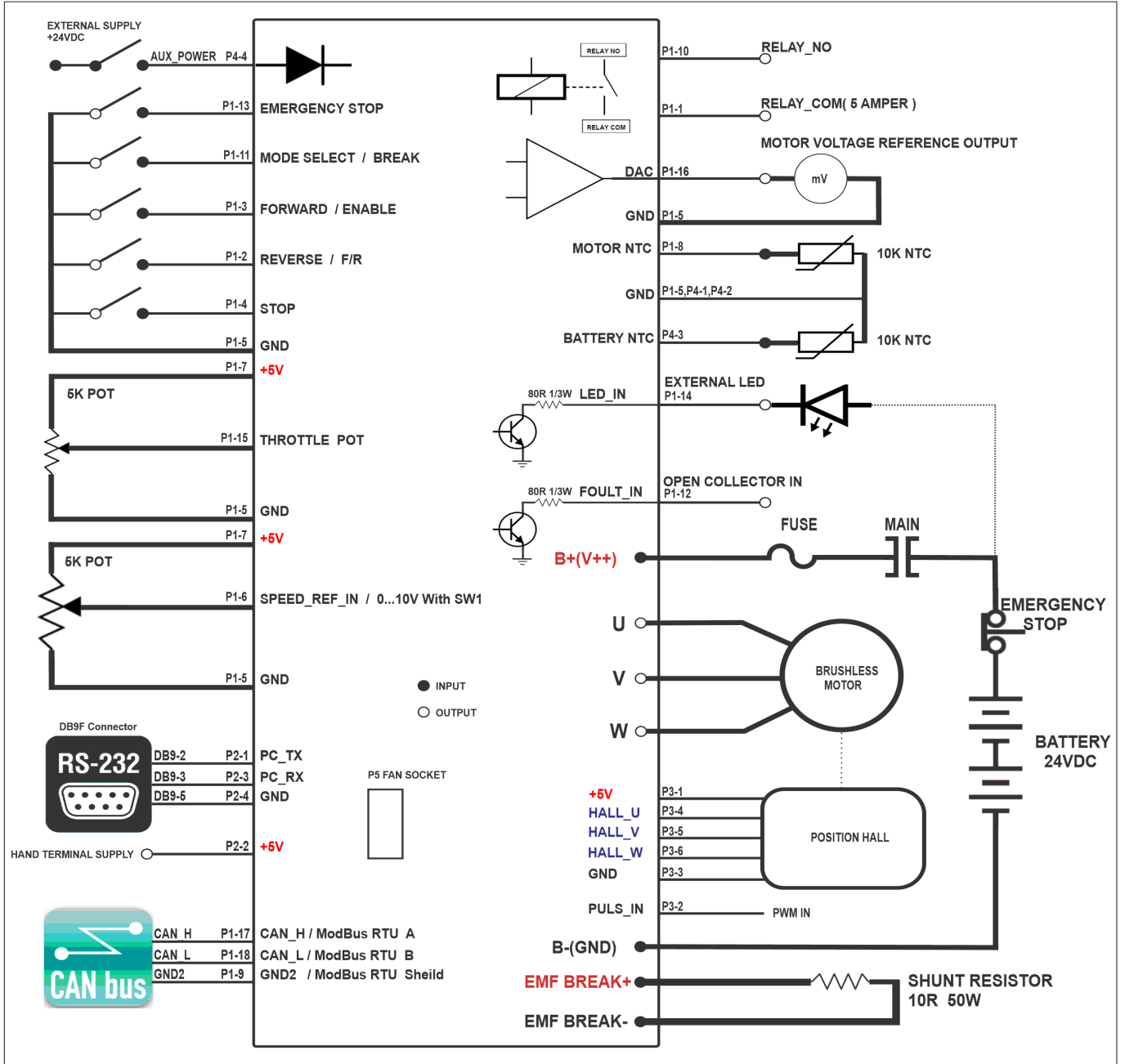
BASIC DIAGRAM

Figure - 4 P1 I/O CONNECTOR

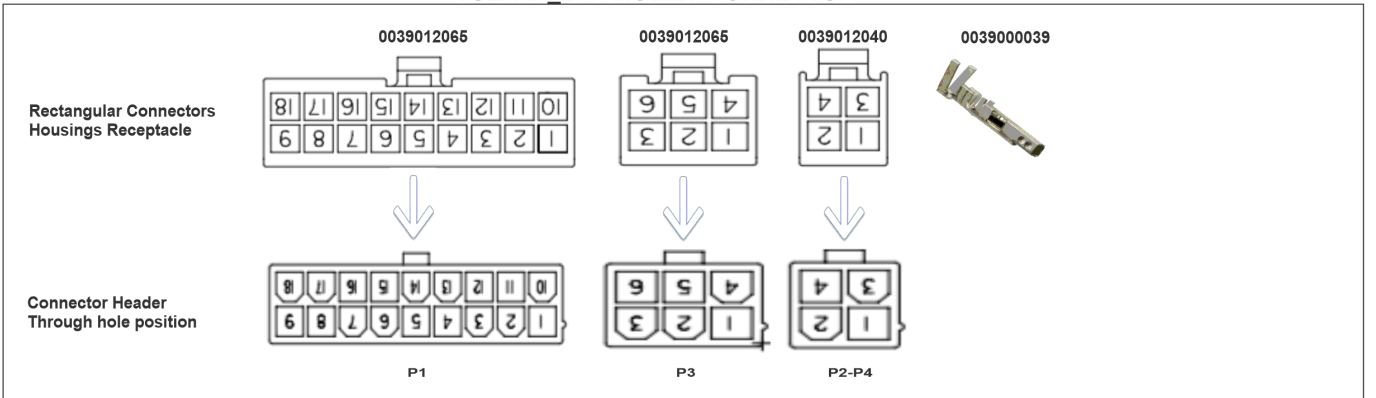


CIRCUIT DIAGRAM

TULPAR_250 CONNECTOR WIRING STANDARD CONFIGURATION

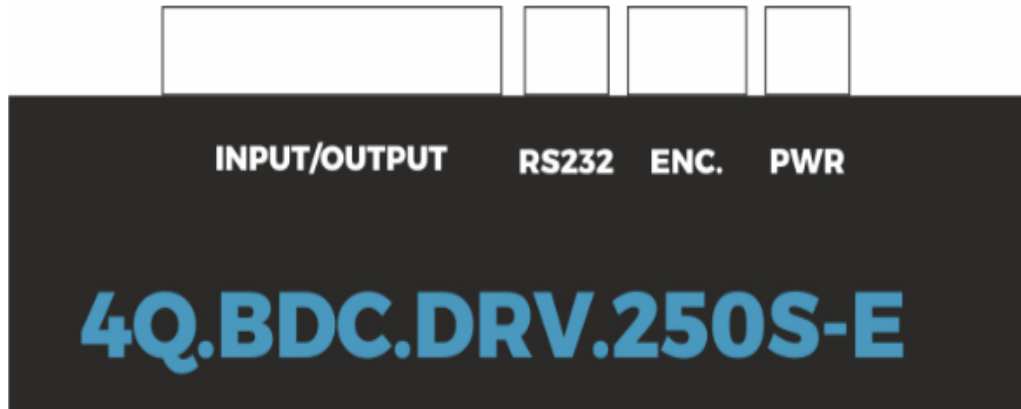


TULPAR_250 MOLEX CONNECTOR



INPUT & OUTPUT P1-18

Figure - 5 P1 I/O CONNECTOR



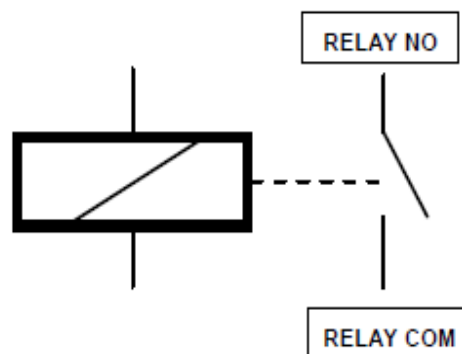
1	X01	RELAY COM (Motor magnetic brake opener)
2	X02	REVERSE DIR / FR
3	X03	FORWARD DIR / ENABLE
4	X04	STOP
5	X05	GND
6	X06	SPEED REF 5K POT , 0-5VDC INPUT, 0-10VDC INPUT
7	X07	5V (50mA) (HAND TERMINAL SUPPLY)
8	X08	MOTOR TEMPERATURE NTC.10K
9	X09	CAN GND & Modbus RTU Shield
10	X10	RELAY NO(Normally open contact - Motor magnetic brake opener)
11	X11	MODE SEL (Motor electromechanical brake input)
12	X12	FAULT (IO)
13	X13	KEY SWITCH (Emergency stop)
14	X14	REMOTE LED (External status led output)
15	X15	SPEED LIMIT ANLG INPUT (Tulpar250 torque control input)
16	X16	0-5V ANLG OUT (Motor voltage reference output 0-5V)
17	X17	CAN HIGH & Modbus RTU
18	X18	CAN LOW & Modbus RTU

OUTPUT P1-18 (RELAY)

Figure -6 P1 RELAY CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
1	X01	RELAY COM
10	X10	RELAY NO

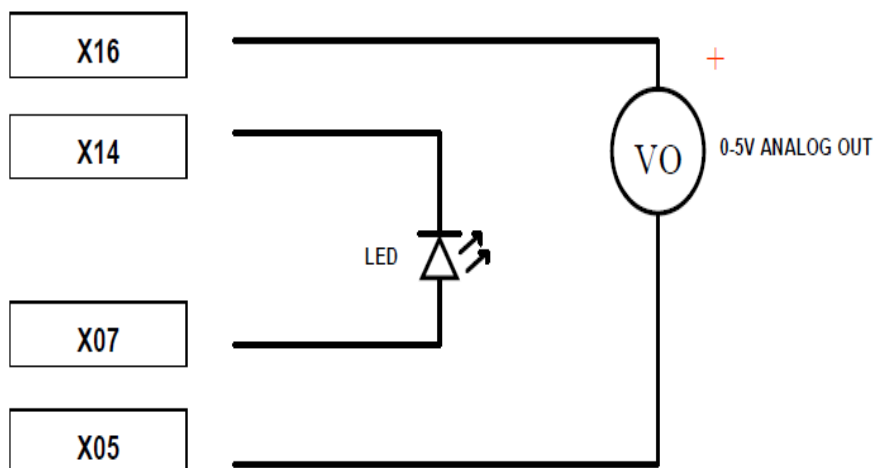


OUTPUT P1-18 (ANLG OUT & REMOTE LED)

Figure - 7 P1 ANLG OUT & REMOTE LED CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
5	X05	GND
16	X16	ANLG OUT (Motor voltage reference output (0-5V))
14	X14	REMOTE LED (External status led output)

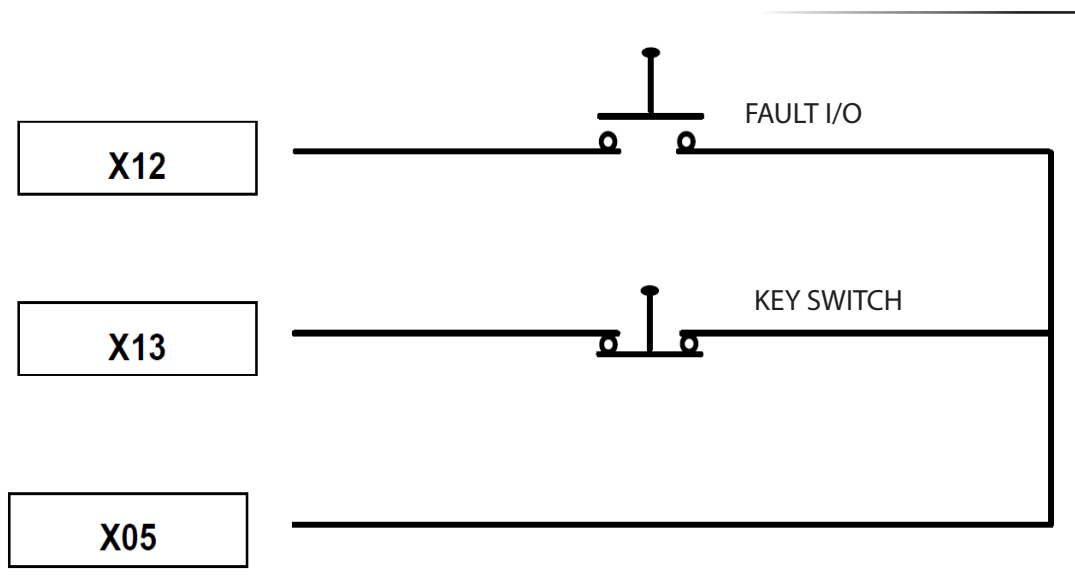


INPUT & P1-18 (FAULT IO & EMERGENCY STOP)

Figure - 8 P1 MODE SEL & KEY SWITCH CIRCUIT

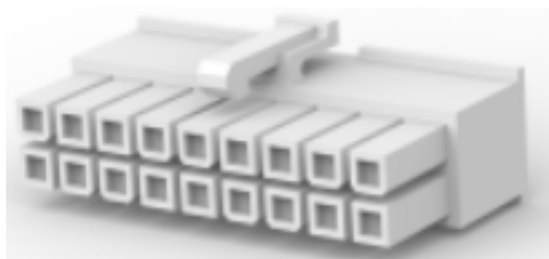


TERMINAL NO	PCB NO	DESCRIPTION
11	X11	MODE SEL (Motor electron-mechanical brake input)
12	X12	FAULT (IO)
13	X13	KEY SWITCH (Emergency stop) Circuit breaker developed for high security applications. Independent from the processor.



INPUT & OUTPUT P1-18 (CANBUS & MODBUS RTU)

Figure - 9 P1 Can bus & Modbus RTU CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
9	X09	CAN GND & Modbus RTU Shield
17	X17	CAN HIGH & Modbus RTU A
18	X18	CAN LOW & Modbus RTU A

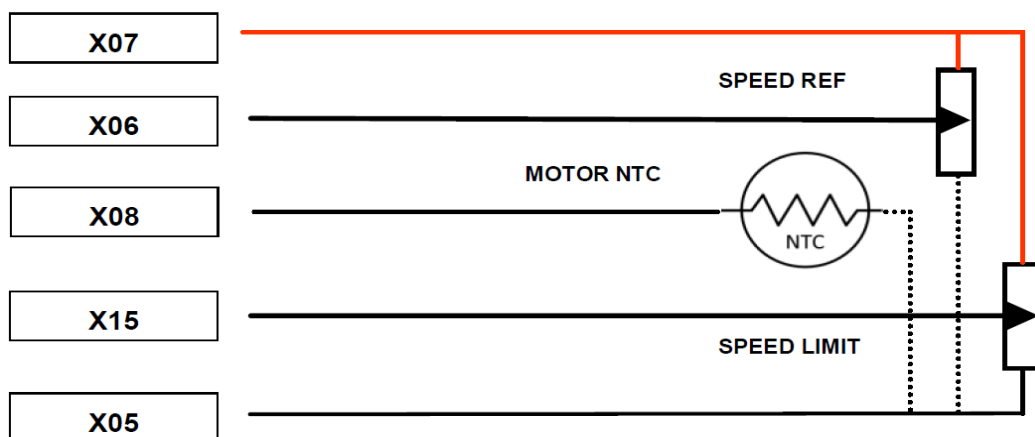


INPUT & P1-18 (SPEED LIMIT , TORQUE LIMIT , MOTOR NTC)

Figure - 10 P1 SPEED REF , MOTOR TEMPERATURE & SPEED LIMIT CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
5	X05	GND
6	X06	SPEED REF 5K POT , 0-5VDC INPUT, 0-10VDC INPUT
7	X07	5V (50mA)
8	X08	MOTOR TEMPERATURE NTC.10K Temperature Measurement
15	X15	SPEED LIMIT ANLG INPUT (Tulpar250 torque control input)

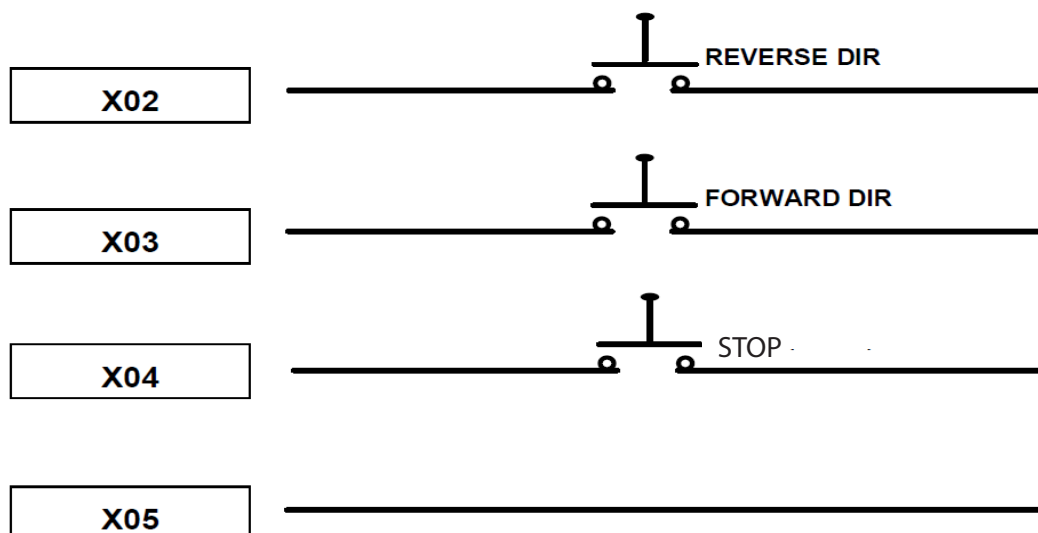


INPUT & P1-18 (FORWARD , REVERSE & STOP)

Figure - 11 P1 FORWARD , REVERSE & STOP INPUT CIRCUIT

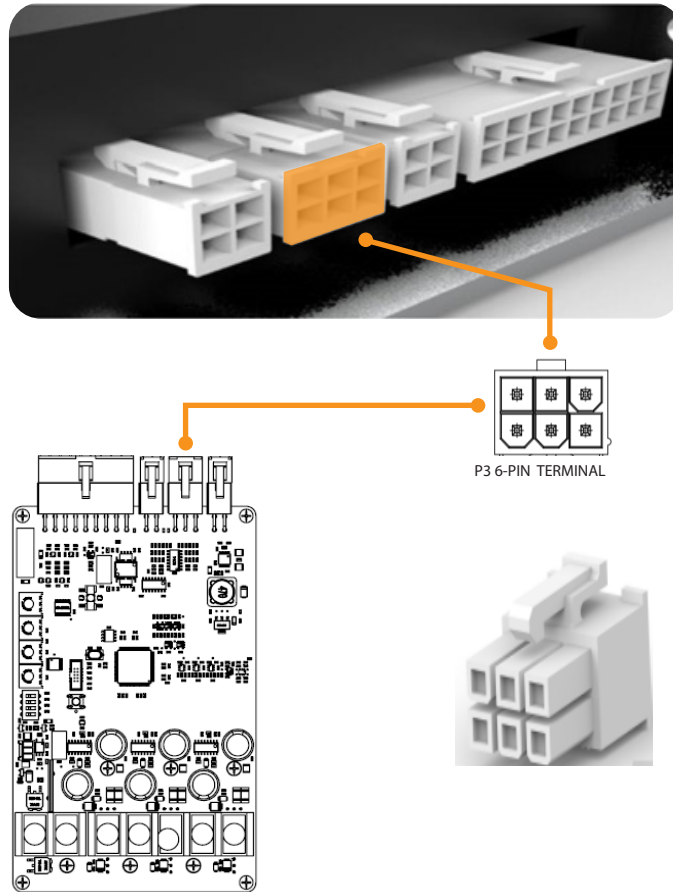


TERMINAL NO	PCB NO	DESCRIPTION
2	X02	REVERSE DIR / FR
3	X03	FORWARD DIR / ENABLE
4	X04	STOP
5	X05	GND

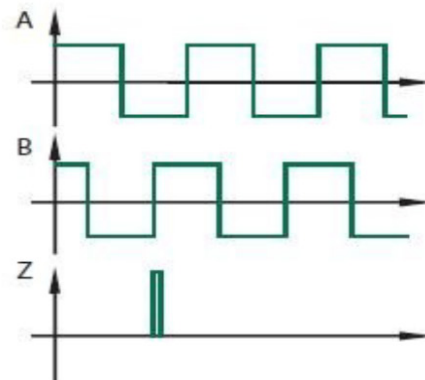


INPUT & P3-6 (HALL SENSOR & ENCODER)

Figure - 12 P3 HALL SENSOR & ENCODER CIRCUIT

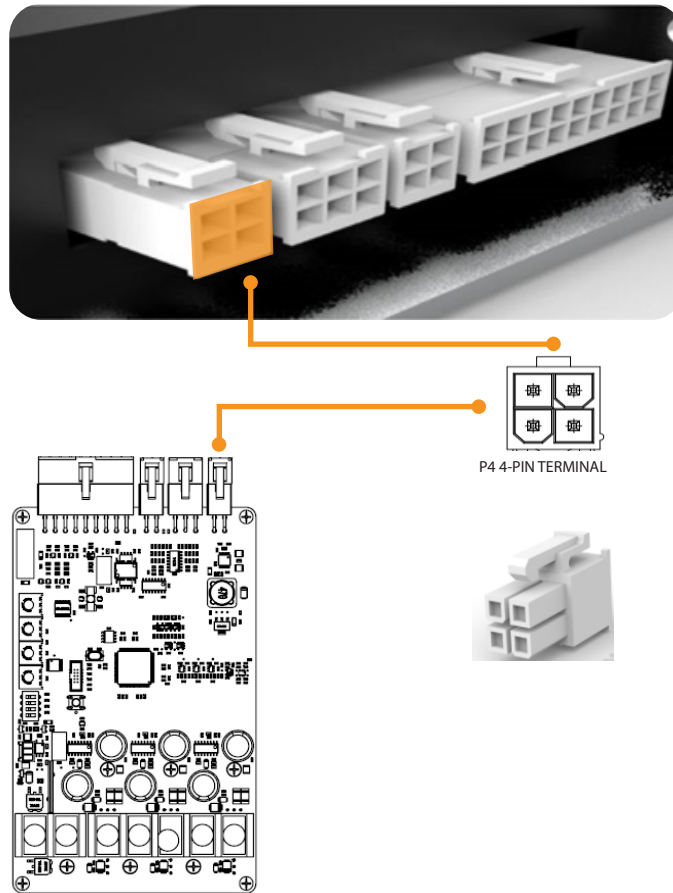


TERMINAL NO	PCB NO	DESCRIPTION
1	X31	5V (0.1A) (HALL SENSOR & ENCODER SUPPLY)
2	X32	PULSE INPUT
3	X33	GND
4	X34	ENC Z / HALL-U
5	X35	ENC B / HALL-V
6	X36	ENC A / HALL-W

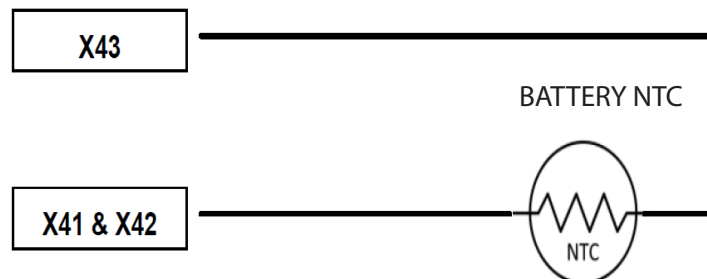


INPUT & P4 - 4 (AUX POWER & BATTERY TERMPERATURE NTC)

Figure - 13 P4 BATTERY NTC & AUX SUPPLY INPUT CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
1	X41	GND 2
2	X42	GND 2
3	X43	BATTERY NTC 10K
4	X44	AUX SUPPLY INPUT (EXTERNAL POWER SUPPLY)



ACT LED NOTIFICATIONS



ACT LED NOTICES:

Periods 1-2 sec in normal condition

Drive Stop Status: Red 1s on, 1s off

On take-off ramp: Red (250msec on - 250msec off)

In forward and reverse speed control: Red (500msec on - 500msec off)

In case of error: (RED LIGHT)

Drive Stop Status	Yellow
Forward Active	Green(Proportional to Duty Cycle)
Reverse Active	Blue (Proportional to Duty Cycle)
Drive Brake Active	Orange(Constant)
In case of error	Red
Periods 4sec in case of error	
Key Entry Passive	Solid red
Low Voltage	(250mS on + 250mS off)x1 + 3.5sn passive
Over Current	(250mS on + 250mS off)x2 + 3.0sn passive
High Voltage	(250mS on + 250mS off)x3 + 2.5sn passive
Min> Max Speed	(250mS on + 250mS off)x4 + 2.0sn passive
High Drive Temperature	(250mS on + 250mS off)x5 + 1.5sn passive
High Motor Temperature	(250mS on + 250mS off)x6 + 1.0sn passive
External Fault Input Active	(250mS on + 250mS off)x7 + 0.5sn passive

COMPUTER COMMUNICATION

The standard RS-232 connection is used for the hand terminal / PC connection. Thanks to this connection, read/write operations can be made for all parameters in the driver.

Computer Interconnect Cable:

To read parameters from the driver, to see the motor current and voltage values, PC connection must be made first.

1 - Energy connections must be made to the driver first.

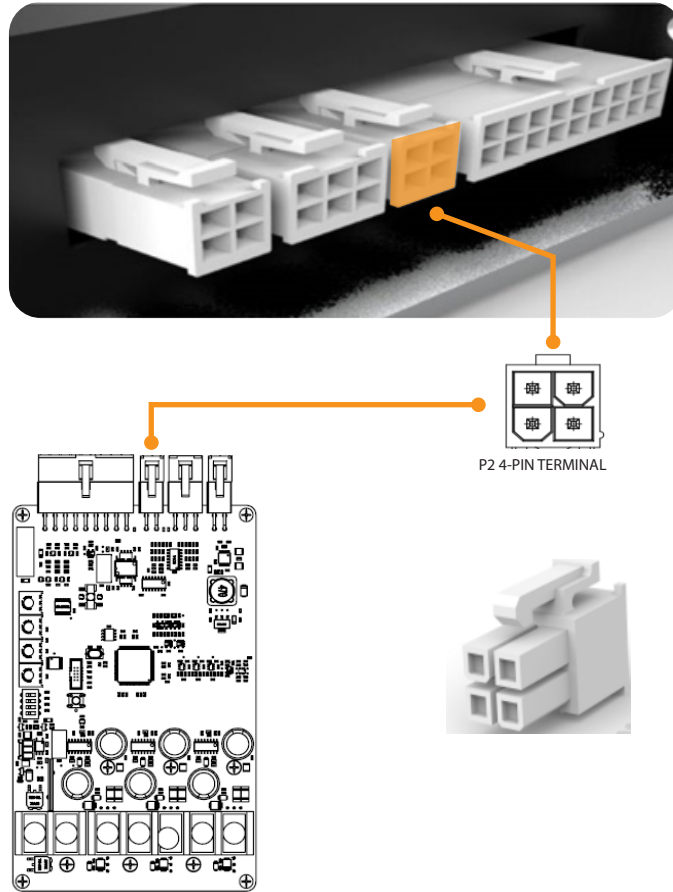
2 - Then, the computer coming out of the box should be plugged into the socket cable.

(P2 - 4)

IF YOU DO NOT HAVE RS232 PORT ON YOUR COMPUTER, YOU CAN USE USB TO RS232 CONVERTER.

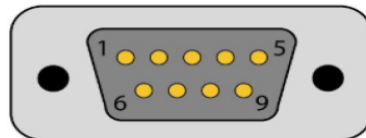
INPUT & P2-4 (RS232 COMMUNICATION)

Figure - 14 P2 RS232 & HAND TERMINAL CIRCUIT



TERMINAL NO	PCB NO	DESCRIPTION
1	X21	RS232 RX
2	X22	5V (0.1A) (HAND TERMINAL SUPPLY)
3	X23	RS232 TX
4	X24	GND

DB9M Connector



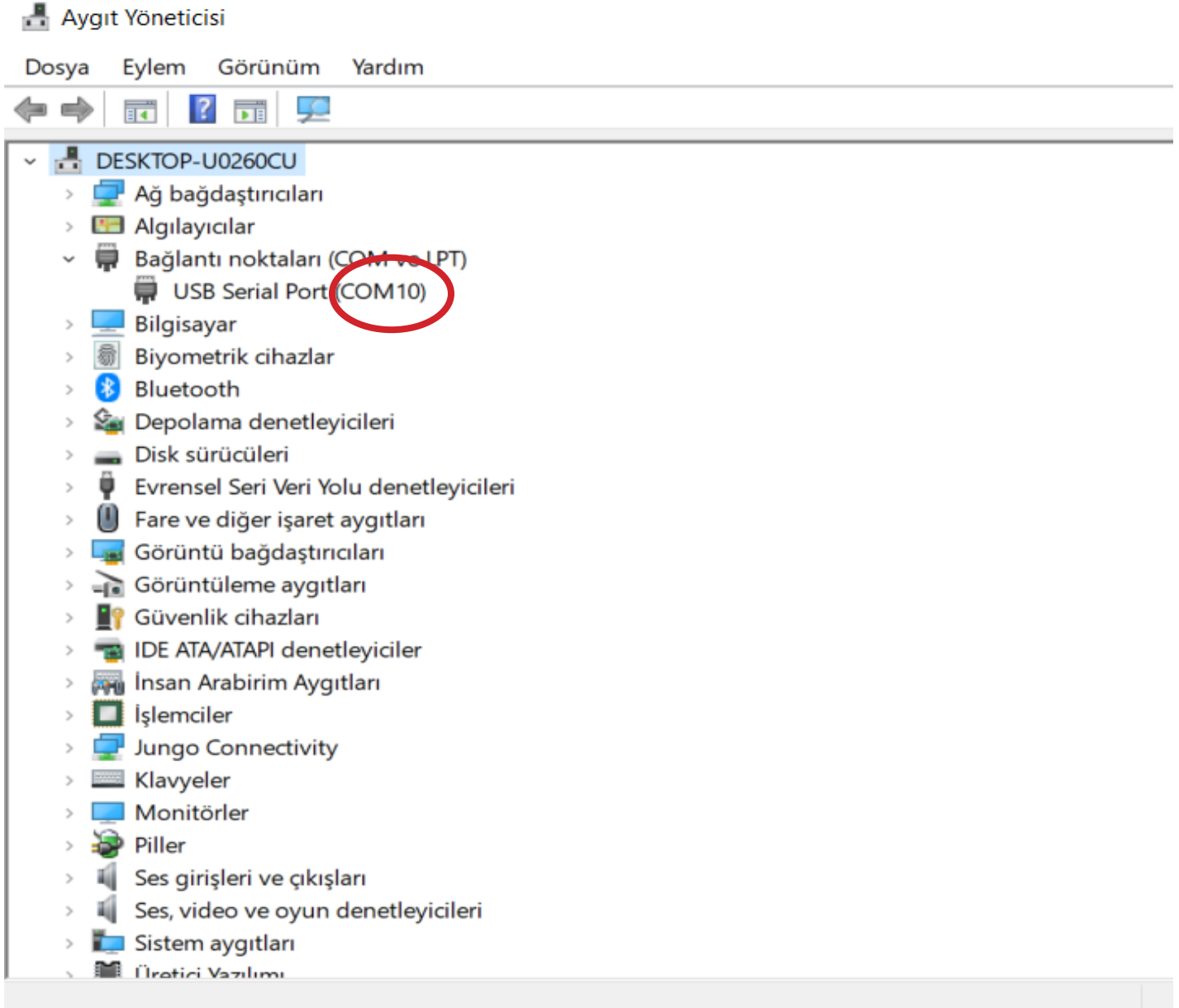
RS232 Pin Out

Pin #	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

COM PORT IDENTIFICATION

The number of the USB or RS232 Port is determined by looking at the computer device manager.

Figure - 15 COM PORT IDENTIFICATION



Then the NES_DRIVE_STUDIO program is installed and run.



Nes Drive Studio COM PORT SELECTION

Figure - 16 P4 COM PORT SELECTION



The motor driver to be used is selected.

It is then opened by selecting the com port. Program menus can be viewed by selecting the virtual port.

P2-4 (RS232 COMMUNICATION & RS485 Modbus RTU)

Tag Name	Address	Data Type	Scaling	Raw Low	Raw High	Scaled Low	Scaled High	Scaled Data Type	R/W
1-Maksimum Speed Rate [%]	40001	Word	0,100	0	1000	0	100	%	R/W
2-Minimum Speed Rate [%]	40002	Word	0,100	0	1000	0	100	%	R/W
3-Acceleration Time[s]	40003	Word	0,001	250	99000	0,25	99	Second	R/W
4-Deceleration Time[s]	40004	Word	0,001	250	99000	0,25	99	Second	R/W
5-Maksimum Battery Voltage[V]	40005	DWord	0,001	10000	100000	10	100	Voltage	R/W
6-Minimum Battery Voltage[V]	40007	DWord	0,001	10000	100000	10	100	Voltage	R/W
7-Current Protection Limit[A]	40009	DWord	0,001	1000	500000	1	500	Ampere	R/W
8-Time Witout Protection Time[s]	40011	Word	0,001	10	3000	0,01	3	Second	R/W
9-Dijital Input Type [0-Sev 1-Ken]	40012	Word	1,000	0	1	0	1	Level	R/W
10-Driver Ptection Limit[°C]	40013	Word	0,010	0	8500	0	85	Temperature	R/W
11-Driver Protection Limit[°C]	40014	Word	0,010	0	10000	0	100	Temperature	R/W
12-Torque Reference In [%]	40015	Word	0,100	0	1000	0	100	%	R
13-Motor Voltage [V]	40016	Long	0,001	-100000	100000	-100	100	Voltage	R
14-Drive Temperature [°C]	40018	Short	0,010	-100000	10000	-1000	100	Temperature	R
15-Motor Temperature [°C]	40019	Short	0,010	-100000	10000	-1000	100	Temperature	R
16-Speed Referance Input[%]	40020	Word	0,100	0	1000	0	100	%	R
17-Supply Voltage[V]	40021	DWord	0,001	0	100000	0	100	Voltage	R
18-Motor Current [A]	40023	Long	0,001	-500000	500000	-500	500	Ampere	R
19-Aktif PWM Duty [%]	40025	Word	0,100	-1000	1000	-100	100	%	R
20-Aktif Motor rpm [RPM]	40026	Long	1,000	-30000	30000	-30000	30000	RPM	R
21-Aktif Speed Pilot [RPM]	40028	Long	1,000	-30000	30000	-30000	30000	RPM	R
22-Closed Loop Control [0-Pas 1-Akt]	40029	Word	1,000	0	1	0	1	Select	R
23-00_BUS_VOLTAGE_MIN_ERROR	40030,0	Boolean	1,000	0	1	0	1	Error Message	R
23-01_CURRENT_MAX_ERROR	40030,1	Boolean	1,000	0	1	0	1	Error Message	R
23-02_BUS_VOLTAGE_MAX_ERROR	40030,2	Boolean	1,000	0	1	0	1	Error Message	R
23-03_MIN_MAX_SPEED_ERROR	40030,3	Boolean	1,000	0	1	0	1	Error Message	R
23-04_BOARD_TEMP_MAX_ERROR	40030,4	Boolean	1,000	0	1	0	1	Error Message	R
23-05_MOTOR_TEMP_MAX_ERROR	40030,5	Boolean	1,000	0	1	0	1	Error Message	R
23-06_EXT_ERROR_INP_ERROR	40030,6	Boolean	1,000	0	1	0	1	Error Message	R
23-07_UNDEFINED_ERROR	40030,7	Boolean	1,000	0	1	0	1	Error Message	R
23-08_HALL_SENSOR_ERROR	40030,8	Boolean	1	0	1	0	1	Error Message	R
23-09_MB_TIME_OUT_ERROR	40030,9	Boolean	1	0	1	0	1	Error Message	R/W
24-00_Digital Input SW_1	40031,0	Boolean	1,000	0	1	0	1	Notification bit	R
24-01_Digital Input SW_2	40031,1	Boolean	1,000	0	1	0	1	Notification bit	R
24-02_Digital Input SW_3	40031,2	Boolean	1,000	0	1	0	1	Notification bit	R
24-03_Digital Input SW_4	40031,3	Boolean	1,000	0	1	0	1	Notification bit	R
24-04_Digital Input FORWARD / ENABLE	40031,4	Boolean	1,000	0	1	0	1	Notification bit	R
24-05_Digital Input STOP	40031,5	Boolean	1,000	0	1	0	1	Notification bit	R
24-06_Digital Input REVERSE /FR	40031,6	Boolean	1,000	0	1	0	1	Notification bit	R
24-07_Digital Input Hold	40031,7	Boolean	1,000	0	1	0	1	Notification bit	R
24-08_Digital Input Fault	40031,8	Boolean	1,000	0	1	0	1	Notification bit	R
24-09_Digital Input KewSW	40031,9	Boolean	1,000	0	1	0	1	Notification bit	R

P2-4 (RS232 COMMUNICATION & RS485 Modbus RTU)

Tag Name	Address	Data Type	Scaling	Raw Low	Raw High	Scaled Low	Scaled High	Scaled Data Type	R/W
25-Motor Torque [Nm]	40032	Long	0,100	-10000	10000	-1000	1000	Nm(Torque)	R
30-Proportional Coefficient [P]	40034	DWord	0,001	1	99999	0,001	99,999	Proportional Coefficient	R/W
31-Integral Coefficient [I]	40036	DWord	0,001	1	99999	0,001	99,999	Proportional Coefficient	R/W
32-Derivative Coefficient[D]	40038	DWord	0,001	1	99999	0,001	99,999	Proportional Coefficient	R/W
33-Encoder Pals (Number of poles in Tulpar series)	40040	DWord	1,000	6	2048	6	2048	ppr	R/W
34-Motor %100 Rpm[rpm]	40042	DWord	1,000	1	30000	1	30000	RPM	R
35-Number of Poles(Tulpar) [pole]	40044	Word	1,000	1	100	1	100	pole	R/W
36-hall sensor adjustment [wvu]	40045	Word	1,000	123	654	123	654	wvu	R/W
37-Hall Sensor Calibration [wvu]	40046	Word	1,000	123	654	123	654	wvu	R/W
38-Spd Cal Volt L [100mV] Calibration	40047	Word	0,001	75	125	0,075	0,125	Voltage	R/W
39-Spd Cal Volt H [5V0] Calibration	40048	Word	0,001	4925	5075	4,925	5,075	Voltage	R/W
40-Spd Cal Adc L [2066] Calibration	40049	Word	1,000	2029	2103	2029	2103	Voltage	R/W
41-Spd Cal Adc H [2978] Calibration	40050	Word	1,000	2922	3034	2922	3034	Voltage	R/W
42-Spd Cal Volt In [V] Calibration	40051	Short	0,001	-10250	10250	-10,25	10,25	Voltage	R/W
43-R01-Remote Mode Timeout	41001	DWord	0,001	1	4294967295	0,001	4294967,295	Second	R/W
44-R02-Remote Mode Enable	41003	Word	1,000	0	10	0	10	Active - Pasive	R/W
45-R03-Remote Digital Input Enable	41004	Word	1,000	0	10	0	10	Active - Pasive	R/W
46-R04-Remote Digital Input FORWARD	41005	Word	1,000	0	10	0	10	Active - Pasive	R/W
47-R05-Remote Digital Input STOP	41006	Word	1,000	0	10	0	10	Active - Pasive	R/W
48-R06-Remote Digital Input REVERSE	41007	Word	1,000	0	10	0	10	Active - Pasive	R/W
49-R07-Remote Digital Input Hold	41008	Word	1,000	0	10	0	10	Active - Pasive	R/W
50-R08-Remote Analog Input Enable	41009	Word	1,000	0	10	0	10	Active - Pasive	R/W
51-R09-Remote Analog Torque Referans Input [%]	41010	Word	0,100	0	1000	0	100	%	R/W
52-R10-Remote Analog Speed Referans Input [%]	41011	Word	0,100	0	1000	0	100	%	R/W
53-DP01-Driver Password 1	41071	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
54-DP02-Driver Password 2	41072	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
55-DP03-Driver Password 3	41073	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
56-DP04-Driver Password 4	41074	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
57-DP05-Driver Password 5	41075	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
58-DP06-Driver Password 6	41076	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
59-DP07-Driver Password 7	41077	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
60-DP08-Driver Password 8	41078	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
61-DP09-Driver Password 9	41079	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
62-DP10-Driver Password 10	41080	Word	1,000	0	65535	0	65535	Data Storage Addresses	R/W
63-M01-Modbus Slave Adres	42001	Word	1,000	1	247	1	247	ModbusRTU Addresses	R/W
64-M02-Modbus Baud Rate	42002	DWord	1,000	9600	115200	9600	115200	ModbusRTU Addresses	R/W
65-M03-Modbus Stop Bits	42004	Word	1,000	1	2	1	2	ModbusRTU Addresses	R/W
66-M04-Modbus Parity	42005	Word	1,000	0	2	0	2	ModbusRTU Addresses	R/W
67-M05-Modbus Reset	42006	Word	1,000	0	10	0	10	ModbusRTU Addresses	R/W

HALL SENSOR RECOGNITION

Figure - 17 HALL SENSOR RECOGNITION

The screenshot shows the 'NES Drive 1.0' software window. It features a dark theme with green text for the title bar. The interface is divided into several sections: a top section with 'Diagnose Sensor' and a '000' input field next to a 'Diagnosis' button; a middle section with a 'Transfer Values' button flanked by four downward-pointing chevrons; a section below with 'Write Flash' (input '123') and 'Write' button, and 'Read Flash (H:wwu)' (input '000') and 'Read' button; a bottom section with three columns of sensor codes: '1=+A', '2=+B', '3=+Z' in the first row, and '4=-A', '5=-B', '6=-Z' in the second row. At the very bottom are 'Ok' and 'Cancel' buttons.

The first introduction of the hall sensor

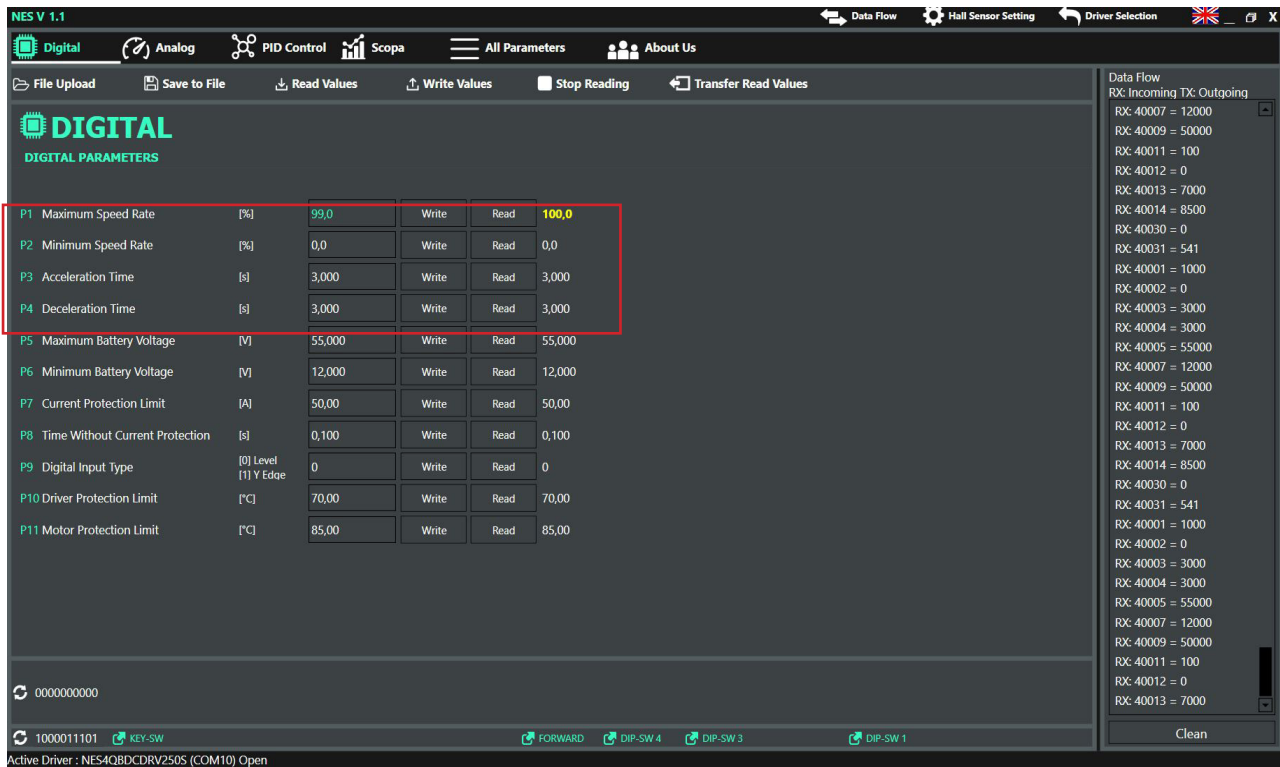
- 1-After the motor U, V, W power cables and hall sensor cables are correctly connected, it is expected to recognize the motor by pressing the recognition button.
- 2-By turning the motor a little, the driver tries to detect the hall sensors.
- 3-He writes the code in the recognition section.
- 4-The detected values are transferred to the flash writing section by pressing the transfer button.
- 5-Clicking the write button will be taken to the flash memory.
- 6-By clicking the flash read button, the hall sensor code in the memory can be read.
- 7-If the same connection will always be established, there is no need to re-introduce it.
- 8-It can start working by writing the code directly into memory.

Recognition should be done again when the connection changes.

If the hall sensor code is known, the working process can be started by writing it directly to flash.

DIGITAL PARAMETER SHEET & P1 , P2 , P3 , P4 Parameter

Figure - 18 DIGITAL PARAMETERS 1



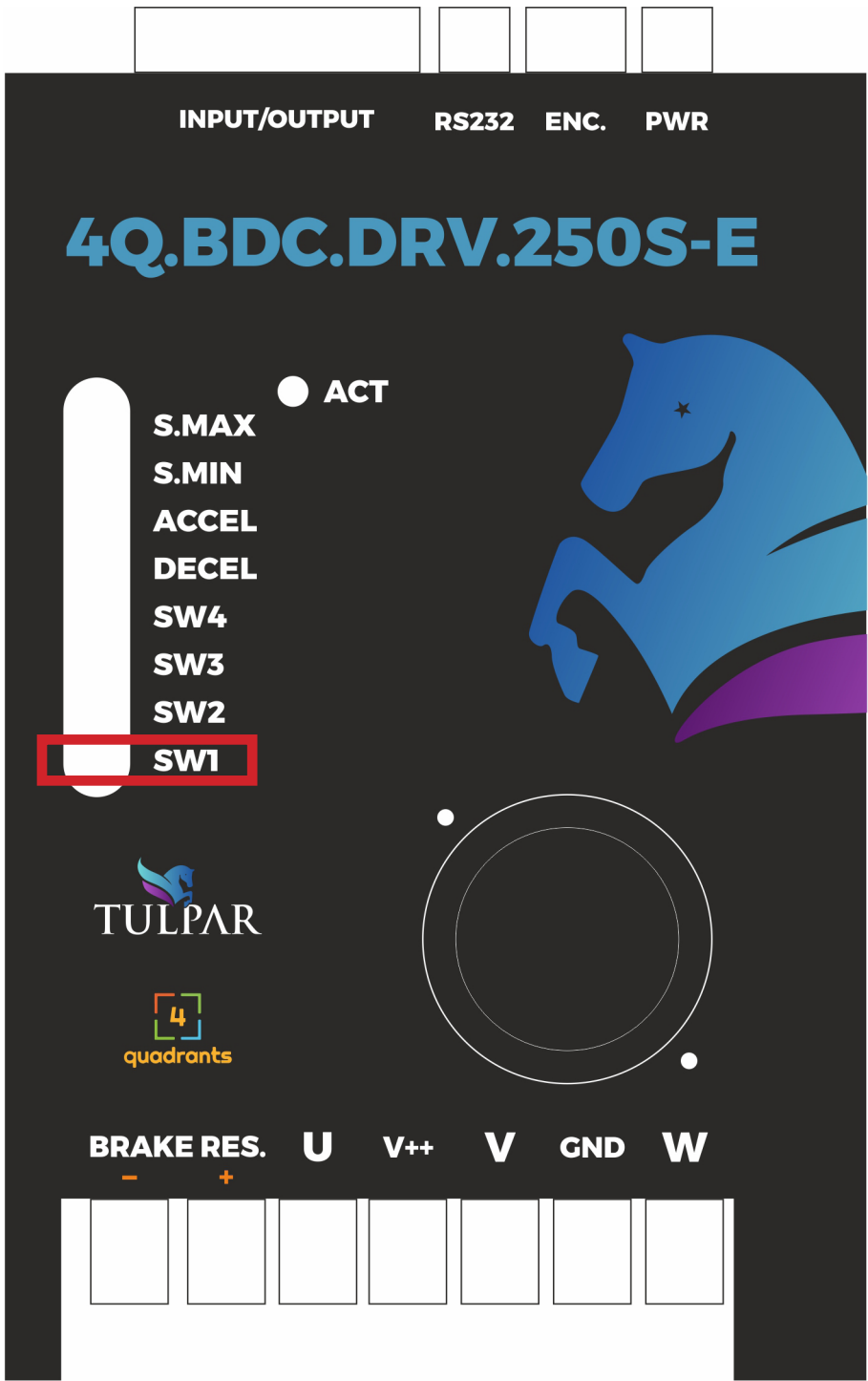
The parameters in the digital page can be read and written individually or with continuous reading buttons.

- P1 With the Maximum Speed Limit ratio, the motor speed can be limited in %. drive supply voltage is upper limit.
- P2 Motor speed in% with minimum speed limit ratio
It can be kept at a certain value above 0 provided it is not greater than 99%.
- P3 The time to climb the motor reference point can be given by the acceleration ramp.
reference movements can also work with ramps.
The unit is in seconds.
- P4 A deceleration ramp can be given from the motor reference point to the zero point.
reference movements can also work with ramps.
the unit is in seconds.

Parameter Setting	4 Pot or Internal parameters
	If SW2 is on external (4 Pot)
	If SW2 is off internal

DIGITAL PARAMETER SHEET & P1 , P2 , P3 , P4 Parameter

Figure - 19 P4 DIGITAL PARAMETERS 2



See. Page 3.

DIGITAL PARAMETER SHEET & P5 .. P11 Parameter

Figure - 20 DIGITAL PARAMETERS 3

Parameter	Unit	Value	Write	Read	Value
P1 Maximum Speed Rate	[%]	99,0	Write	Read	100,0
P2 Minimum Speed Rate	[%]	0,0	Write	Read	0,0
P3 Acceleration Time	[s]	3,000	Write	Read	3,000
P4 Deceleration Time	[s]	3,000	Write	Read	3,000
P5 Maximum Battery Voltage	[V]	55,000	Write	Read	55,000
P6 Minimum Battery Voltage	[V]	12,000	Write	Read	12,000
P7 Current Protection Limit	[A]	50,00	Write	Read	50,00
P8 Time Without Current Protection	[s]	0,100	Write	Read	0,100
P9 Digital Input Type	[0] Level [1] Y Edge	0	Write	Read	0
P10 Driver Protection Limit	[°C]	70,00	Write	Read	70,00
P11 Motor Protection Limit	[°C]	85,00	Write	Read	85,00

P5- Maximum battery voltage upper alarm value can be entered. If the voltage is above this value, it will give the driver an alarm and stop after 3 seconds. It is not affected by instant increases. Its duration is 3 seconds. If the braking resistor is connected, any voltage above the limit is dissipated across the resistor.(See. Page 7).

P6- Minimum battery voltage alarm value can be entered. When the battery falls below this value, the driver stops.

Works smoothly between Maximum battery voltage and Minimum battery voltage.

P7- Motor current protection limit value. It is not affected by instant increases. It does not give more in constant flow. It allows up to P8 time over the limit. will give.

P8- When the motor wants to draw current above the P7 current limit,P8 seconds are allowed.

P9- Digital input type =0 (Momentary)

As long as the inputs are active, the motor is active.

Digital input type =1 (Toggle)

As long as the inputs are active once, the motor is active.

It does not change its position without pressing the stop or change direction button, it continues.

Digital input type =2

Forward = Enable

Reverse = FR

Forward = if active

FR = Passive

Motor Direction CC

FR = Active

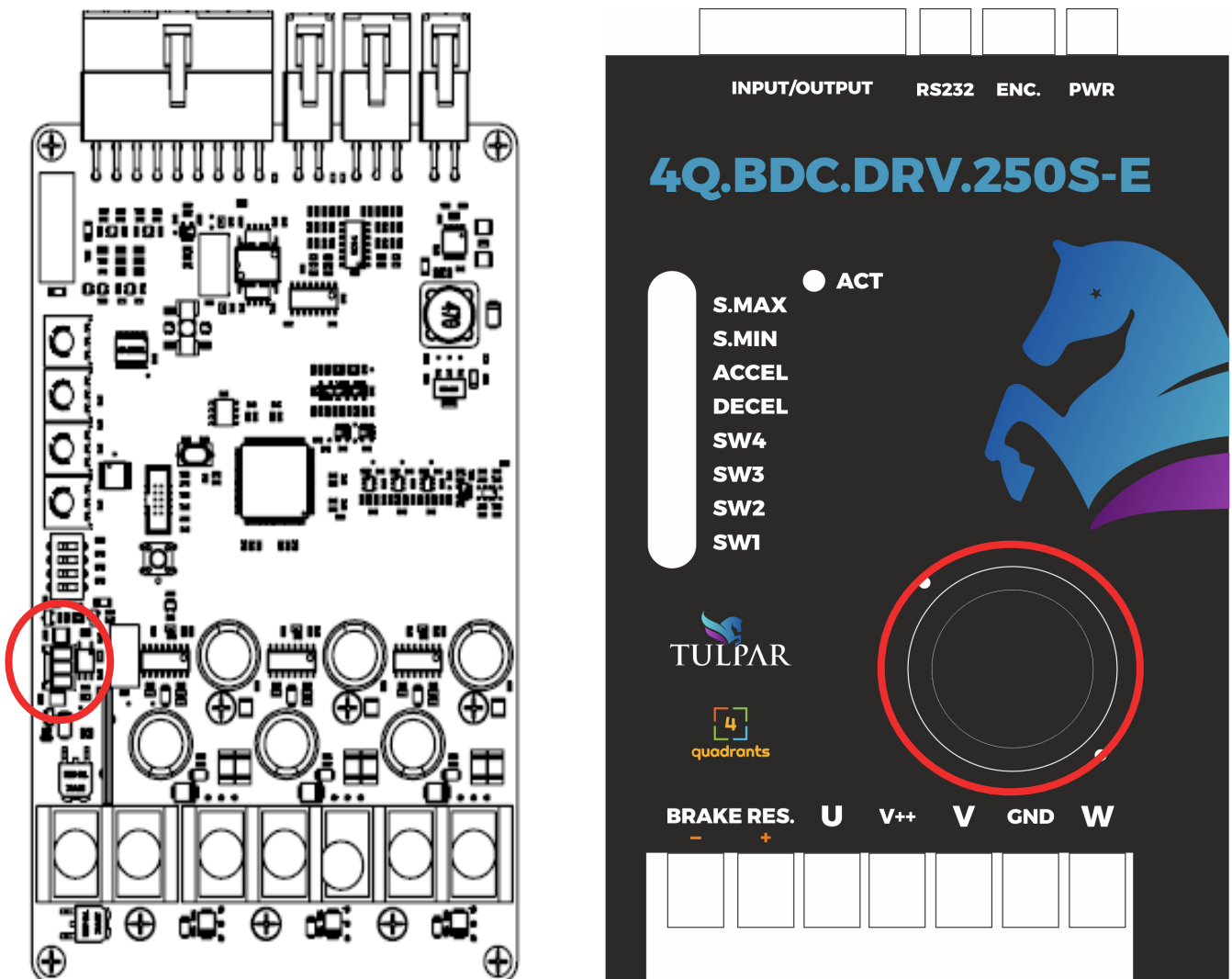
Motor Direction CCW

P10- Drive protection temperature. There is a sensor that measures the drive case temperature. It gives an alarm when the temperature value is exceeded. 45 degrees stage 1(Low) , 55 degrees stage 2(Middle). 65 degrees stage 3.(High) It works in stages.

P11- Motor protection limit & Battery protection are used together. If the motor or battery sensor is connected, a heat alarm can be assigned.

FAN CONNECTION AND OPERATING MODE

Figure - 21 FAN CONNECTION

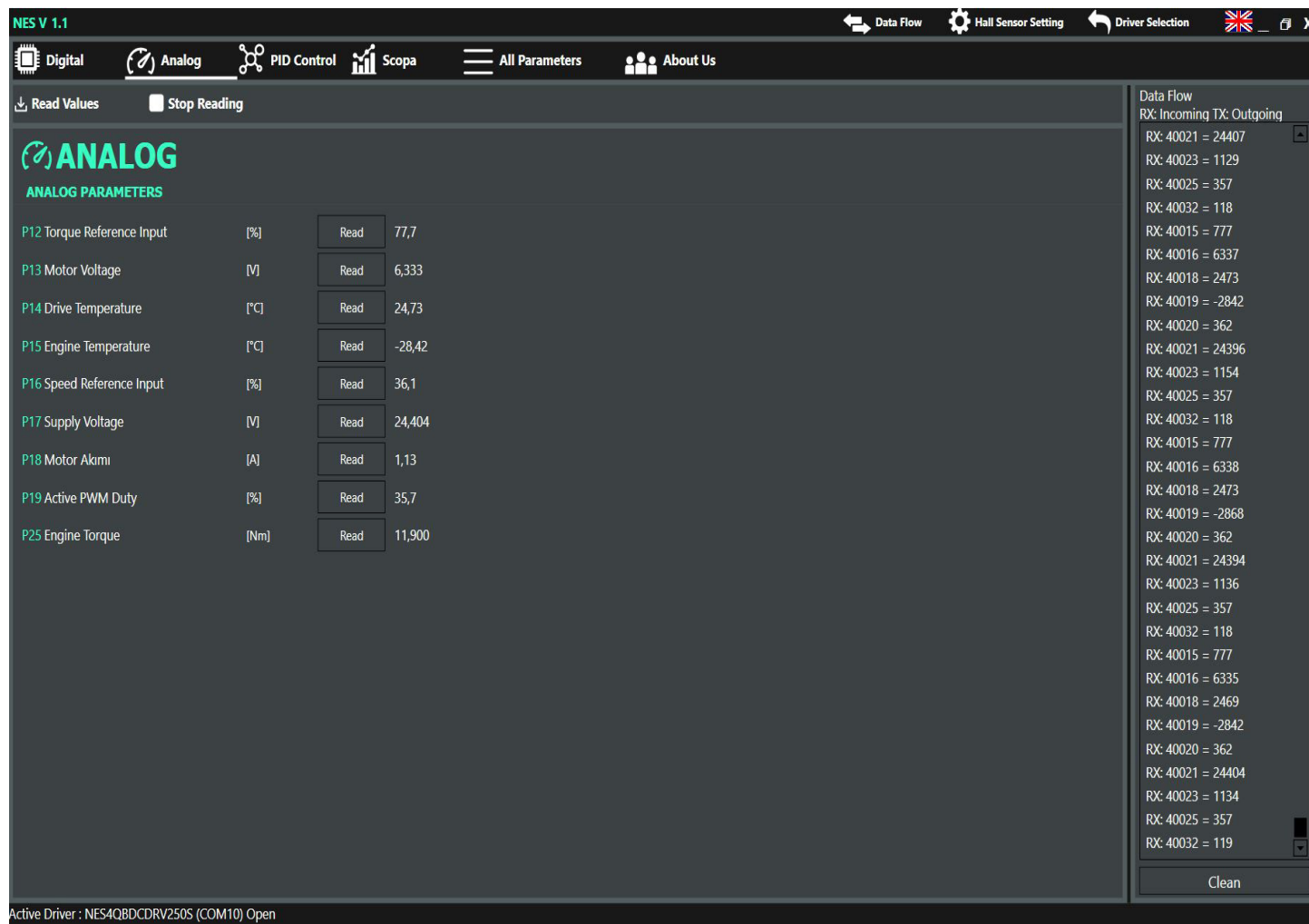


Depending on the drive case temperature, the fan can operate at 3 levels for cooling.

- P10 Drive protection temperature. There is a sensor that measures the drive case temperature. It gives an alarm when the temperature value is exceeded.
45 degrees stage 1(Low), 55 degrees stage 2(Middle).
65 degrees stage 3.(High)
It works in stages.

ANALOG PARAMETER SHEET & P12 .. P25 Parameter

Figure - 22 ANALOG PARAMETERS

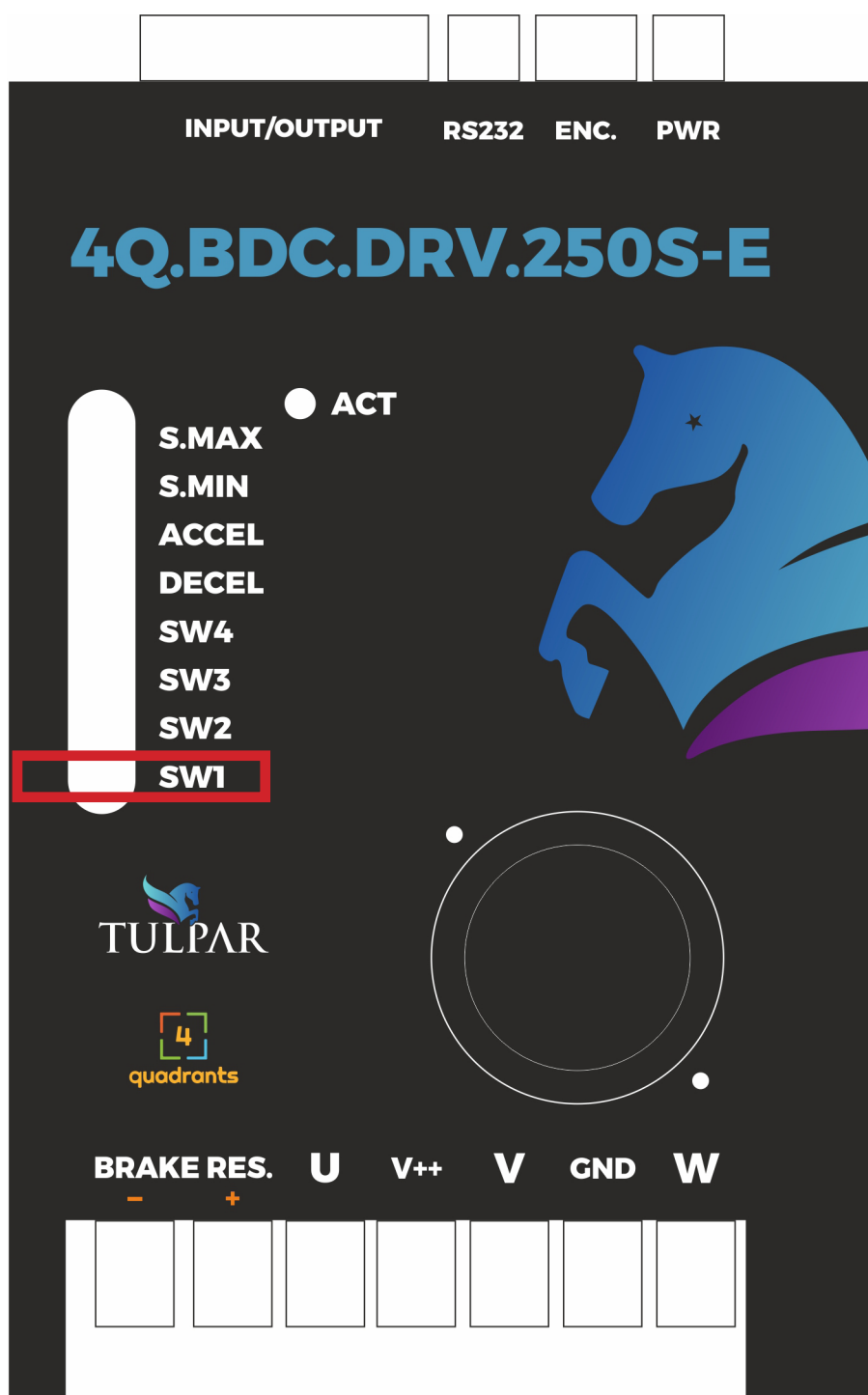


- P12-P16 0-5vdc and 0-10vdc can be selected by SW1. PORT(P1-15, P1-6), (See. Page 17).
- P13 Instantaneous Motor voltage. Motor voltage reference output (0-5V), PORT(P1-16 , P1-5), (See. Page 11).
- P14 Instantaneous driving temperature(Degres).
- P15 Instantaneous motor temperature PORT(P1-8, P1-5), (See. Page 11).
- P17 Instantaneous Battery Voltage
- P18 Instantaneous Motor current.
- P19 Instantaneous active PWM
- P25 Instantaneous engine torque

The parameters in the digital page can be read individually or continuously.

TORQUE & SPEED REFERENCE INPUT 0-5VDC or 0-10VDC SELECT

Figure - 23 SPEED REFERENCE SELECT

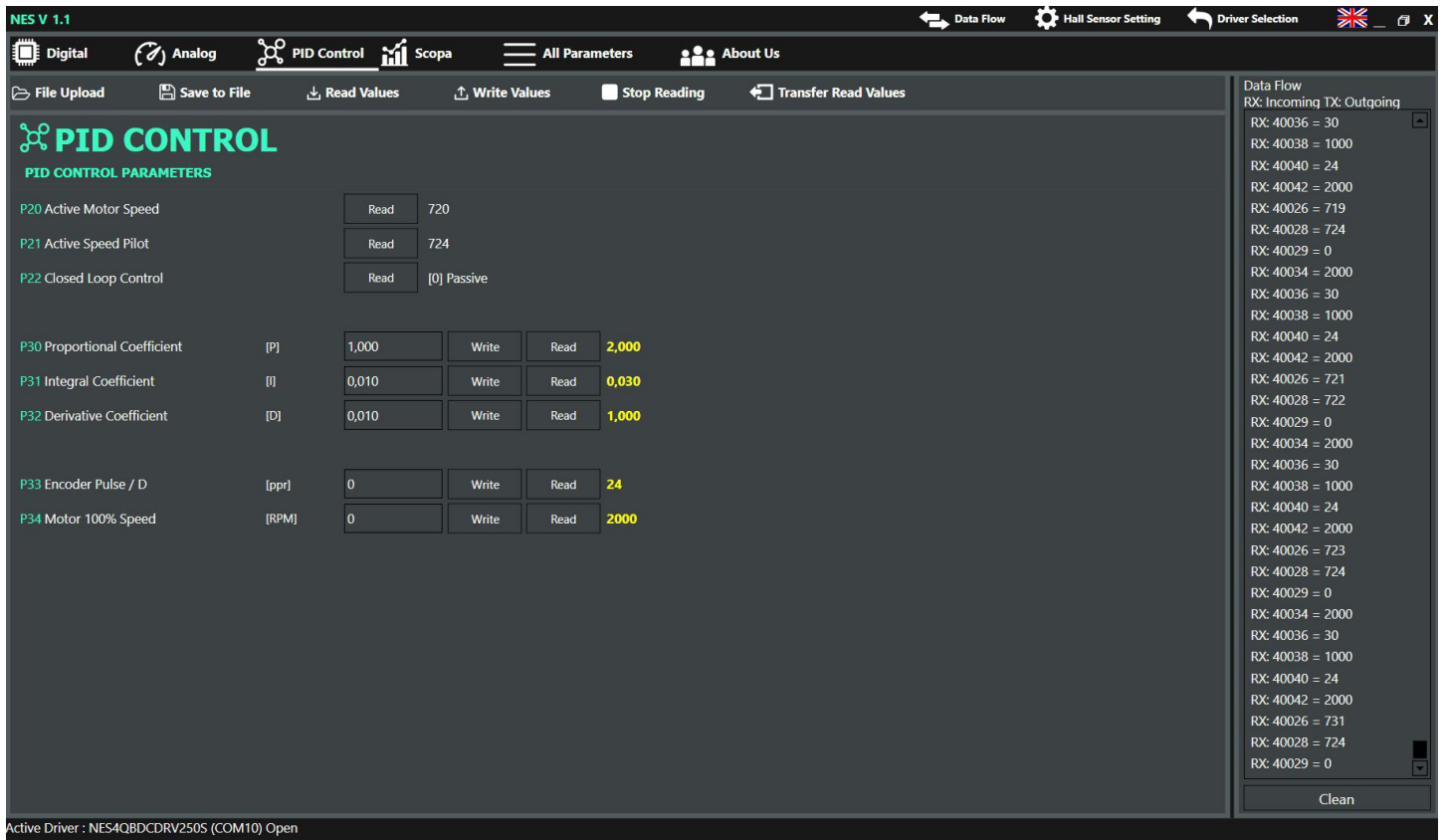


See. Page 3.

PID PARAMETER SHEET

P20 , 21 , 22 - P30 .. 34 Parameter

Figure - 24 PID PARAMETERS

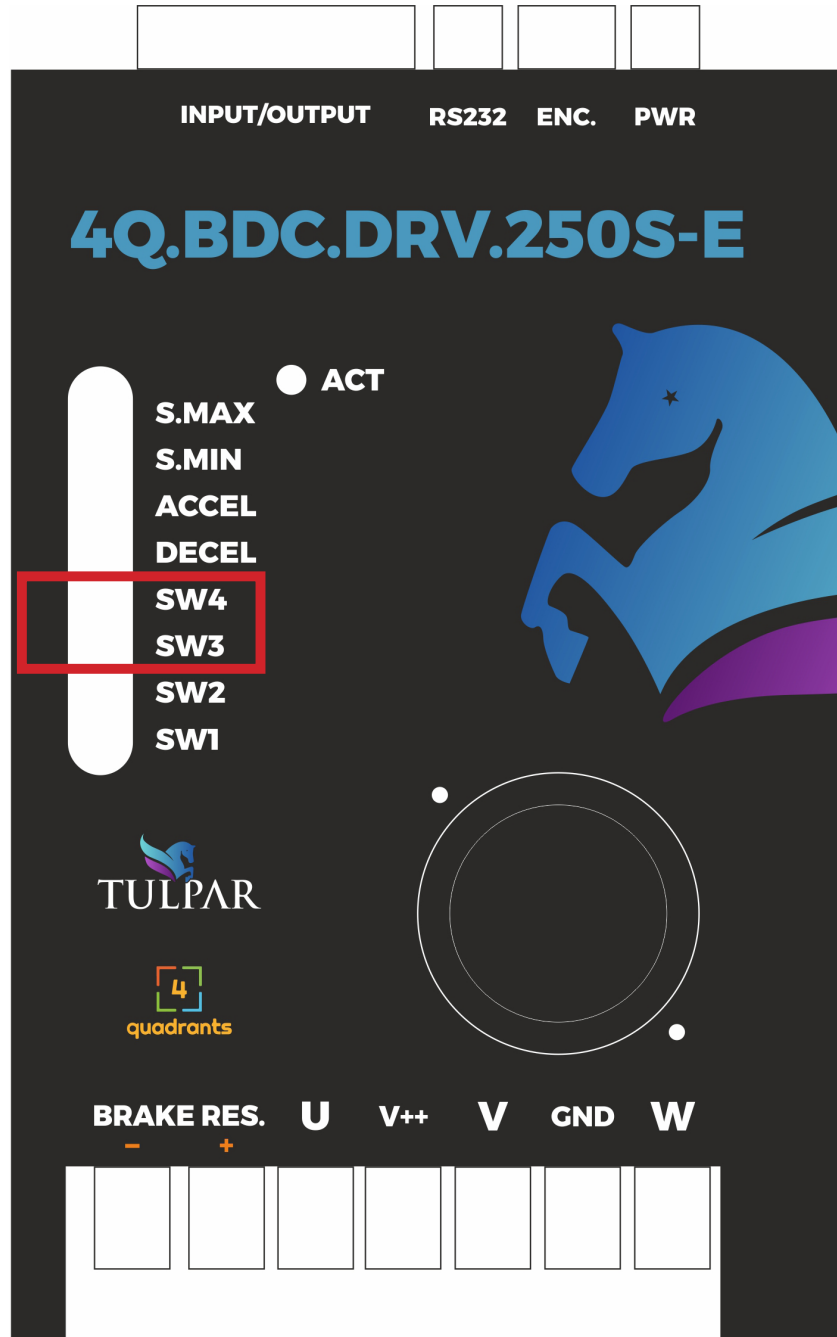


- P20 Shows the instant engine speed value.
- P21 It is the pilot value that the engine should output.
- P22 It works with SW3 and SW4. The drive is a closed loop or open loop operating option.
- P30 Proportional Coefficient , It can be adjusted according to the reaction of the engine.
- P31 Integral Coefficient , It can be adjusted according to the reaction of the engine.
- P32 derivative Coefficient , It can be adjusted according to the reaction of the engine.
- P33 Motor pole number value can be entered in Tulpur series drives. For Bamsı series drives, the encoder pulse value is entered in closed loop operation.
- P34 The engine is factory (Label) rpm.This value must be entered exactly.

The parameters in the digital page can be read individually or continuously.

SW2 , SW3 OPEN LOOP - CLOSE LOOP

Figure - 25 MODE SELECT SW



SW4 FOC	SW3 BLDC	MODE	CURRENT LIMIT	SPEED LIMIT	TORQUE CONTROL	OPERATION WITHOUT SENSOR
0	0	OPEN LOOP	YES	NO	NO	NO
0	1	BLDC	YES	YES PID	YES PID	NO
1	0	FOC	YES	YES PID	YES PID	YES
1	1	BLDC + FOC	YES	YES PID	YES PID	NO

ALL PARAMETER SHEET & P1 ... P34 Parameter

Figure - 26 ALL PARAMETERS

NES V 1.1

Menu: Digital, Analog, PID Control, Scopa, **All Parameters**, About Us

Toolbar: File Upload, Save to File, Read Values, Write Values, Stop Reading, Transfer Read Values

ALL PARAMETERS

Parameter	Unit	Value	Write	Read	Value
P1 Maximum Speed Rate	[%]	99,0	Write	Read	100,0
P2 Minimum Speed Rate	[%]	0,0	Write	Read	0,0
P3 Acceleration Time	[s]	3,000	Write	Read	3,000
P4 Deceleration Time	[s]	3,000	Write	Read	3,000
P5 Maximum Battery Voltage	[V]	55,000	Write	Read	55,000
P6 Minimum Battery Voltage	[V]	12,000	Write	Read	12,000
P7 Current Protection Limit	[A]	50,00	Write	Read	50,00
P8 Time Without Current Protection	[s]	0,100	Write	Read	0,100
P9 Digital Input Type	[0] Level [1] Y Edge	0	Write	Read	0
P10 Driver Protection Limit	[°C]	70,00	Write	Read	70,00
P11 Motor Protection Limit	[°C]	85,00	Write	Read	85,00
P12 Torque Reference Input	[%]	Read			77,7
P13 Motor Voltage	[V]	Read			5,221
P14 Drive Temperature	[°C]	Read			24,88
P15 Engine Temperature	[°C]	Read			-28,42

0000000000

1000011101 KEY-SW

FORWARD DIP-SW 4 DIP-SW 3 DIP-SW 1

Active Driver : NES4QBD/CDRV250S (COM10) Open

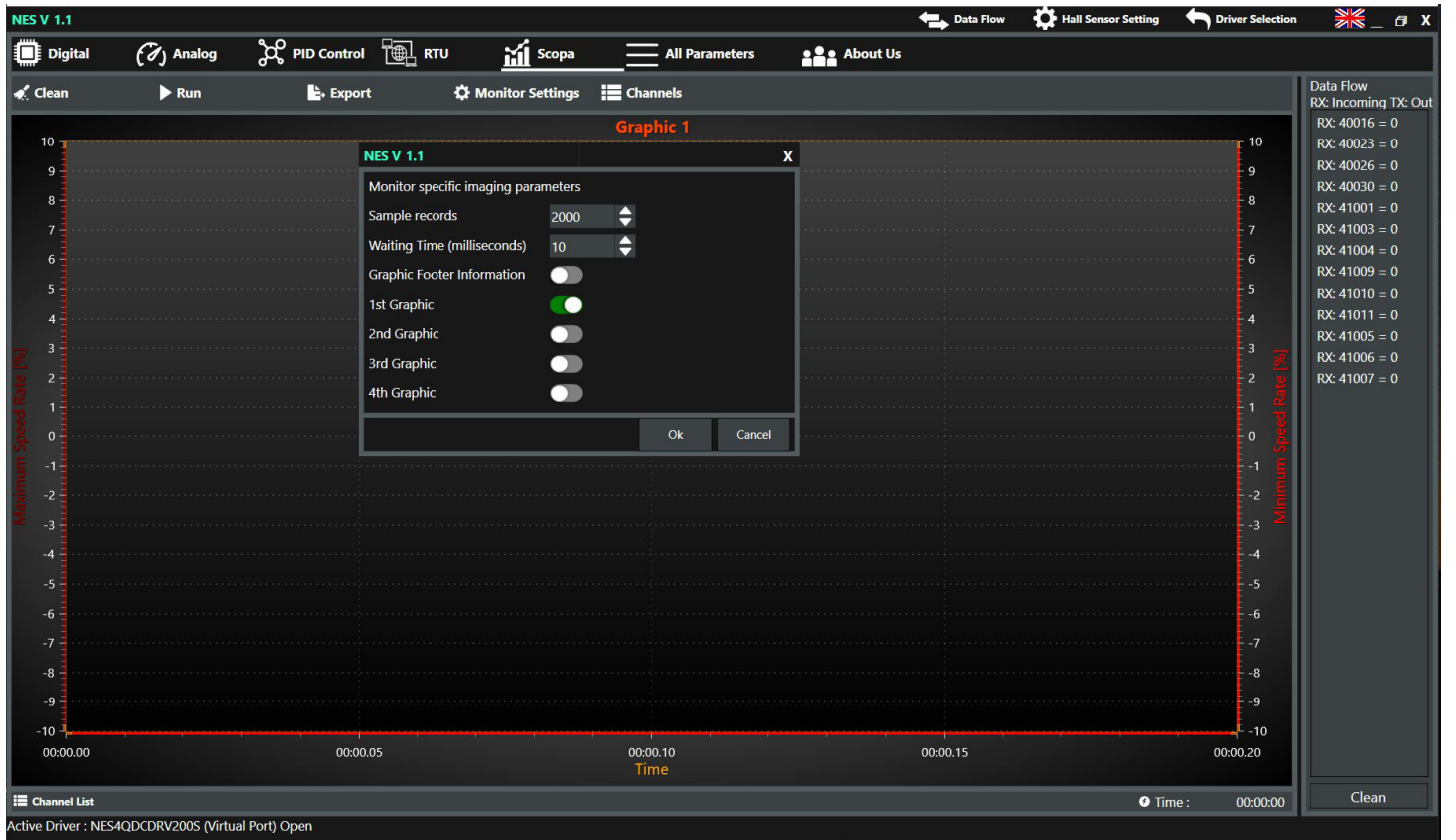
Data Flow
RX: Incoming TX: Outgoing
RX: 40013 = 7000
RX: 40014 = 8500
RX: 40015 = 777
RX: 40016 = 5221
RX: 40018 = 2488
RX: 40019 = -2842
RX: 40020 = 286
RX: 40021 = 24404
RX: 40023 = 977
RX: 40025 = 294
RX: 40026 = 576
RX: 40028 = 572
RX: 40029 = 0
RX: 40030 = 0
RX: 40031 = 541
RX: 40032 = 100
RX: 40034 = 2000
RX: 40036 = 30
RX: 40038 = 1000
RX: 40040 = 24
RX: 40042 = 2000
RX: 40001 = 1000
RX: 40002 = 0
RX: 40003 = 3000
RX: 40004 = 3000
RX: 40005 = 55000
RX: 40007 = 12000
RX: 40009 = 50000
RX: 40011 = 100
RX: 40012 = 0
RX: 40013 = 7000

Clean

In this parameter page, all parameters within the drive can be viewed in a single page. parameters can be saved and saved and recalled.

The parameters in the digital page can be read individually or continuously or the written ones can be changed.

Figure - 27 SCOPE CHART TRACKING PAGE 1



4 graphic pages can be displayed on the scope screen.

Sampling times can be selected.

It can be selected which data will be watched live on the graphic screens.

Figure - 28 SCOPE CHART TRACKING PAGE 2



Figure - 29 REMOTE MANAGEMENT UNIT PAGE



Device IO can be canceled and taken completely to the Remote control unit.

Speed reference and torque control can be done with the mouse thanks to the dial on the screen.

Motor motion can be given with forward stop buttons.

Analog or digital inputs can be operated in RTU mode.

Working order

1- R08 = ON if speed reference or torque will be RTU Mode

2- R03 = ON if digital inputs will be in IO RTU mode

3-Time must be written for R01. If there is no movement, the time counts down and becomes 0.

Time is renewed with the flow of information. When there is no information flow, the time will be 0 and an error occurs. The time error is reset with P23.

Otherwise, RTU will not switch to mode.

4-RTU mode is activated with R02.

RTU Mode works actively through RS232 and RS485.

WHO ARE WE

Nes Yazilim Sanayi ve Ticaret Ltd. Şti, we started our work on electronic card design and embedded software. Our Company Headquarters carries out its activities within the Erciyes Technopark. At the same time, we have an R&D center under the same roof with our company partner Name Elektronik, which operates in electronic card repair and component sales, in order to provide better service to companies operating in the Kayseri OSB region. We have liaison offices in Aksaray and Istanbul. We carry out our activities professionally with our expert staff with 20 years of R&D and market experience.

OUR WAY TO WORK DIFFERENT

First, we listen to you, and we work so that you can afford the right solution. We are aware that your time is precious and we start our business at the time we promise, and deliver your products at the time we promise. He stands behind what we do, guides etc. We deliver the documents to you, answer all your questions, and continue our after-sales technical support 24/7. We know that success; It is only possible with the appropriate content, quality and delivery of the work.

Erciyes Üniversitesi Teknoloji Geliştirme Bölgesi
Tekno-3 No: 67/31 Pk: 38039
Melikgazi/KAYSERİ/ TÜRKİYE
Telefon: +90 352 311 55 57
www.nesdrive.com - info@nesdrive.com

Design and software Our areas of expertise

- DC Motor drivers
- STEP Motor drivers
- LINEAR Actuators
- (Piston Motor) drivers
- BLDC (Brushless) Motor Drivers
- SRM (Switched Reluctance Motor) drivers
- AC-DC Converters
- DC-DC Converters
- LINEAR Actuator
- M-BUS Converters
- PELET Stove Control Systems
- Intersection Control Devices
- Mechanical Calorimeters
- Ultrasonic Calorimeters
- Wireless Data Collection Systems
- Wireless Vehicle Detection Systems
- Electrostatic Powder Coating Control Systems
- Tram and Trambus On Vehicle Communication and Control Systems
- LED Panel Control Systems
- Analog, Digital, Hybrid, RF,
- Power circuit design and software
- Magnetic, Ultrasonic, Temperature,
- Humidity, Pressure etc. sensor interfaces
- Every brand RISC, DSP, ARM etc.