

Programowanie serwonapędów SD6 / SC6 / SI6

firmy [Stober Antriebstechnik](http://www.stober.com)



**STÖBER**  
DriveControlSuite



**Konfiguracja parametrów w programie DriveControlSuite DS6**

**dla parametryzowania podstawowego wizzardu**

**skalowanie oraz referowanie**

Najważniejsze czynności jakie należy przeprowadzić przy tworzeniu nowej aplikacji.

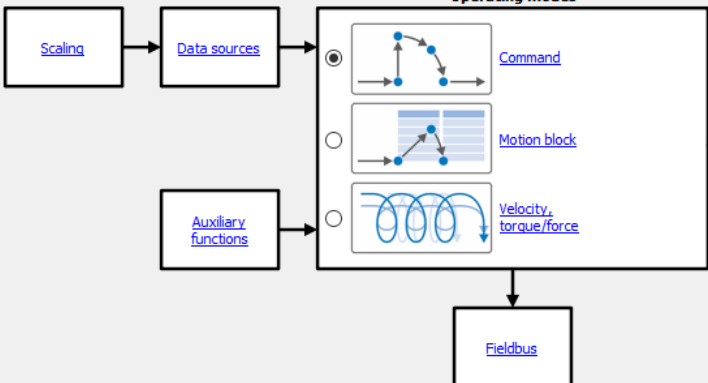
Omawiane ustawienia dla aplikacji DriveBased – Command:

Wizards - A1 : Axis 1 - T1 : Drive controller 1 - M1 : Module 1

- Status display
- Energy supply
- Braking resistor
- > Motor
- Brake
- Encoder
- Axis model
- Referencing
- Jog control panel
- Control panel motion
- Drive Based device control
- > Drive Based application
- > Motion core
- > Control cascade
- > Terminals
- > Control/status words
- > PROFINET
- > Protection functions
- > Local operation
- Remote maintenance
- > Monitoring: Drive controller
- > Fault memory
- Save values
- Restart

**Drive Based application**

1.A150 Cycle time 4: 1 ms E191 Runtime usage 0,0 %



Jeżeli chcemy uruchomić falownik testowo na zasilaniu 1x230V to możemy wprowadzić następujące ustawienia:

- Status display
- Energy supply
- Braking resistor
- > Motor
- Brake
- > Encoder
- > Axis model
- > Referencing

**Energy supply**

A35 Low voltage limit 350 V

A36 Mains voltage 400 V

A38 DC power-input 0: Inactive

Kolejnym krokiem jest sprawdzenie czy mamy prawidłowo wybrany enkoder. Zależnie od typu serwonapędu. Jeżeli jest to enkoder jednokablowy Hiperface DSL to należy ustawić:

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

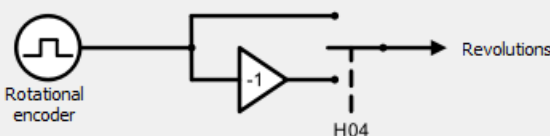
- Status display
- Energy supply
- Braking resistor
- > Motor
- Brake
- > Encoder
- X4
- X101/X103 (DI)
- Master encoder: Scaling
- > Nameplate data
- > Axis model
- > Referencing
- Jog control panel

**X4**

1.H00 X4 function 74: One cable solution 1.H09[0] X4 info

1.H03 Encoder version 0: Rotational 1.H09[1] X4 info

1.H04 X4 inverted 0: Inactive 1.H09[2] X4 info



Kolejnym krokiem jest wybranie typu osi. Czy jest to oś obrotowa czy liniowa. Ograniczona czy nie.

Przykład dla osi ograniczonej obrotowej:

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
- Axis: Scaling
- Window position, velocity
- > Limit: Position
- Limit: Velocity, acceleration, jerk
- Limit: Torque/force
- > Referencing
- Jog control panel
- Control panel motion
- Drive Based device control
- > Drive Based application
- > Motion core
- > Control cascade
- > Terminals
- > Control/status words

### Axis model

1.I05 Type of axis: 2: Rotational

1.B26 Motor encoder: 2: X4 encoder

1.I02 Position encoder: 0: Motor encoder

1.I00 Position range: 0: Limited

Przykład dla osi liniowej ograniczonej:

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
- Axis: Scaling
- Window position, velocity
- > Limit: Position
- Limit: Velocity, acceleration, jerk
- Limit: Torque/force
- > Referencing
- Jog control panel
- Control panel motion
- Drive Based device control
- > Drive Based application
- > Motion core
- > Control cascade

### Axis model

1.I05 Type of axis: 3: Translational

1.B26 Motor encoder: 2: X4 encoder

1.I02 Position encoder: 0: Motor encoder

1.I00 Position range: 0: Limited

Kolejnym etapem jest wprowadzenie przełożenia przekładni przykład dla przełożenia  $i=3$ , poniżej na schemacie znajduje się wygodny kalkulator do sprawdzenia.

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
- Axis: Scaling
- Window position, velocity
- > Limit: Position
- Limit: Velocity, acceleration, jerk
- Limit: Torque/force
- > Referencing
- Jog control panel
- Control panel motion
- Drive Based device control
- > Drive Based application
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- > Protection functions
- > Monitoring: Drive controller
- > Fault memory
- Save values
- Restart

### Axis: Scaling

1.C15 Gear ratio n1: 3

1.C16 Gear ratio n2: 1

1.I03 Axis polarity: 0: Positive

Conversion of positions, velocities, accelerations, torque/force

Item	Motor	By gear unit	User units
Position	1 rev	0,3333 rev	120,0000 °
Velocity	3000 rpm	1000,000 rpm	999,9999 rpm
Acceleration	1 rpm/s	0,333 rpm/s	0,03490659 rad/s <sup>2</sup>
Torque/force	1 Nm	3,0 Nm	

Inny przykład z innym przełożeniem  $i=3,067$  (46/15)

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

Status display  
Energy supply  
Braking resistor  
Motor  
Encoder  
Axis model  
Axis: Scaling  
Window position, velocity  
Limit: Position  
Limit: Velocity, acceleration, jerk  
Limit: Torque/force  
Referencing  
Jog control panel  
Control panel motion  
Drive Based device control  
Drive Based application  
Motion core  
Control cascade  
Terminals  
Control/status words  
PROFINET  
Protection functions  
Monitoring: Drive controller  
Fault memory  
Save values  
Restart

### Axis: Scaling

1.C15 Gear ratio n1: 46  
1.C16 Gear ratio n2: 15  
1.C18 Feed constant denominator: 1 revolutions  
1.C17 Feed constant numerator: 10,0000 mm  
1.I03 Axis polarity: 0: Positive

Conversion of positions, velocities, accelerations, torque/force

Item	Motor	By gear unit	By feed
Position	1 rev	0,3261 rev	3,2609 mm
Velocity	3000 rpm	978,261 rpm	9,7826 m/min
Acceleration	1 rpm/s	0,326 rpm/s	0,0033 m/s <sup>2</sup>
Torque/force	1 Nm	3,1 Nm	1926,8 N

Kolejnym krokiem jest wprowadzenie limitów softwarowych lub/oraz hardwarowych. Zakres dopuszczalnych pozycji od 0 do 100mm oraz krańcówki na wejściach DI1 oraz 2

Wizards - A1 : Axis 1 - I2 : Drive controller 2 - M2 : Module 2

Status display  
Energy supply  
Braking resistor  
Motor  
Encoder  
Axis model  
Axis: Scaling  
Window position, velocity  
Limit: Position  
Limit: Velocity, acceleration, jerk  
Limit: Torque/force  
Referencing  
Jog control panel  
Control panel motion  
Drive Based device control  
Drive Based application  
Motion core  
Control cascade  
Terminals  
Control/status words  
PROFINET  
Protection functions  
Monitoring: Drive controller  
Fault memory  
Save values  
Restart

### Limit: Position

1.I00 Position range: 0: Limited  
1.I191 Error: <offline>  
1.I150 Software stop positive: 100,0000 mm  
1.I190 PLCOpen Error/Stop cause: <offline>  
1.I151 Software stop negative: 0,0000 mm  
1.I192 Position limit cyclic: <offline>  
1.I101 Source positive /limit switch: 3: DI1  
1.I1441 Signal /HW limit switch positive: 1: Active  
1.I102 Source negative /limit switch: 5: DI2  
1.I1442 Signal /HW limit switch negative: 1: Active

Kolejnym etapem jest ustawienie dopuszczalnych prędkości oraz ramp. Pomocny będzie wspomniany wcześniej kalkulator z zakładki skalowania. Przykład poniżej:

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
  - Axis: Scaling
  - Window position, velocity
  - > Limit: Position
  - Limit: Velocity, acceleration, jerk
  - Limit: Torque/force
- > Referencing
- Jog control panel
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- > Drive Based application
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### Limit: Velocity, acceleration, jerk

1.110 Maximal speed	<input type="text" value="9,78 m/min"/>	1.1190 Speed limit	<input type="text" value="&lt;offline&gt;"/>
1.111 Maximal acceleration	<input type="text" value="97 m/s²"/>	1.1193 Speed limit cyclic	<input type="text" value="&lt;offline&gt;"/>
1.117 Quickstop deceleration	<input type="text" value="97 m/s²"/>	1.1191 Acceleration/ jerk limit	<input type="text" value="&lt;offline&gt;"/>
1.116 Maximal jerk	<input type="text" value="970 m/s³"/>	1.1195 Acceleration limit cyclic	<input type="text" value="&lt;offline&gt;"/>
		1.191 Error	<input type="text" value="&lt;offline&gt;"/>
		1.190 PLCOpen ErrorStop cause	<input type="text" value="&lt;offline&gt;"/>

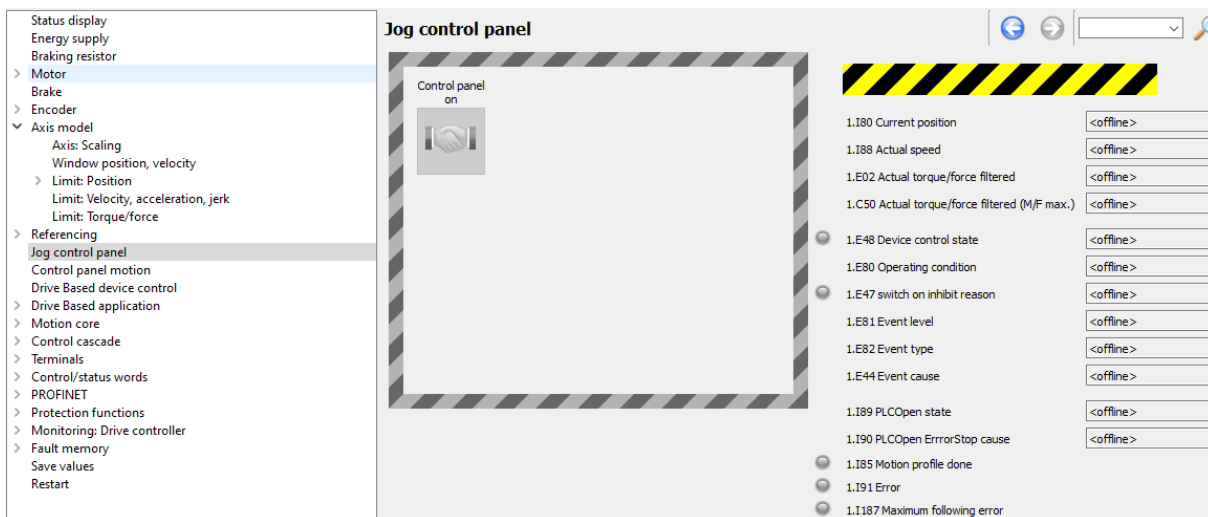
Następnie wybieramy metodę bazowania. Przykładowo na limit switch. Musimy dostosować maksymalne prędkości oraz przyspieszenia.

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
  - Axis: Scaling
  - Window position, velocity
  - > Limit: Position
  - Limit: Velocity, acceleration, jerk
  - Limit: Torque/force
- > Referencing
- Jog control panel
- Control panel motion
- Drive Based device control
- > Drive Based application
- > Motion core
- > Control cascade
- > Terminals
- > Control/status words
- > PROFINET
- > Protection functions
- > Monitoring: Drive controller
- > Fault memory
- Save values
- Restart

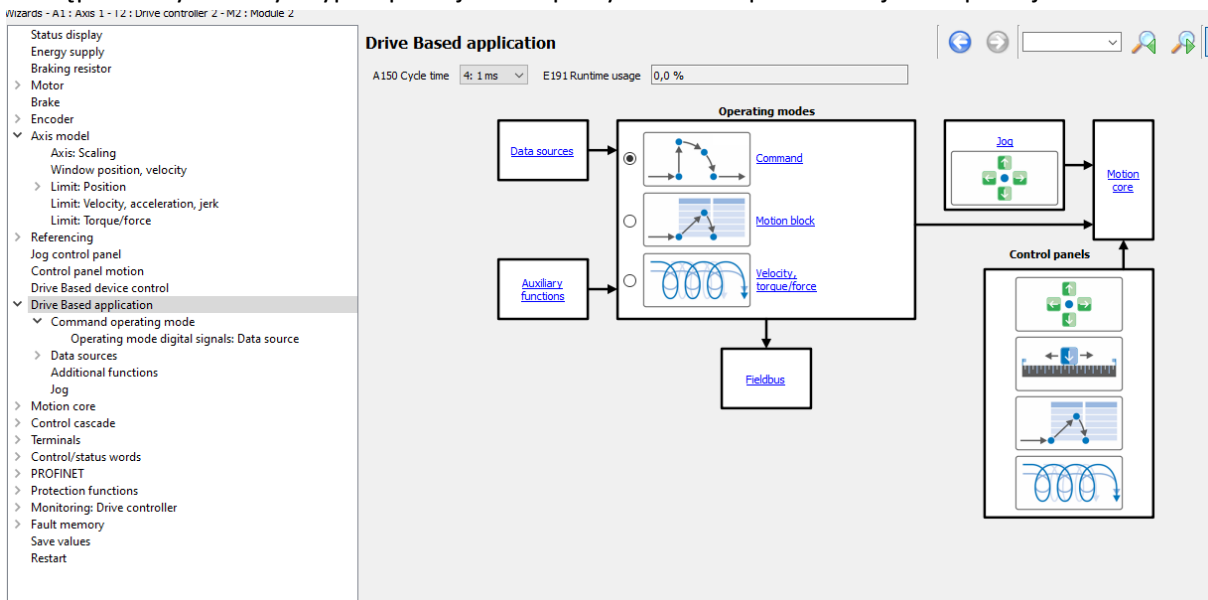
### Referencing

1.130 Referencing type	<input type="text" value="2: Limit switch"/>	1.134 Reference position	<input type="text" value="0,0000 mm"/>
1.131 Referencing direction	<input type="text" value="1: Negative"/>	1.132 Referencing speed fast	<input type="text" value="15 m/min"/>
1.1102 Source negative /limit switch	<input type="text" value="5: DI2"/>	1.133 Referencing speed slow	<input type="text" value="3 m/min"/>
1.143 Move to reference position	<input type="text" value="0: Inactive"/>	1.139 Referencing acceleration	<input type="text" value="150 m/s²"/>
1.135 Referencing with zero pulse	<input type="text" value="0: Inactive"/>	1.144 Reference jerk	<input type="text" value="1500 m/s³"/>

Jazdę testową możemy przeprowadzić za pomocą Jog control panel lub Control Panel motion.:



Następnie wybieramy typ aplikacji do pracy z PLC polecana jest aplikacja Command:



To co należy wykonać to wybranie sygnałów, które mają być zadawane z wejść cyfrowych np. DI1, Di2 lub za pomocą sieci 2:Parameter.

Jeżeli chcemy wszystkie sygnały zadawać z sieci to najlepiej ustawić wszystkie parametry jako 2:Parameter.

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

- Status display
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- > Motor
- > Brake
- > Encoder
- > Axis model
  - Axis: Scaling
  - Window position, velocity
  - > Limit: Position
    - Limit: Velocity, acceleration, jerk
    - Limit: Torque/force
- > Referencing
  - Jog control panel
  - Control panel motion
  - Drive Based device control
  - Drive Based application
    - Command operating mode
      - Operating mode digital signals: Data source
    - Data sources
      - Application digital signals: Data source**
      - Device control digital signals: Data source
      - Torque/force limit: Data source
      - External velocity: Data source
      - External additional velocity: Data source
      - Velocity override: Data source
      - Set torque/force, velocity bracketing: Data source
    - Additional functions
    - Jog

### Application digital signals: Data source

1.I100 Source execute	2: Parameter	<input type="checkbox"/>
1.I101 Source positive /limit switch	3: DI1	<input checked="" type="checkbox"/>
1.I102 Source negative /limit switch	5: DI2	<input checked="" type="checkbox"/>
1.I104 Source jog enable	2: Parameter	<input type="checkbox"/>
1.I105 Source positive jog	2: Parameter	<input type="checkbox"/>
1.I106 Source negativ jog	2: Parameter	<input type="checkbox"/>
1.I107 Source positive jog step	2: Parameter	<input type="checkbox"/>
1.I108 Source negativ jog step	2: Parameter	<input type="checkbox"/>
1.I110 Source position latch 1 start	0: Low	<input type="checkbox"/>
1.I126 Source position 2 latch start	0: Low	<input type="checkbox"/>
1.I111 Source set reference	2: Parameter	<input type="checkbox"/>
1.I112 Source reference mark	0: Low	<input type="checkbox"/>
I210 Control word application	0000 0000 0000 0110 bin	

E19 Digital inputs <offline>

Set all data sources to parameter

Deactivate all data sources

I100 - I108, I110 - I112, I126

Inactive 0 | 1 | Active

## Oraz

Wizards - A1 : Axis 1 - T2 : Drive controller 2 - M2 : Module 2

- Status display
- Energy supply
- Braking resistor
- > Motor
- > Brake
- > Encoder
- > Axis model
  - Axis: Scaling
  - Window position, velocity**
  - > Limit: Position
    - Limit: Velocity, acceleration, jerk
    - Limit: Torque/force
- > Referencing
  - Jog control panel
  - Control panel motion
  - Drive Based device control
  - Drive Based application
    - Command operating mode
      - Operating mode digital signals: Data source
    - Data sources
      - Application digital signals: Data source
      - Device control digital signals: Data source**
      - Torque/force limit: Data source
      - External velocity: Data source
      - External additional velocity: Data source
      - Velocity override: Data source
      - Set torque/force, velocity bracketing: Data source
    - Additional functions
    - Jog

### Device control digital signals: Data source

1.A60[0] Source additional enable	2: Parameter	<input type="checkbox"/>
1.A60[1] Source additional enable	2: Parameter	<input type="checkbox"/>
1.A61 Source fault reset	2: Parameter	<input type="checkbox"/>
1.A62 Source /quick stop	2: Parameter	<input type="checkbox"/>
1.A180 Control byte device	0000 0000 bin	

E19 Digital inputs <offline>

Set all data sources to parameter

Deactivate all data sources

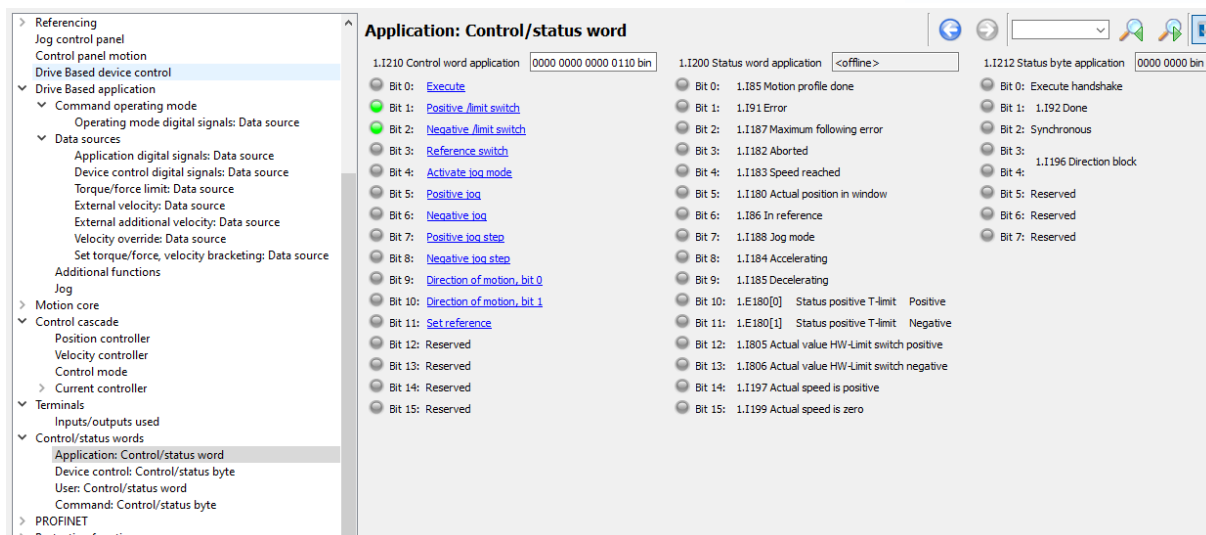
A60-A62, F06

Inactive 0 | 1 | Active

Parameters 2 | 3-28

A180 → DI1 - DI13

Podgląd oraz symulacja zadanych bitów możliwa jest z następujących zakładek:



**Application: Control/status word**

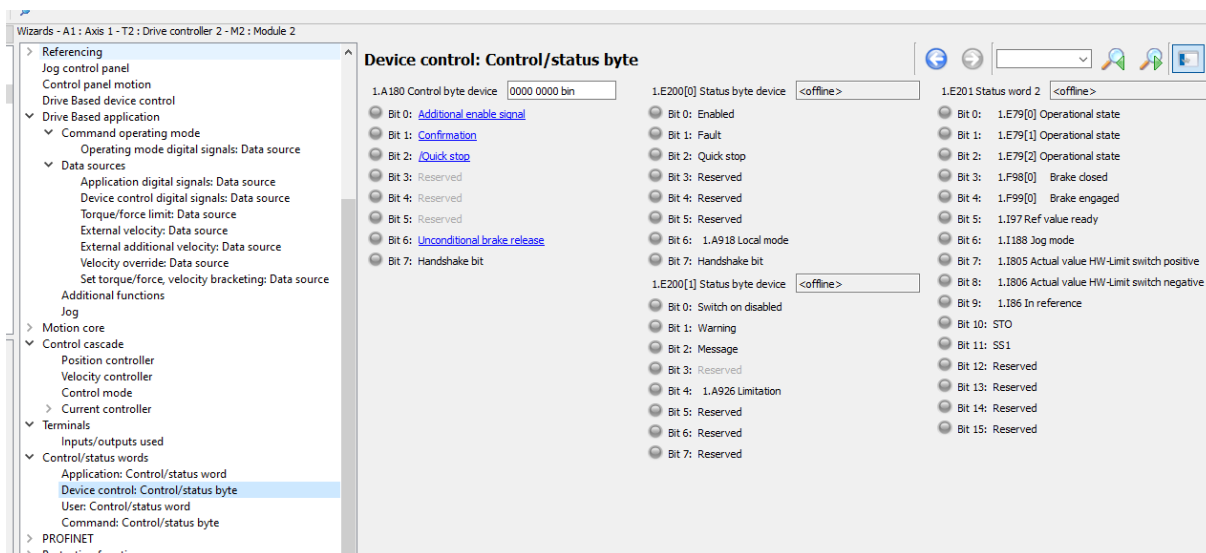
1.I.1210 Control word application

1.I.1200 Status word application

1.I.1212 Status byte application

- Bit 0: Execute
- Bit 1: **Positive limit switch**
- Bit 2: Negative limit switch
- Bit 3: Reference switch
- Bit 4: Activate jog mode
- Bit 5: Positive jog
- Bit 6: Negative jog
- Bit 7: Positive jog step
- Bit 8: Negative jog step
- Bit 9: Direction of motion, bit 0
- Bit 10: Direction of motion, bit 1
- Bit 11: Set reference
- Bit 12: Reserved
- Bit 13: Reserved
- Bit 14: Reserved
- Bit 15: Reserved

Oraz



**Device control: Control/status byte**

1.A.180 Control byte device

1.E.200[0] Status byte device

1.E.201 Status word 2

- Bit 0: **Additional enable signal**
- Bit 1: Confirmation
- Bit 2: Quick stop
- Bit 3: Reserved
- Bit 4: Reserved
- Bit 5: Reserved
- Bit 6: Unconditional brake release
- Bit 7: Handshake bit

Ustawienia należy zapisać za pomocą A00 lub przycisku dyskietki na falowniku lub z wizzadru Save values. Polecane jest po tej czynności uruchomienie falownika ponownie.