



Aplikacje sterowników przemysłowych 1

Podstawy sterowania ruchem



WEAi!



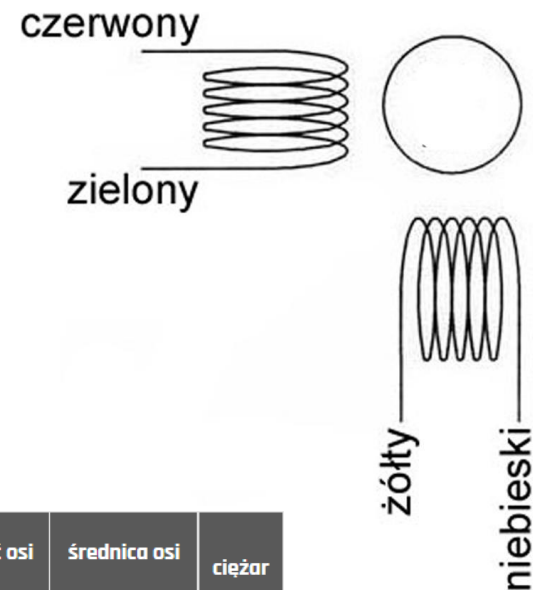
PSk

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Katedra Urządzeń Elektrycznych i Automatyki

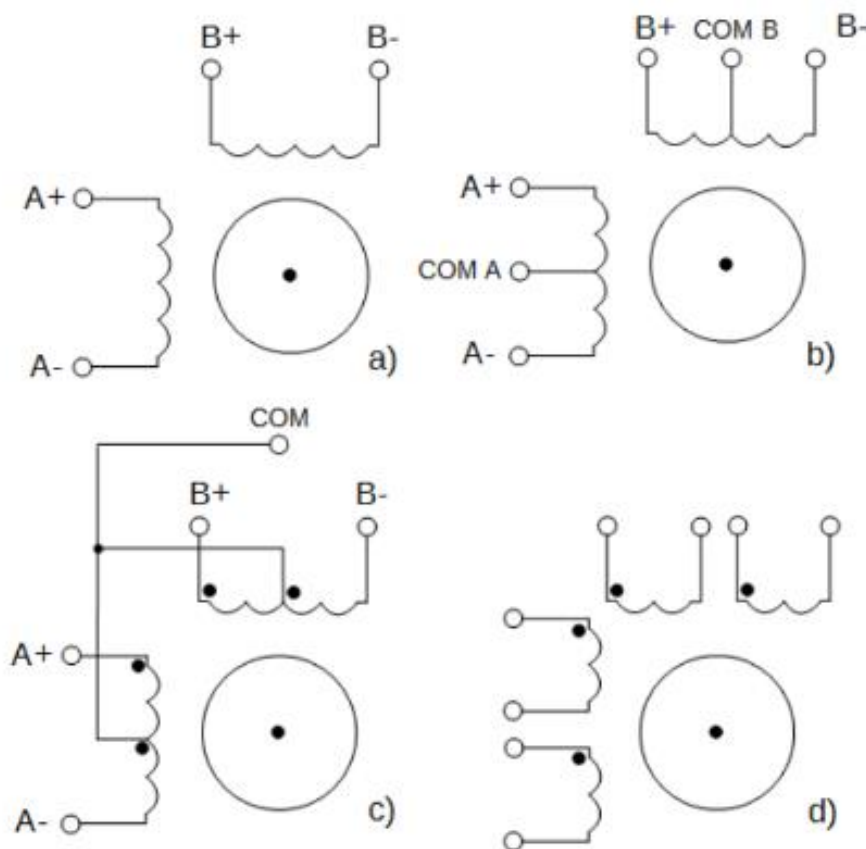
Silnik krokowy JK57HS82-3004



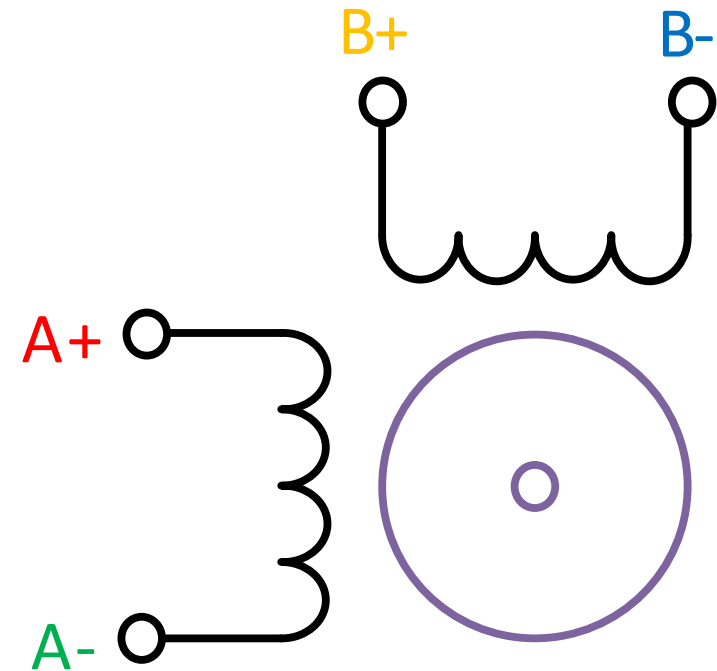
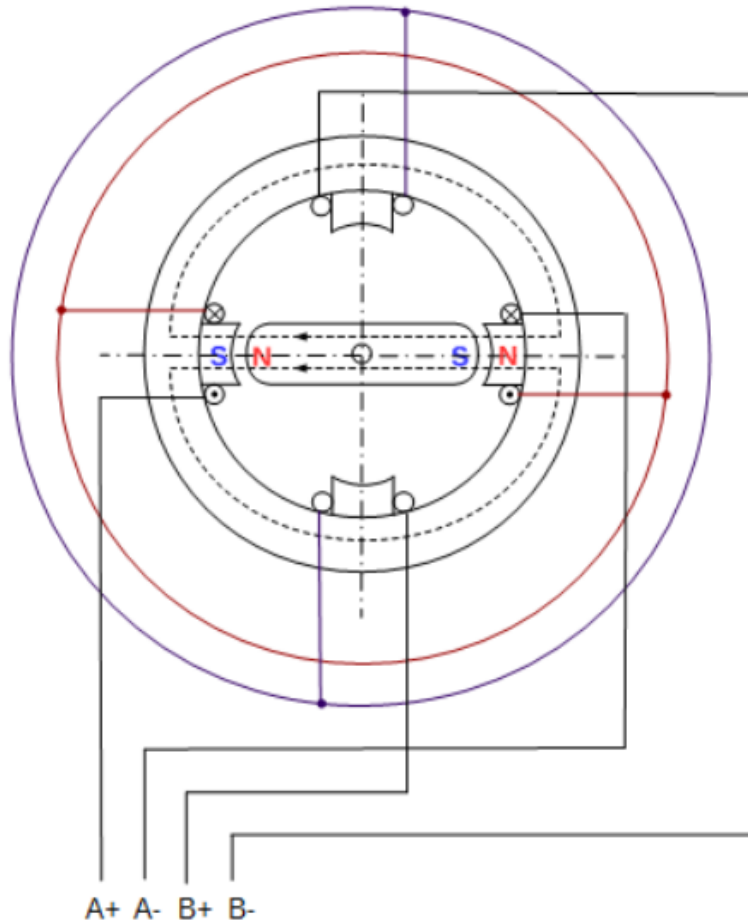
typ silnika	napięcie fazy voltage	prąd fazy phase current	rezystancja fazy Phase resistance	indukcyjność fazy phase in ductance	moment trzymający holding torque	ilość wyprowadzeń leeds	długość korpusu body lenght	długość osi L1 shaft lenght	długość osi L2 shaft lenght	średnica osi shaft diameter	ciężar Weight
	V	A	ohm	mH	N.m / kg.cm		mm	mm	mm	mm	kg
JK57HS56-2504-01	3,25	2,5	1,3	4,2	1 / 11	4	56	21	-	6,35	0,7
JK57HS76-2804	3,1	2,8	1,1	3,6	1,8 / 18	4	76	21	-	6,35	1,1
JK57HS82-3004	3,6	3	1,2	4	2,2 / 22,5	4	82	21	-	8	1,14
JK57HS82-3004-02B	3,6	3	1,2	4	2,2 / 22,5	4	82	21	21	6,35	1,15
JK57HS112-3004-03	4,8	3	1,6	7,5	2,7 / 28	4	112	21	-	8	1,5



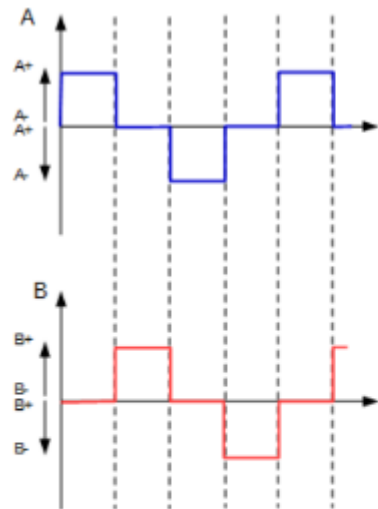
Podział silników krokowych ze względu na sposób połączenia uzwojeń



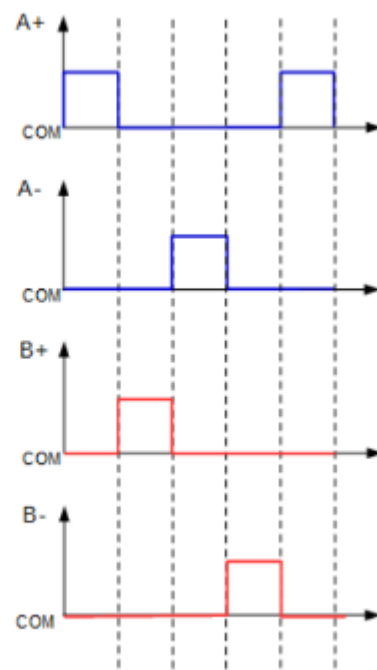
Silnik krokowy bipolarny – budowa



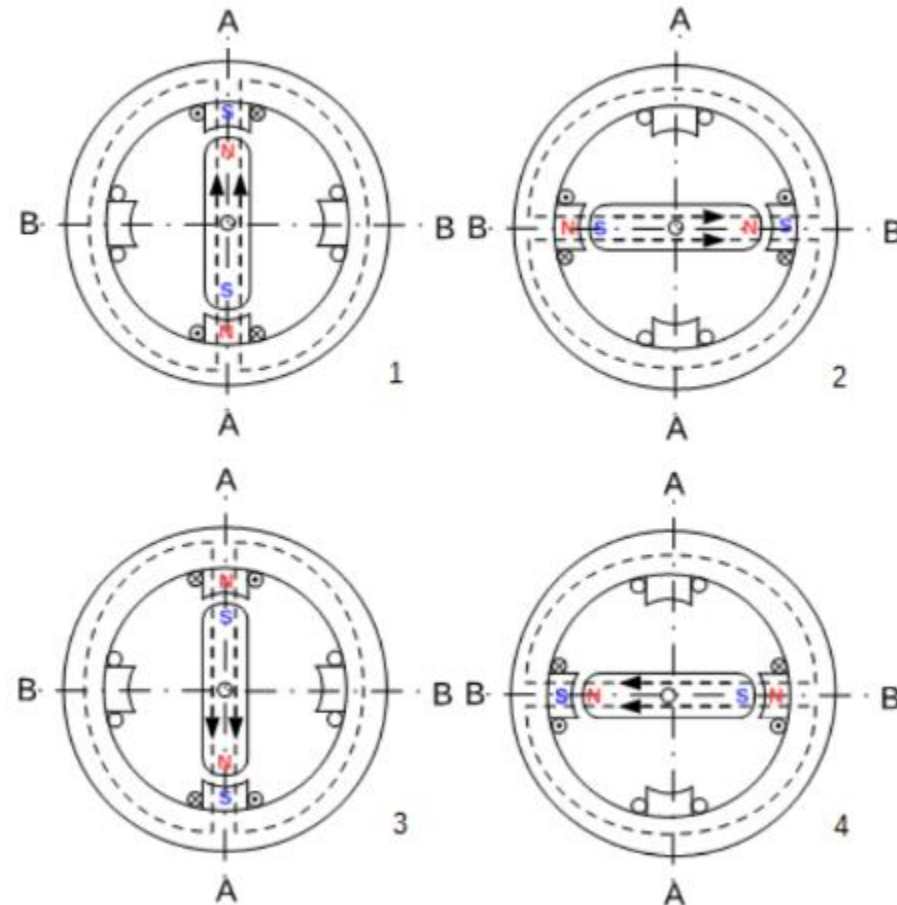
Silnik krokowy – sterowanie pełnokrokowe



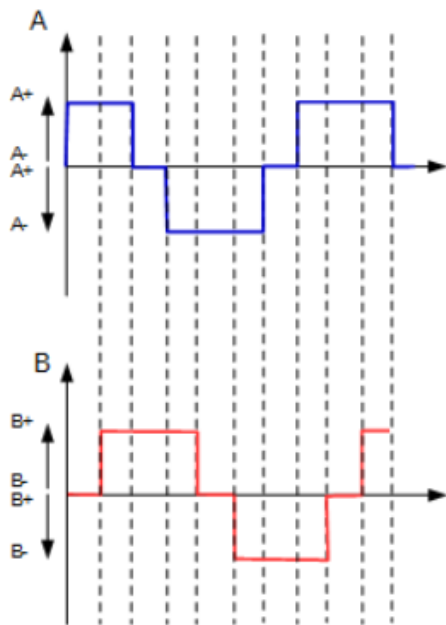
Sterowanie bipolarne



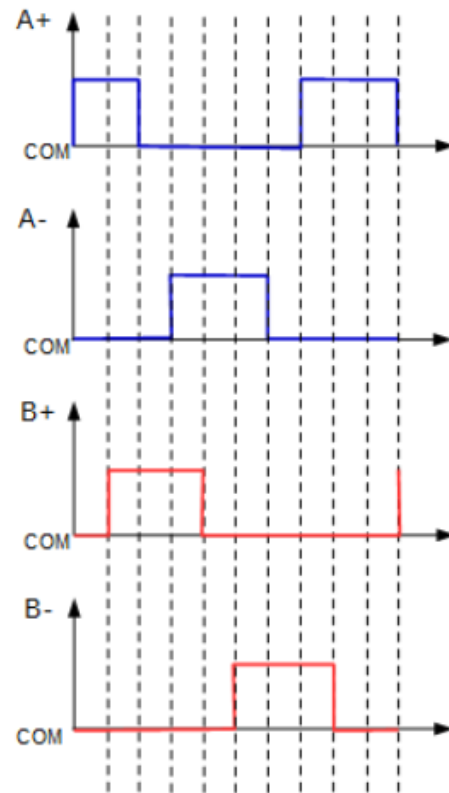
Sterowanie unipolarne



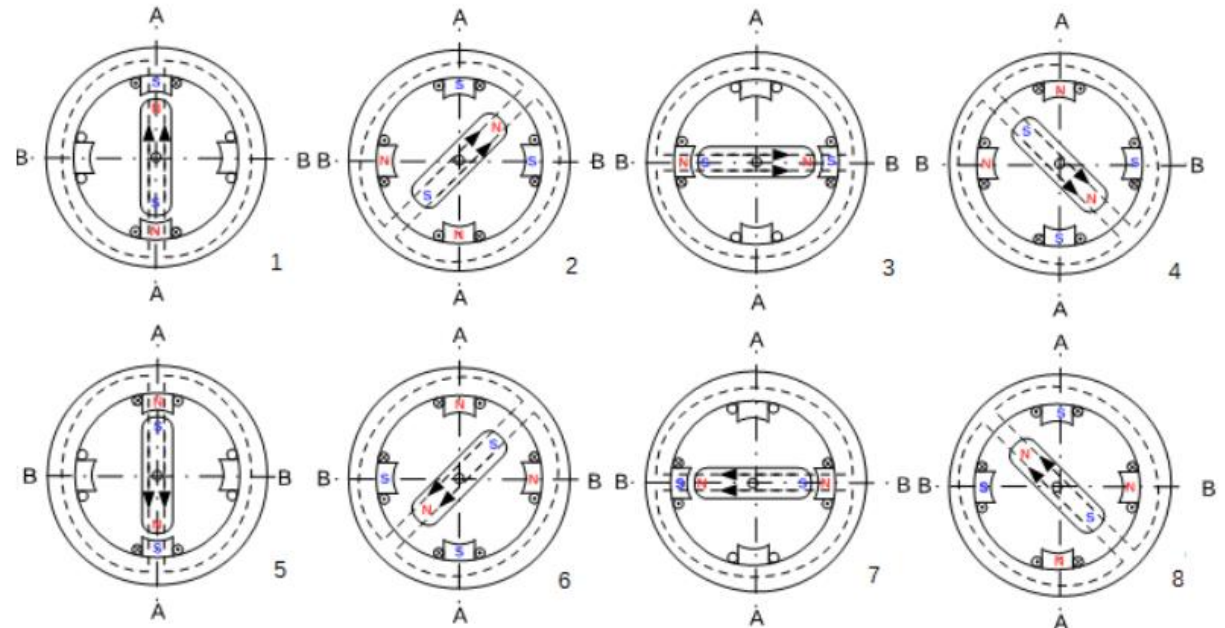
Silnik krokowy – sterowanie półkrokowe



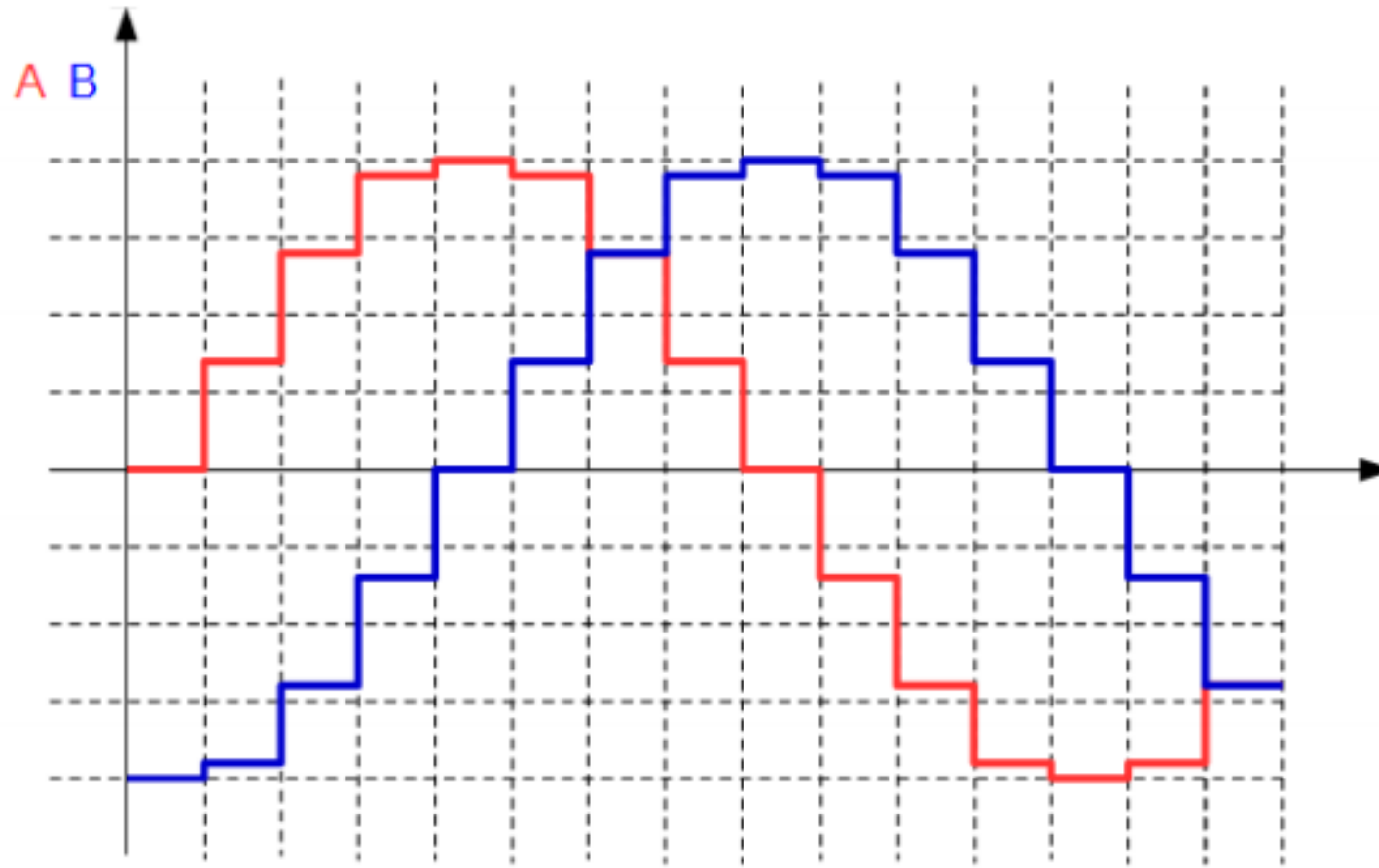
Sterowanie bipolarne



Sterowanie unipolarne



Silnik krokowy – sterowanie mikrokrokowe



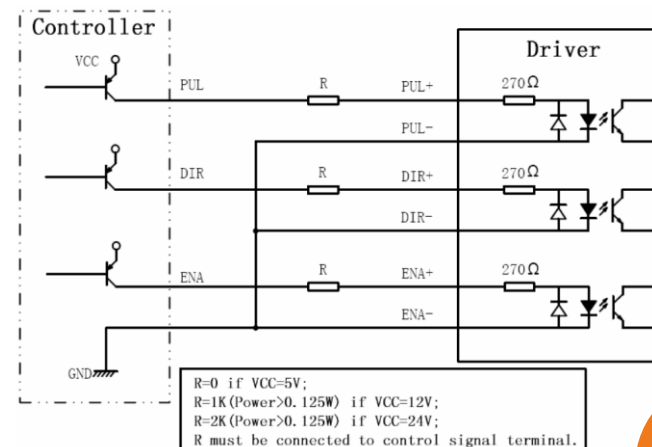
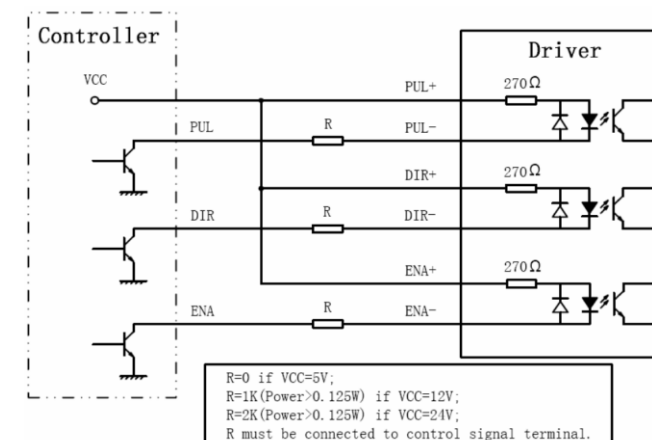
Sterownik silnika krokowego DM556



Cooling	Natural Cooling or Forced cooling	
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0°C — 50°C (32°F — 122°F)
	Humidity	40%RH — 90%RH
	Operating Temperature	70°C (158°F) Max
Storage Temperature	Vibration	5.9m/s ² Max
Weight	Approx. 280g (10 oz)	

Pin Function	Details
PUL+	Pulse signal: In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (software configurable); 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. In double pulse mode (pulse/pulse), this input represents clockwise (CW) pulse, active both at high level and low level (software configurable). For reliable response, pulse width should be longer than 2.5μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signals.
PUL-	
DIR+	DIR signal: In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation; in double-pulse mode (software configurable), this signal is counter-clock (CCW) pulse, active both at high level and low level (software configurable). For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. Please note that rotation direction is also related to motor-Driver wiring match. Exchanging the connection of two wires for a coil to the Driver will reverse motion direction.
DIR-	
ENA+	Enable signal: This signal is used for enabling/disabling the Driver. High level (NPN control signal, PNP and Differential control signals are on the contrary, namely Low level for enabling.) for enabling the Driver and low level for disabling the Driver. Usually left UNCONNECTED (ENABLED) .
ENA-	

Pin Function	Details
+Vdc	Power supply, 20-45 VDC, Including voltage fluctuation and EMF voltage.
GND	Power Ground.
A+, A-	Motor Phase A
B+, B-	Motor Phase B



Sterownik silnika krokowego DM556



Microstep	Steps/rev.(for 1.8°motor)	SW5	SW6	SW7	SW8
1 to 512	Default/Software configured	ON	ON	ON	ON
2	400	OFF	ON	ON	ON
4	800	ON	OFF	ON	ON
8	1600	OFF	OFF	ON	ON
16	3200	ON	ON	OFF	ON
32	6400	OFF	ON	OFF	ON
64	12800	ON	OFF	OFF	ON
128	25600	OFF	OFF	OFF	ON
5	1000	ON	ON	ON	OFF
10	2000	OFF	ON	ON	OFF
20	4000	ON	OFF	ON	OFF
25	5000	OFF	OFF	ON	OFF
40	8000	ON	ON	OFF	OFF
50	10000	OFF	ON	OFF	OFF
100	20000	ON	OFF	OFF	OFF
125	25000	OFF	OFF	OFF	OFF



Sterownik silnika krokowego DM556



Peak Current	RMS Current	SW1	SW2	SW3
Default/Software configured (0.5 to 5.6A)		OFF	OFF	OFF
2.1A	1.5A	ON	OFF	OFF
2.7A	1.9A	OFF	ON	OFF
3.2A	2.3A	ON	ON	OFF
3.8A	2.7A	OFF	OFF	ON
4.3A	3.1A	ON	OFF	ON
4.9A	3.5A	OFF	ON	ON
5.6A	4.0A	ON	ON	ON

Priority	Time(s) of ON	Sequence wave of RED LED	Description
1 st	1		Over-current protection
2 nd	2		Over-voltage protection
3 rd	4		Phase error protection



SIEMENS TIA Portal – konfiguracja PTO/PWM

Pulse options

Signal type:

Output source:

Time base:

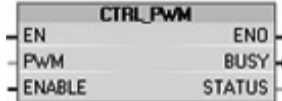
Pulse duration format:

Cycle time:

Initial pulse duration:

Pulse output:

Direction output:

LAD/FBD	SCL	Opis
	<pre>„ctrl_pwm_db” (PWM:= hw_pwm_in_, enable:= _bool_in_, busy=> _bool_out_, status=> _word_out_) ;</pre>	Instrukcja CTRL_PWM dotycząca modulacji szerokości impulsów PWM (<i>Pulse Width Modulation</i>) zapewnia stały okres przebiegu wyjściowego ze zmiennym współczynnikiem wypełnienia. Wyjście PWM działa przez cały czas od chwili uruchomienia generując impulsy o określonej częstotliwości (okresie). Szerokość impulsów jest zmieniana zgodnie z potrzebami, tak by uzyskać pożądany efekt sterowania.

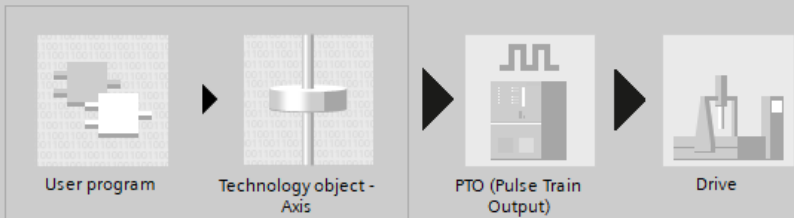
Opis	Domyślne przypisanie wyjść	Impuls	Kierunek
PTO 1	Wyjścia CPU	Q0.0	Q0.1
	Wyjścia płytki sygnałowej	Q4.0	Q4.1
PWM 1	Wyjścia CPU	Q0.0	–
	Wyjścia płytki sygnałowej	Q4.0	–
PTO 2	Wyjścia CPU	Q0.2	Q0.3
	Wyjścia płytki sygnałowej	Q4.2	Q4.3
PWM 2	Wyjścia CPU	Q0.2	–
	Wyjścia płytki sygnałowej	Q4.2	–



SIEMENS TIA Portal – obiekt technologiczny

Technology object - Axis

Axis name:



User program → Technology object - Axis → PTO (Pulse Train Output) → Drive

Hardware interface

Pulse generator:

Output location:

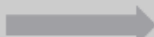
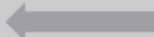
Pulse output:

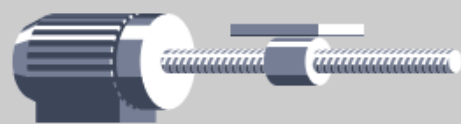
Direction output:

Assigned fast counter:

Unit of measurement

Position unit:

CPU			Drive
Enable output:	Axis_1_DriveEnable ...	%Q0.7	
			Drive enable
Ready input:	TRUE ...		
			Drive ready

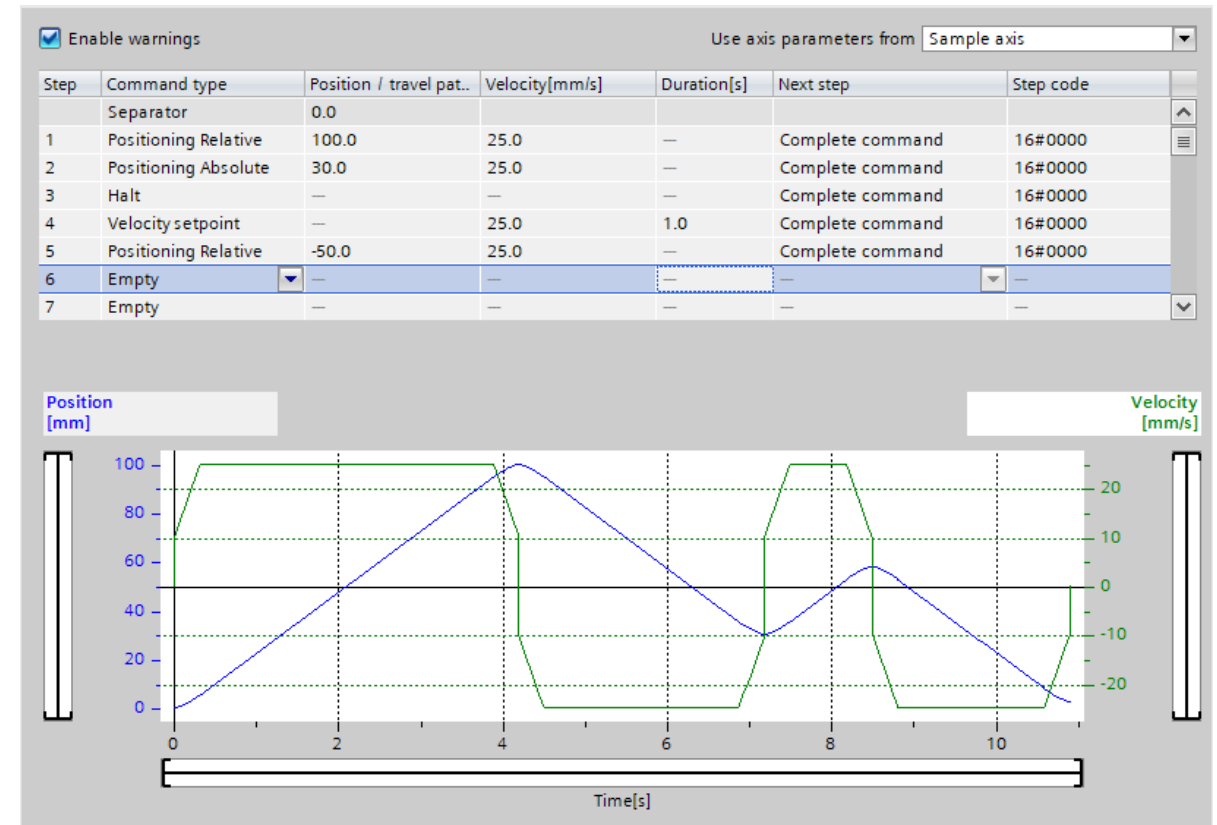
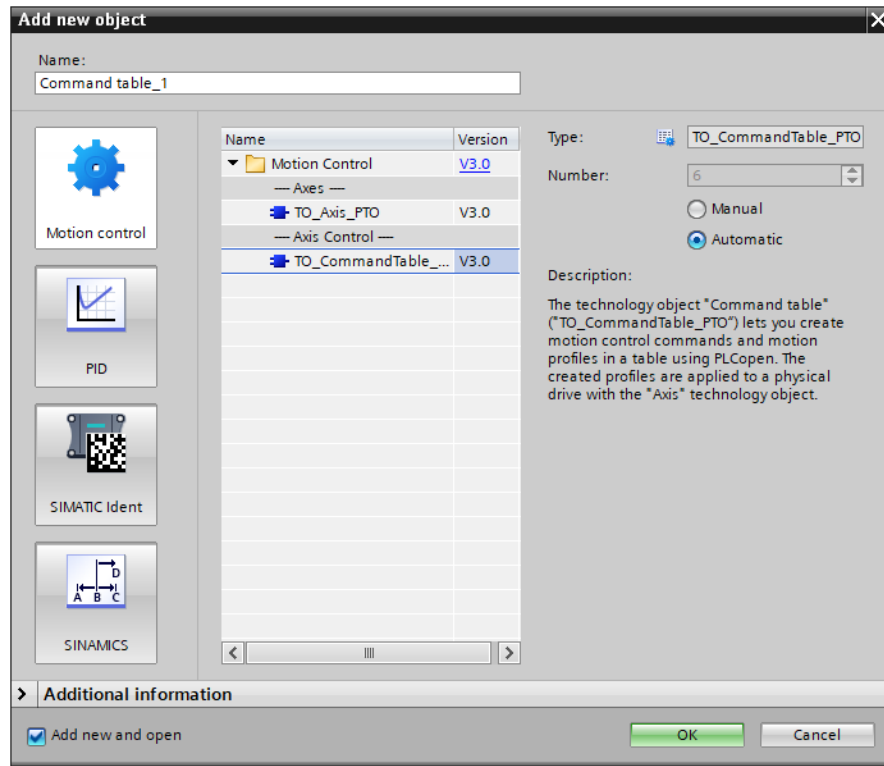


Pulses per motor revolution:

Load movement per motor revolution:

☐ Invert direction signal

SIEMENS TIA Portal – konfigurowanie instrukcji CommandTable



SIEMENS TIA Portal – sterowanie ruchem

► Counting	V1.1	
► PID Control		
▼ Motion Control	V3.0	
MC_Power	V3.0	
MC_Reset	V3.0	
MC_Home	V3.0	
MC_Halt	V3.0	
MC_MoveAbsolute	V3.0	
MC_MoveRelative	V3.0	
MC_MoveVelocity	V3.0	
MC_MoveJog	V3.0	
MC_CommandTable	V3.0	
MC_ChangeDynamic	V3.0	
► SINAMICS	V1.0	

