

INS500 Series Driver (**CE Approved)

5 Phase NanoDrive DC Type Driver Units

五相驱动器

- A compact package matching most existing motors
- 24Vdc Supply Input
- High Resolution possible (selectable 500 up to 500,000 steps per revolution [up to 0.00072 deg/step])
- Extremely Low vibration & No Hunting problems
- Maintains High Torque
- Low Power consumption
- Opto-isolated inputs and outputs
- Auto-current down feature
- Conforms to CE Standard



1. Specifications

Model 型号	INS 500-020	INS 500-120
Drive Methods 驱动方式	Star Bi-polar ; constant current chopper driver	
Power Requirement 电源规格	DC 24V±10%	
Power Consumption 电能消耗	36W max.	60W max.
Output Current 输出电流	0.75 Amp per phase	1.4 Amp per phase
Resolution 分辨率	Basic Step : 0.72° 1, 1/2, 1/2.5, 1/5, 1/8, 1/10, 1/20, 1/40, 1/50, 1/100, 1/125, 1/200, 1/250, 1/500, 1/1000 (Maximum 500,000 steps/revolution)	
Functions 功能	Auto-current down at standstill, Auto-current OFF, MONITOR and indicator output, Nano resolutions selection	
Input Signals 输入信号	CW (PULSE) , CCW(CW/CCW) , CO, SEL All Opto Isolated Input resistance : 390 Ω Voltage H : 4~5V L : 0~0.5V	
CW / CCW (preferred pulse type) 脉冲形式	<p>In Bi-Clock mode Clockwise direction pulses applied to the CW input. Counter clockwise direction pulses applied to the CCW input. Rising edge of input pulse starts to move.</p> <p>Timing chart of Bi-Clock signal</p>	
Pulse / Direction 脉冲 / 方向	<p>In Pulse / Direction mode Stepping pulses applied to the Pulse input. Direction logic signal applied to the CW/CCW input. Rising edge of input starts to move.</p> <p>Timing chart of Pulse/Direction signal</p> <p>[L] Level : CW [H] Level : CCW</p>	

Output Signal 输出信号	MONITOR SIGNAL output. All Opto Isolated. 25V 10mA or less
Excitation Timing Output (MONI)励磁周期零位输出	This MONI output is activated when the driver is at origin (step zero) in the excitation sequence. Full Step : one pulse output at every 10 steps Half Step : one pulse output at every 20 steps
Insulation Resistance 绝缘电阻	100M ohms or higher with DC500V applied in normal temperature and humidity. • Between Voltage- input terminal Case • Between Voltage- input terminal and Signal terminal
Applicable Standard 适配标准	EN60950
Operating Environment 操作环境	Temperature:0~+40°C No freezing Humidity: less than 80% No condensation
Storage Environment 收藏环境	Temperature:-10~+60°C No freezing Humidity: less than 80% No condensation
Operating Height 操作高度	Less than 1,000m from sea level
Atmosphere 气氛	In the room without corrosive gas, inflammable gas or dust, without splashing water or oil.
Accessories 附属品	Connectors (Part Nos : IL-2S-S3L * 1, IL-5S-3SL * 1, IL-9S-S3L * 1, IL-C2-100000 * 16)
Weight 重量	270 g (with cover)

2. Applicable Motor Range

Type 类型	Motor Size (mm) 马达体型	Motor Model 型号	Max. Holding Torque (kgcm) 静力矩	Rotor Inertia (gcm ²) 转子惯量	Basic Step Angle*** 步距角	Phase Current (Amps) 额定电流	Motor Weight (kg) 马达重量
HI-TORQUE 高扭转力	28	PEE 533 A (B)	0.33	9	0.72°	0.75	0.1
		PEE 535 A (B)	0.6	18	0.72°	0.75	0.17
	42	PF 543 AC (BC)	1.3	35	0.72°	0.75	0.25
		PF 544 AC (BC)	1.8	54	0.72°	0.75	0.3
		PF 545 AC (BC)	2.4	68	0.72°	0.75	0.4
	60	PCE 5641 AC (BC)	4.2	175	0.72°	1.4	0.6
		PCE 5661 AC (BC)	8.3	280	0.72°	1.4	0.8
		PCE 5691 AC (BC)	16.6	560	0.72°	1.4	1.3
	85	PCE 5961 AC (BC)	21	1400	0.72°	1.4	1.7
		PCE 5991 AC (BC)	41	2700	0.72°	1.4	2.8
PCE 59131 AC (BC)		63	4000	0.72°	1.4	3.8	
HI-TORQUE 高扭转力 *Brake Type	60	PCE 5641 ACM	4.2	320	0.72°	1.4	0.9
		PCE 5661 ACM	8.3	425	0.72°	1.4	1.1
		PCE 5691 ACM	16.6	705	0.72°	1.4	1.6
	85	PCE 5961 ACM	21	2200	0.72°	1.4	2.4
		PCE 5991 ACM	41	3500	0.72°	1.4	3.5
		PCE 59131 ACM	63	4800	0.72°	1.4	4.5

Note : Motor model ending with A or AC - single shaft Motor model ending with B or BC - double shaft

*** refer to resolution selection table for step angle setting

Motor Electrical Specifications

Dielectric Strength 电击强度	No abnormality detected after the application of 0.5KV at 50 Hz between motor windings and frame for duration of one minute		
Insulation Resistance 绝缘电阻	100 Mohms or better with 500V potential applied between motor windings and frame at normal ambient temperature and humidity		
Insulation Class 绝缘等级	Class B	Operating Environment Temperature 操作环境	0°C ~ + 50°C

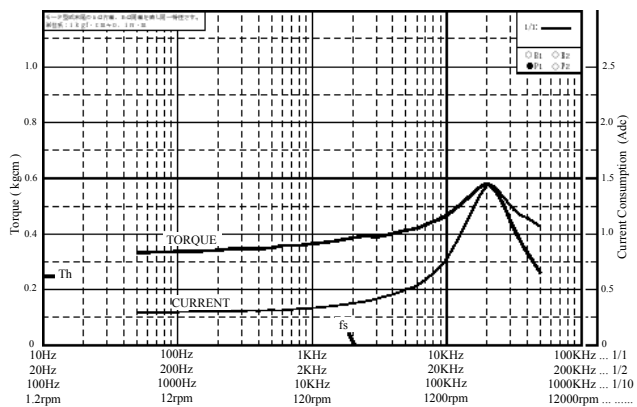
Motor Mechanical Specifications

Shaft Radial Play 轴向跳动	0.025 mm (max) at load 0.5 Kg
Shaft Axial Play 轴向跳动	0.075mm (max) at load 1 Kg
Step Angle Accuracy 步距角的准确度	± 3 min

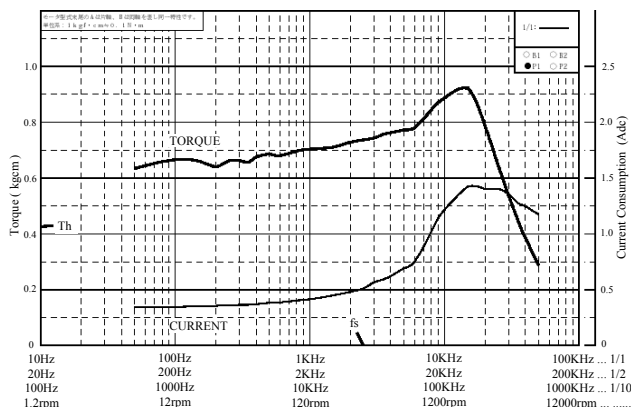
3. Performance Characteristics



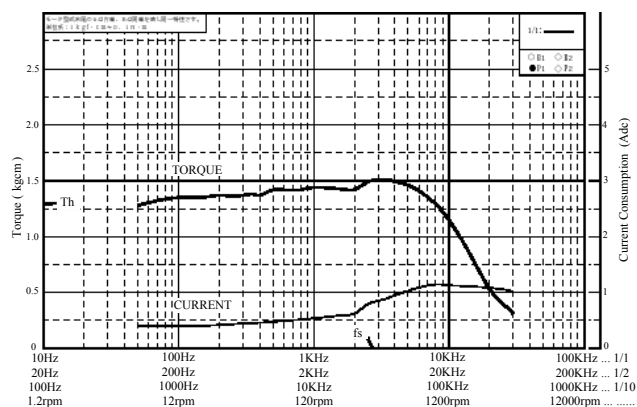
INS500-020 + PEE 533B



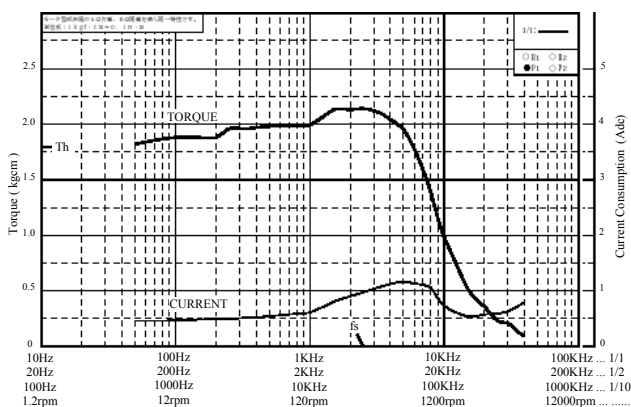
INS500-020 + PEE 535B



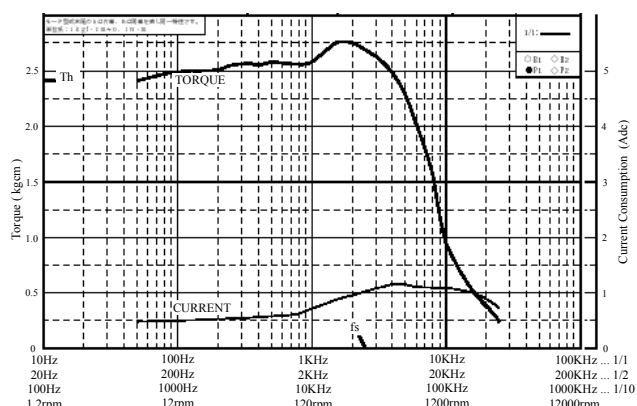
INS500-020 + PF 543BC



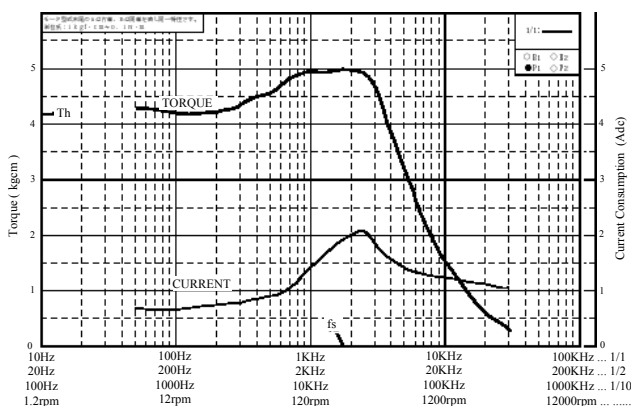
INS500-020 + PF 544BC



INS500-020 + PF 545BC



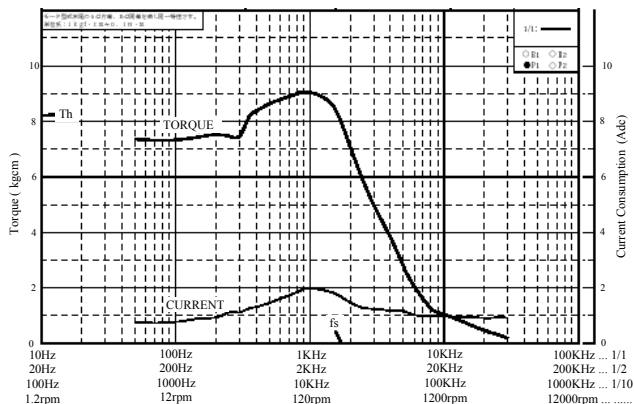
INS500-120 + PCE 5641BC



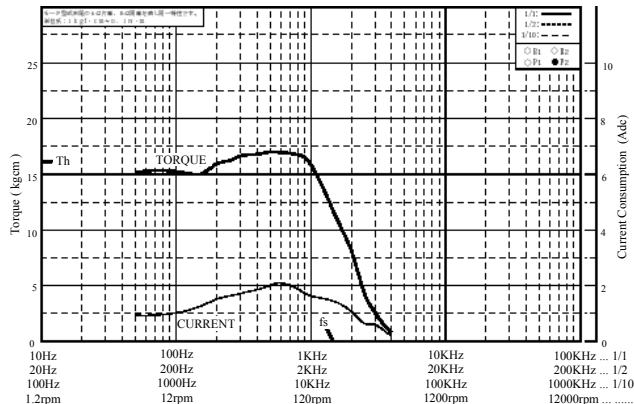
3. Performance Characteristics



INS500-120 + PCE 5661BC



INS500-120 + PCE 5691BC



4. Part Number Identification & Default Setting

INS 500 - 1 2 0

Series Name

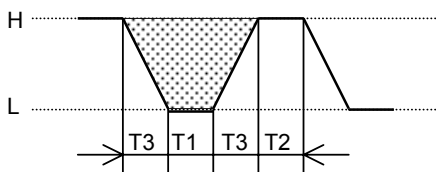
- Clock Signal Input Type : 0:BiClock (Default) , 1:Gate/Dir
- Supply Input Voltage : 2:DC24V
- Phase Current Setting : 0: 0.75A , 1:1.4A

Factory Default Setting :

Driver Model 型号	INS 500-020	INS 500-120
Phase Current 额定电流	0.75A	1.4A
Phase Current at Standstill (A.CD enabled)	0.4A	0.7A
Auto Current Down (A.CD)	Enabled	
Input Pulse Signal	Bi-Clock mode (2P setting)	
Resolution 分辨率	Full Step (1/1 : SEL1 and SEL2 all OFF)	

5. Signal Input Waveform

5-1. Input Signal Waveform



- $T1 \geq 0.2\mu\text{sec}$
- $T2 \geq 0.2\mu\text{sec}$
- $T3 \leq 0.2\mu\text{sec}$

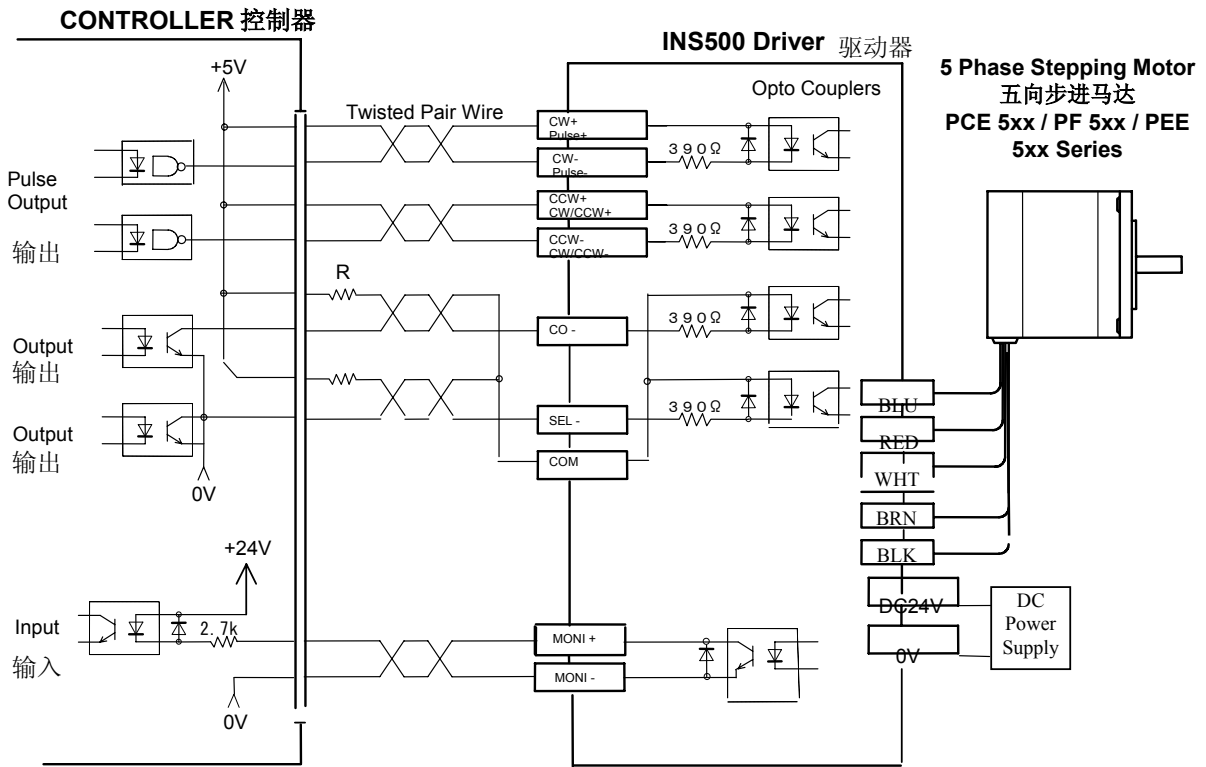
Shaded area shows "ON" of photo coupler at input circuit. The rising edge activates the motor.

6. Automatic Current Down 静态电流自动下降

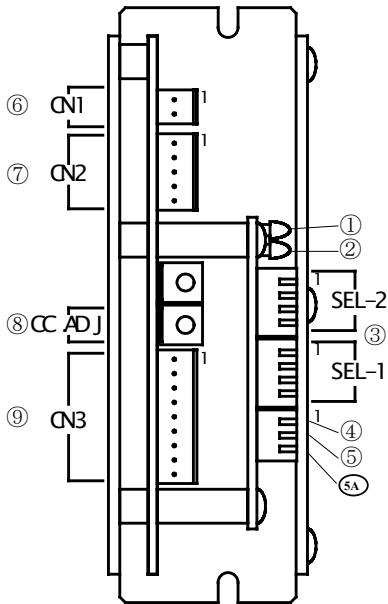
This driver is equipped with the auto-current down function where the motor current is reduced at stand still status. This reduces the motor heat build up when not running.

The factory setting is at 50% of the motor running current, user can adjust this setting via the CC.ADJ trimpot. The function is activated 200 msec after the motor stops. i.e. pulse input changes from H to L.. This function can be deactivated by the A.CD DIP Switch setting.

7. Connection Diagram 接线图



*(If controller outputs are DC24V, a resistor of value $R = 1.2k\Omega$ 1/2W is to be connected in series to the signals. Not necessary if the outputs are DC5V.)



① Power Indicator LED 电源指示灯

② MONI LED 励磁周期零位指示灯

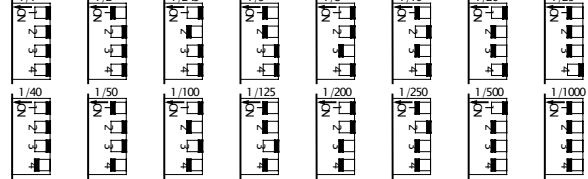
This MONI output is activated when the driver is at origin (step zero) in the excitation sequence.

Full Step : one pulse output at every 10 steps
Half Step : one pulse output at every 20 steps

③ Resolution select Switch (SEL-1, SEL-2) 选择分辨率

This sets the resolution of the Motor Step.

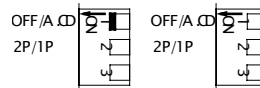
2 sets of setting is available, selectable via SEL input.



④ Auto Current Down Function (A.CD) 电流自动下降功能

This switch enables/disables the function of Auto Current Down Feature of the driver. When enabled, the motor driving current is reduced to 50% (default) (or setting as in CC.ADJ trimpot) of the motor running current. This current reduction feature helps to reduce the temperature of the motor when it is not in operation. The current down feature is activated 200msec after the last pulse input received (determined by the non-conducting state of Clock input). It is recommended to ENABLE this function.

A.CD Disabled A.CD Enabled



⑧ Motor Standstill Current Cut-Off Adjustment (CC.ADJ)

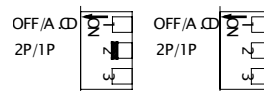
When motor is not running, motor current is reduced to this setting. Turning clockwise increases motor standing current and vice versa. Factory setting at 50%. This function is activated 200msec after motor stops. This feature is disabled when CW clock input is in ON (conducting) state.

⑤ Input Pulse Type Selection Switch

This Switch sets the Type of Input Pulse for the driver.

2P: Bi-Clock (CW, CCW clock input) – Default setting
1P: 1 Clock (Gate / Direction input)

Bi-Clock type Gate/Direction type



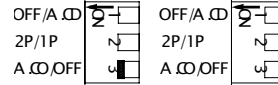
⑨ Signal I/O connector (CN-3)

Pin	Driver Signal	Description
1	CW+ (Pulse)	CW pulse input terminal (SW2-ON) This opto-isolated terminal accepts CW pulse train from an indexer
2	CW-	Step/Pulse input terminal (SW2-OFF) This opto-isolated terminal accepts motor step pulses from an indexer.
3	CCW+ (CW / CCW)	CCW pulse input terminal (SW2-ON) This opto-isolated terminal accepts CCW pulse train from an indexer
4	CCW-	Direction input terminal (SW2-OFF) This opto-isolated terminal accepts CW/CCW direction input.
5	CO-	Motor current shutoff input signal (CO) The driver's output current can be turned off by this input. The motor is FREE while this input is ON. (CO+ connect to COM+)
6	SEL-	Resolution select input signal (SEL) 2 sets of resolution select available. OFF : SEL1 sets resolution of motor ON : SEL2 sets resolution of motor
7	COM+	+5V output. Supply for CO and SEL
8	MONI+	Excitation timing output terminal. This is an open collector output which turns on once per every 10 pulses received by the driver in the FULL step mode (SW2 OFF), and 20 pulses received by the driver in the HALF step mode (SW2 ON).
9	MONI-	

⑤A Auto Current OFF Function (A.CO) 电流自动关断功能

This Switch enables/disables the Motor current Cut-OFF function when the driver temperature exceeds 70 deg Celsius.

Enabled Disabled



⑥ Power Input Connector (CN-1)

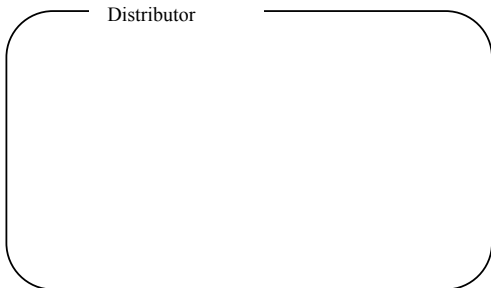
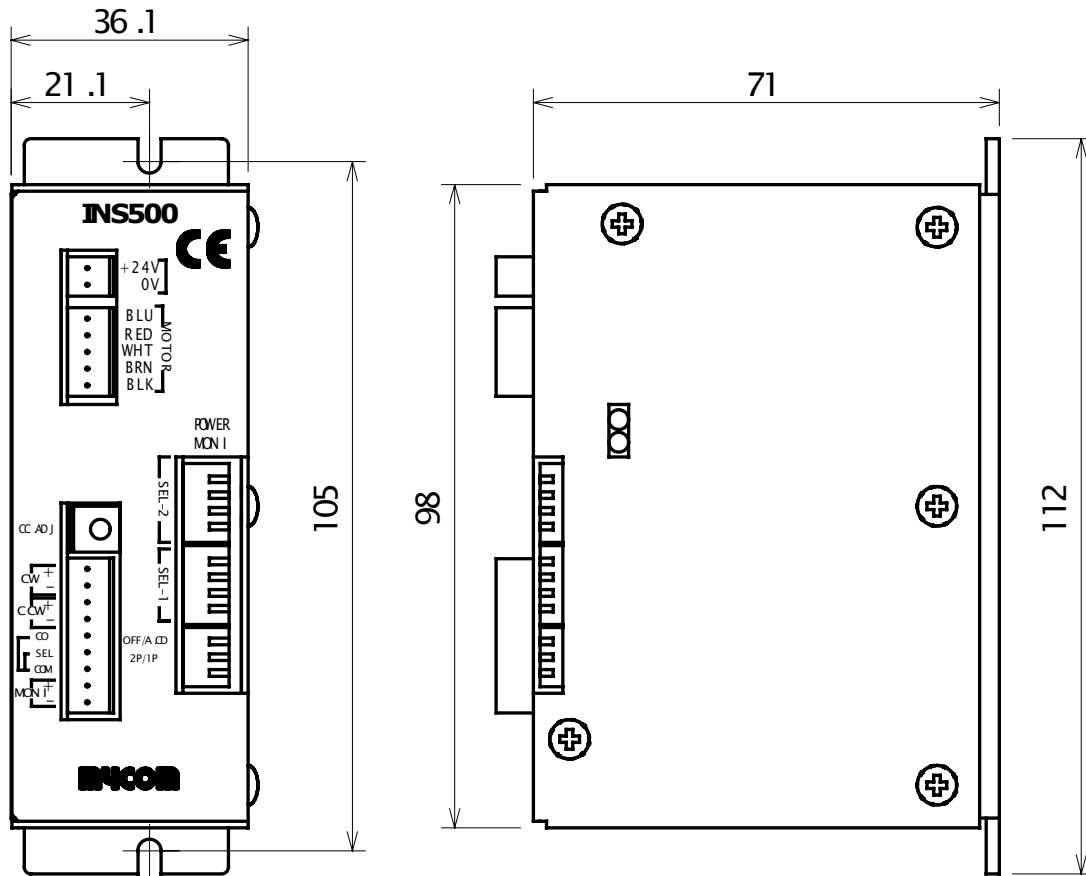
Connect 24V power supply to this connector to power up the driver unit.

Connector pin assignment	
1	+24Vdc
2	0V

⑦ Motor Lead Connector (CN-2)

Connect motor leads to the connector as follows :-

Connector pin assignment			
1	BLU	4	BRN
2	RED	5	BLK
3	WHT		



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