

Mil-Drive-55 Military Motor Drive and Control Unit

Reliable Power Control for Demanding Missions





Mil-Drive-55

Motor Drive and Control Subsystem

Mil-Drive-55 Military Motor Drive and Control Unit

The Mil-Drive-55 is a military-grade motor drive and control unit developed to ensure reliable and precise control of three-phase asynchronous motors used in modern military platforms.

It is designed to deliver dependable power and uninterrupted control in critical mission applications such as armored ground vehicles, radar and antenna positioning systems, electro-optic turrets, and missile launch platforms.

With its compact and rugged design, the Mil-Drive-55 integrates advanced motor control algorithms with a secure communication infrastructure.

Thanks to its RS-485 (MODBUS RTU) and CAN-Bus protocols, it can be easily integrated into various platforms while providing high-precision speed and torque control.

The dual-channel Safe Torque Off (STO) function and emergency input interfaces ensure the highest level of mission safety and operational reliability.

Compliant with MIL-STD-810G environmental standards, the sealed aluminum enclosure enables continuous operation even under rain and harsh outdoor conditions.

Its fanless, passively cooled structure ensures silent and maintenance-free performance, supporting reliable operation within a wide temperature range of -32°C to $+55^{\circ}\text{C}$.

Designed to meet MIL-STD-461F electromagnetic compatibility (EMC) requirements, the Mil-Drive-55 provides superior EMI/EMC resilience, protecting sensitive onboard electronic subsystems and enhancing overall platform reliability.

All input/output interfaces are equipped with MIL-DTL-38999 series military connectors, offering durability, vibration resistance, and easy field integration.

With these features, the Mil-Drive-55 enhances operational continuity across land and naval defense platforms, reduces maintenance costs, and ensures maximum reliability in critical mission environments.

Advanced Features

Multi-Control Mode:

Supports both sensed and sensorless FOC (Field Oriented Control) operation for compatibility with various motor configurations.

Precision Speed and Torque Control:

Ensures stable operation through integrated PI control algorithms optimized for high dynamic performance.

Smooth Start/Stop Ramping:

Configurable acceleration and deceleration ramps between 0.1 – 600 seconds for controlled motion transitions.

High PWM Frequency:

Selectable PWM frequency range from 4 – 32 kHz, ensuring low harmonic distortion and quiet operation.

Dual-Channel Safety Function:

Complies with international safety standards via Safe Torque Off (STO) dual-channel input circuitry.

Emergency Management:

Dedicated emergency input channels allow safe system shutdown under critical operating conditions.

Advanced Communication:

Features RS-485 (Modbus RTU) and CAN-Bus interfaces for data exchange, enabling remote access to drive status, fault codes, serial number, and device ID.

Multi-Sensor Compatibility:

Supports resolver, incremental encoder, absolute encoder, and NTC temperature sensor inputs for flexible integration.

Military-Grade Connectors:

Equipped with MIL-DTL-38999 series connectors on all I/O ports for maximum durability and reliable field operation.

Environmental Durability:

Compliant with MIL-STD-810G environmental standards, ensuring continuous operation under rain and harsh outdoor conditions.

EMI/EMC Compliance:

Designed to meet MIL-STD-461F requirements for electromagnetic immunity and interference suppression.

Maintenance and Monitoring:

Integrated operating hour meter function simplifies preventive maintenance and service scheduling.

Technical Specifications

Category	Specification	Value
Electrical	Nominal Power	5.5 kW
	Output Voltage	3 × 400 VAC
	Output Frequency	0 – 500 Hz
	Motor Current	14 A
	Overload Capacity	150% (60 sec), 175% (2.5 sec)
	Input Voltage	400 VAC ±10%
	Input Frequency	48 – 62 Hz
	Phase Imbalance	Max. 3%
Control	Control Modes	Sensored / Sensorless FOC (Field Oriented Control)
	PID Control	Built-in PI Algorithm
	Start/Stop Function	Ramp-up / Ramp-down, 0.1 – 600 sec
	PWM Frequency	4 – 32 kHz (Selectable)
	Safety Functions	STO (Dual Channel), Emergency Stop
Communication	Protocols	RS-485 (Modbus RTU), CAN-Bus
	Baud Rate	9600 – 115200 bps
	Output Data	Operating status, fault codes, limit switch information, serial number, device ID

Technical Specifications

Category	Specification	Value
Sensor & Feedback	Resolver	SIN, COS, REF inputs
	Incremental Encoder	A, B, I channels
	Absolute Encoder	DATA±, CLOCK±
	Thermistor Input	NTC/PTC motor winding temperature
Mechanical & Durability	Dimensions	245 × 350 × 145 mm
	Weight	12 ± 0.5 kg
	Enclosure Material	Aluminum 6000 series
	Connectors	MIL-DTL-38999 series
	Operating Temperature	−30°C ... +55°C
	Humidity Resistance	95% RH
	Durability Standards	MIL-STD-810G (vibration, shock, rain exposure) MIL-STD-461F (EMI/EMC compliance)
Monitoring & Maintenance	Operating Hour Meter	Built-in
	Status Indicators	LED
	Optional Display	OLED screen support

Electrical and Mechanical Interface

KN1			KN2			KN8		
Motor Brake Power Supply		24WB98PN	Motor Brake Power Out		24WB98SN	Motor Sensör		24WC35SN
Sinyal Adı	Sinyal Açıklama	Kontakt No	Sinyal Adı	Sinyal Açıklama	Kontakt No	Sinyal Adı	Sinyal Açıklama	Kontakt No
PWR	24V PWR	B	Motor Brake Pwr	24V PWR	B	RESOLVER_EXT+	RESOLVER_EXT+	1
RTN	24V RTN	C	Motor Brake Pwr Return	24V RTN	C	RESOLVER_EXT-	RESOLVER_EXT-	2
PWR	24V PWR	D	Motor Brake Pwr	24V PWR	D	RESOLVER_SIN+	RESOLVER_SIN+	3
RTN	24V RTN	E	Motor Brake Pwr Return	24V RTN	E	RESOLVER_SIN-	RESOLVER_SIN-	4
PWR	24V PWR	A	Motor Brake Pwr	24V PWR	A	RESOLVER_COS+	RESOLVER_COS+	5
RTN	24V RTN	F	Motor Brake Pwr Return	24V RTN	F	RESOLVER_COS-	RESOLVER_COS-	6
						24VDC Output (200 mA)	24VDC Output (200 mA)	7
						24VDC Output RTN	24VDC Output RTN	8
KN3			KN4			ABS_ENC_DATA+	ABS_ENC_DATA+	9
AC Giriş		24WE6PN	MOTOR FAZ ÇIKIŞI		24WE6SN	ABS_ENC_DATA-	ABS_ENC_DATA-	10
Sinyal Adı	Sinyal Açıklama	Kontakt No	Sinyal Adı	Sinyal Açıklama	Kontakt No	ABS_ENC_CLOCK+	ABS_ENC_CLOCK+	11
R Fazı	Servo AC Besleme R fazı	A	U	MOTOR PHASE U	A	ABS_ENC_CLOCK-	ABS_ENC_CLOCK-	12
R Fazı	Servo AC Besleme R fazı	B	V	MOTOR PHASE V	B	NTC // PTC	Thermistor +	13
S Fazı	Servo AC Besleme S fazı	C	W	MOTOR PHASE W	C	NTC // PTC	Thermistor -	14
S Fazı	Servo AC Besleme S fazı	D	U	MOTOR PHASE U	D	INC_ENC_A+	INC_ENC_A+	15
T Fazı	Servo AC Besleme T fazı	E	V	MOTOR PHASE V	E	INC_ENC_A-	INC_ENC_A-	16
T Fazı	Servo AC Besleme T fazı	F	W	MOTOR PHASE W	F	INC_ENC_B+	INC_ENC_B+	17
Koruma İletkeni (PE)	Servo AC Besleme Koruma İletkeni (PE)	SHIELD	PE	MOTOR PE	SHIELD	INC_ENC_B-	INC_ENC_B-	18
						INC_ENC_I+	INC_ENC_I+	19
						INC_ENC_I-	INC_ENC_I-	20
KN5			KN6			5VDC Output(200 mA)	5VDC Output(100 mA)	21
PLATFORM&HABERLEŞME		24WC35PN	HARİCİ REJEN		24WE6SA	5VDC Output RTN	5VDC Output RTN	22
Sinyal Adı	Sinyal Açıklama	Kontakt No	Sinyal Adı	Sinyal Açıklama	Kontakt No			
RS485_D+	MODBUS_RS485_D+	1	BRAKE_RES+	BRAKE_RES+	A	KN9		
RS485_D-	MODBUS_RS485_D-	2	BRAKE_RES-	BRAKE_RES-	B	Test Arayüz Konektörü		24WB35SA
RS485_GND	MODBUS_RS485_GND	3	BRAKE_RES+	BRAKE_RES+	C	Sinyal Adı	Sinyal Açıklama	Kontakt No
CAN_H	CAN_H	4	BRAKE_RES-	BRAKE_RES-	D	RS485_D+	PLATFORM_RS485_D+	1
CAN_L	CAN_L	5	BRAKE_RES+	BRAKE_RES+	E	RS485_D-	PLATFORM_RS485_D-	2
CAN_GND	CAN_GND	6	BRAKE_RES-	BRAKE_RES-	F	RS485_GND	PLATFORM_RS485_GND	3
STO_1	STO_1	7	KN7			CAN_H	CAN_H	4
STO_1 RTN	STO_1 RTN	8	General Purpose IO		24WB35SN	CAN_L	CAN_L	5
STO_2	STO_2	9	Sinyal Adı	Sinyal Açıklama	Kontakt No	CAN_GND	CAN_GND	6
STO_2 RTN	STO_2 RTN	10	24VDC Output (200 mA)	24VDC Output (200 mA)	1	EMULATED_ENC_A+	EMULATED_ENC_A+	7
System Enable	System Enable	11	24VDC Output RTN	24VDC Output RTN	2	EMULATED_ENC_A-	EMULATED_ENC_A-	8
System Enable RTN	System Enable RTN	12	10VDC Output (200 mA)	10VDC Output (200 mA)	3	EMULATED_ENC_B+	EMULATED_ENC_B+	9
Emergency	Emergency	13	10VDC Output RTN(Analog)	10VDC Output RTN(Analog)	4	EMULATED_ENC_B-	EMULATED_ENC_B-	10
Emergency RTN	Emergency RTN	14	Digital Input 1	Digital Input 1	5	EMULATED_ENC_I+	EMULATED_ENC_I+	11
Rezerve	Rezerve	15-22	Digital Input 2	Digital Input 2	6	EMULATED_ENC_I-	EMULATED_ENC_I-	12
			Digital Input 3	Digital Input 3	7	Rezerve	Rezerve	13
			Digital Input 4	Digital Input 4	8			
			Digital Input Return (1,2,3)	Digital Input Return (1,2,3)	9			
			Analog Input +	Analog Input + (0-5V)	10			
			Analog Input -	Analog Input - (0-5V)	11			
			Rezerve	Rezerve	12,13			

Electrical and Mechanical Interface

