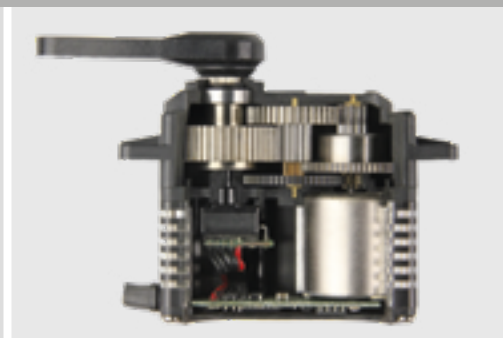


INNOVATIVE LÖSUNGEN FÜR
INDUSTRIELLE ANWENDUNGEN

AKTUATOREN UND SERVOS



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Seit 2002 gehört die MULTIPLEX Modellsport GmbH & Co.KG mit Standort in Bretten, Deutschland zur südkoreanischen HITEC-Gruppe.

Die Produkte der Hitec RCD Korea, Inc. werden weltweit eingesetzt und eignen sich aufgrund ihrer Diversität für die unterschiedlichsten Einsatzgebiete. So finden sie beispielsweise Anwendung als Servo im UAV-Bereich, als Aktuator für Automatisierungs- und Handhabungsaufgaben in der Industrie, oder auch als Stellgeber für die aktive Aerodynamik eines Rennwagens.

Detaillierte Spezifikationen, sowie zusätzliche Informationen lassen wir Ihnen gerne auf Anfrage zukommen.

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GmbH & Co.KG**



Hitec RCD Korea, Inc.



Hitec Group USA, Inc.



Hitec-MULTIPLEX Japan, Inc.



Hitec RCD Philippines, Inc.

PRODUKTÜBERSICHT

Servos und Linear Aktuatoren

HLS-Serie Linear Aktuatoren

SG-Serie Servos

HSB/HSR-Serie Servos

D/DB/MD/MDB-Serie Servos

Sonstige Servos für industriennahe Anwendungen

Servo Zubehör

- a. Programmiergeräte
- b. Servo Abtriebsarme



ANALOG-AKTUATOREN

Analog-Aktuatoren sind in der Nieder- bis Mittelpreisregion angesiedelt und mit zumeist preiswerten Komponenten versehen. Der Antriebsmotor ist immer ein Gleichstrom-Bürstenmotor. Die Aktuatoren bieten keine Programmieroptionen seitens des Nutzers. Die Kommunikation erfolgt immer über ein PWM-Signal mit einer Frequenz von 50Hz. Die Motor-PWM ist analog zu Ansteuerfrequenz und beträgt somit ebenfalls 50Hz, somit ergibt sich lediglich alle 20ms die Möglichkeit für eine Kontrollaktivität (Motor-An oder Motor-Aus). Langsame Bewegungen oder kleine Korrekturen führen zu langen Motor-Aus-Perioden im Verhältnis zu Motor-An-Perioden. Die Motorspannung entspricht immer der Versorgungsspannung.

Vorteile:

- Günstig
- Angenehme Geräusentwicklung durch niedrige Motor-Ansteuerfrequenz
- Geringe Leistungsaufnahme

Nachteile:

- Geringeres Haltemoment
- Langsames Ansprechverhalten
- Geringe Auflösung durch niedrige Ansteuerfrequenz
- Große Totzone (20ms)
- Langsame Bewegungen können unstetig werden

DIGITAL-AKTUATOREN

Digital-Aktuatoren sind in der gehobenen Nieder- bis Hochpreisregion angesiedelt. Es können sehr hochwertige Komponenten wie beispielsweise Hall-Sensoren zur Positionserfassung, aber auch Bürstenlose-Gleichstrommotoren verwendet werden. Die Kommunikation erfolgt über ein PWM-Signal mit Frequenzen von bis zu 330Hz (je nach Aktuatortyp) oder andere Schnittstellen wie CAN, UAV/DroneCAN, RS-485 oder TTL. Die Motoransteuerfrequenz ist unabhängig von der Ansteuerfrequenz der Steuerung und beträgt zumeist 300-500Hz. Hieraus ergeben sich sehr kleine mögliche Totzonen von bis zu 1ms. Digitalaktuatoren bieten zudem vielseitige Programmier- und Schutzfunktionen und erlauben je nach Typ auch eine Zwei-Wege-Kommunikation (Feedback).

Vorteile:

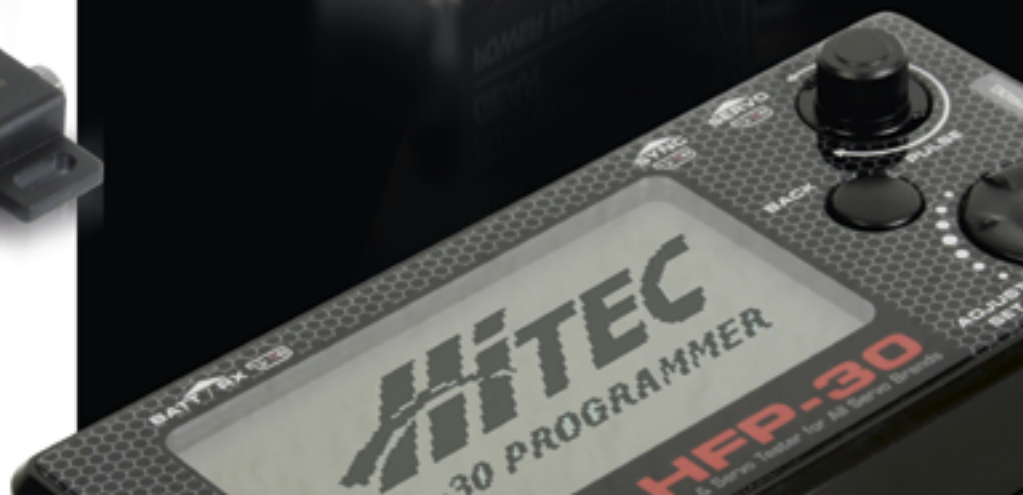
- Schnelles Ansprechverhalten
- Schnelle Korrekturaktivitäten
- Hohe Haltekraft
- Variabel Einstellbare Totzone
- Hohe Genauigkeit
- Zwei-Wege-Kommunikation
- Programmierbarkeit
- Sicherheitsfunktionen
- Hohe Auflösung

Nachteile:

- Zumeist teurer
- Stellenweise unangenehme Geräusentwicklung durch hohe Motor-Ansteuerfrequenz
- Höhere Leistungsaufnahme



HITEC



SCHNITTSTELLEN

PWM-Kommunikation

Der klassische Weg der Ansteuerung von Hitec Aktuatoren mit vielen Vorteilen für einfache Aufgaben. Hitec PWM-Aktuatoren können mit einer Pulsweite von 900 bis 2100µs angesteuert werden. Die übliche Ansteuerfrequenz beträgt dabei 50Hz (20ms). Für spezielle Anwendungen sind je nach Aktuatortyp auch Frequenzen bis 330Hz möglich.

Aktuatoren mit PWM-Kommunikation lassen sich unkompliziert und preiswert ansteuern und sind für viele Anwendungen ohne benötigtes Feedback ausreichend.

Die Schnittstelle ist weit verbreitet und viele Steuerungen/Controller bieten passende Presets und Libraries.

Pin-Layout von Hitec PWM-Aktuatoren*



RS485- und TTL-Kommunikation

Es finden sich etliche Anwendungen in unterschiedlichen Bereichen bei denen eine Rückmeldung zur tatsächlichen Position des Servos notwendig, oder zumindest wünschenswert ist. Verschiedene Hitec Aktuatoren sind auch mit RS485- und TTL-Schnittstellen erhältlich und bieten somit die Möglichkeit für eine Zweiwegekommunikation (Feedback).

Hitec RS485- und TTL-Aktuatoren kommunizieren mit externen Geräten über das Halbduplex-Verfahren. TTL-Aktuatoren verfügen dabei neben der Spannungs- und Masseleitung über nur eine, RS485-Aktuatoren über zwei Signalleitungen.

Pin-Layout von Hitec TTL-Aktuatoren*



Pin-Layout von Hitec RS485- Aktuatoren*



CAN- und UAV/DroneCAN-Kommunikation

Der Industrie- und UAV-Bereich gewinnt zunehmend an Bedeutung. Dieser zukunftssträchtige, schnelle und technisch hoch komplexe Markt verlangt nach Innovation und Zuverlässigkeit. Viele Anwendungen benötigen intelligente Lösungen und ein echtes Feedback von Position, Drehmoment und anderen Parametern zur Diagnose der Anwendung oder um Aussagen über den Zustand der Komponenten treffen zu können.

Folgende Protokolle sind verfügbar: CAN 2.0A, CAN 2.0B, UAV/DroneCAN

Pin-Layout von Hitec CAN-Aktuatoren (SG-Serie abweichend)



* Ausführung auf Kundenwunsch auch mit kundenspezifischen Steckverbindern möglich.

FEATURE ÜBERSICHT

Einstellung der Mittel- und Endlagen (EPA / Neutral Settings)

Erlaubt die Programmierung von Mittel- und Endpositionen des Servos.

Einstellung der Drehrichtung

Clockwise (CW) = Aus der Draufsicht dreht das Servo bei Impulslängenvergrößerung im Uhrzeigersinn.

Counter-Clockwise (CCW) = Aus der Draufsicht dreht das Servo bei Impulslängenvergrößerung im Gegenuhrzeigersinn.

Dead Band (DB-Width)

Je niedriger das Dead Band, desto eher finden Korrekturaktivitäten bei Winkeländerungen statt. Ein für die Applikation zu niedriges Dead Band führt zu erhöhtem Verschleiß. Eine Erhöhung des Dead Bands führt zu einem Präzisionsverlust.

Travel Speed

Stellgeschwindigkeit des Servos: 100% entspricht der maximal möglichen Stellgeschwindigkeit.

ID-Read / Node-ID

Zuweisung einer Aktuator-ID in TTL bzw. CAN-Netzwerken.

Fail Safe

Bei einem Signalverlust fährt das Servo auf eine voreingestellte Position.

Fail Safe Limp Modus

Das Servo geht in einen Schlafmodus, der Motor wird deaktiviert und die Position wird nicht gehalten. Das Servo lässt sich von Hand bewegen.

Soft Start Einstellung

Bei Inbetriebnahme fährt das Servo verlangsamt auf die Sollposition um das Getriebe und die Peripherie zu schonen. Bei einer Einstellung von 100% fährt das Servo beim Einschalten mit maximaler Stellgeschwindigkeit auf die Sollposition.

Overload Protection

Schutzmechanismus der das Servo vor Beschädigung bei Überlast/Blockieren schützt. Eine Einstellung von 20% entspricht einer Reduzierung des maximalen Drehmoments um 80%.

Smart Sense

Ein intelligenter Regelkreis passt während des Betriebs Regelparameter an, um Schwingungen zu reduzieren. Diese werden durch variierende Trägheiten der unterschiedlichen Applikationen provoziert.

Eine manuelle Beeinflussung des Regelkreises ist ebenfalls möglich (Sensitivity Ratio Settings). Ein hoher Wert kann schnelle Schwingungen am Servo erzeugen. Ein niedriger Wert kann ein stark gedämpftes Ansprechverhalten erzeugen.

HITEC



SERIENÜBERSICHT

HLS-Serie (Linear Aktuatoren)

Elektrische Linearaktuatoren erzeugen geradlinige Hubbewegungen und können somit viele Anwendungen von Pneumatik- und Hydraulikzylindern ersetzen.

SG-Serie (Industrie Servos)

Die premium Industrieservo Linie konsequent für Anforderungen der Bereiche Automatisierung, unbemannte Luftfahrt und Robotik entwickelt. Zur Grundausstattung gehört ein leistungsstarker BLDC-Motor, ein Hall-Sensor zur berührungslosen und verschleißfreien Positionserfassung, sowie eine wasserdichte Ausführung. Alle SG-Serie Servos verfügen zudem über eine Multi-Turn* und Continuous-Rotation** Funktion.

HSB-Serie (Brushless Servos)

Servomotoren der Mittelpreisregion mit leistungsstarken BLDC Motoren.

HSR-Serie (Servos mit Multi-Turn)

Servomotoren der Mittelpreisregion mit Multi-Turn* und teilweise Continuous-Rotation** Funktion. Zumeist ausgestattet mit einem BLDC-Motor.

D-Serie (Digitale Servos)

Digitale Servomotoren der Mittelpreisregion mit Glockenanker- oder Bürstenmotor. Die Positionserfassung erfolgt mit Hilfe eines hochwertigen Potentiometers.

MD-Serie (Digitale Servos mit Hall-Sensor)

Digitale Servomotoren der Mittelpreisregion mit Glockenanker- oder Bürstenmotor. Die Positionserfassung erfolgt mit Hilfe eines Hall-Sensors.

DB-Serie (Brushless Servos)

Digitale Servomotoren der Mittelpreisregion mit leistungsstarken BLDC-Motoren. Die Positionserfassung erfolgt mit Hilfe eines hochwertigen Potentiometers.

MDB-Serie (Brushless Servos mit Hall-Sensor)

Digitale Servomotoren der Mittelpreisregion mit leistungsstarken BLDC-Motoren. Die Positionserfassung erfolgt mit Hilfe eines Hall-Sensors.

MDR-Serie (Digitale Servos mit Hall-Sensor und Multi-Turn)

Digitale Servomotoren der Mittelpreisregion mit Multi-Turn* und teilweise Continuous-Rotation** Funktion. Ausgestattet mit einem Glockenanker- oder Bürstenmotor. Die Positionserfassung erfolgt mit Hilfe eines Hall-Sensors.

HS-Serie (Analoge Servos)

Analoge Servomotoren der Niederpreisregion, ausgestattet mit Bürstenmotoren und einem Potentiometer zur Positionserfassung.

HS-1XXX, HS-5XXX, HS-7XXX Serie (Digitale Servos)

Digitale Servomotoren der Mittelpreisregion, ausgestattet mit Glockenanker- und Bürstenmotoren und einem Potentiometer zur Positionserfassung.

* Als maximaler Drehwinkel sind mehrere Umdrehungen möglich.

** Das Servo ist in der Lage endlos zu drehen. DroneCAN nicht!

ZWEI-WEGE-KOMMUNIKATION (FEEDBACK)

Absolute Position

Eine Steuerung muss sich nicht länger darauf verlassen, dass ein Aktuator auch wirklich die gewünschte Position eingenommen hat, sie kann die aktuelle Position mit einer Auflösung von 4096 Schritten ablesen.

Drehmoment

Das Drehmoment ist ein besonders wichtiges Feature. Hier können Aussagen über die tatsächlichen Belastungen im Betrieb sowie über den Zustand der Komponenten getroffen werden. Schwergängige Mechaniken können erfasst und somit rechtzeitig gewartet werden, bevor es zu einer Überlastung des Aktuators kommt. Das Drehmoment wird aus der Motor PWM abgeleitet und ist somit keine tatsächliche Messung, aber für die meisten Anwendungen hinreichend genau.

Geschwindigkeit

Wie schnell ist der verwendete Aktuator in der Anwendung wirklich? Die Antwort liefert der Aktuator und ermöglicht somit wichtige Rückschlüsse für so manche Steuerungsaufgabe.

Versorgungsspannung

Der Aktuator übermittelt stets die aktuelle Versorgungsspannung. Das Entwickler- oder das Wartungsteam sieht somit eventuelle Schwachpunkte im Kabelbaum und kann zum Beispiel hochohmige Verbinder rechtzeitig ersetzen.

Stromaufnahme

Der Strom ist das wichtigste Feedback bei der Schadensprophylaxe. Ein ansteigender Strom über eine bestimmte Laufzeit bei gleichbleibender Belastung deutet immer auf einen anstehenden Defekt hin. Dieser kann am Motor, dem Getriebe oder der zu bewegenden Mechanik zu finden sein. Die Erfassung der Stromaufnahme eröffnet neue Möglichkeiten in der Programmierung. Durch gezieltes Optimieren der internen Regelung (PID) sowie anderer Parameter wie Softstart (Ramp) oder Deadbands, lässt sich die Lebenszeit erhöhen. Weniger Stromspitzen = mehr Lebenszeit.

Mikrocontroller-Temperatur

Die Temperatur des Mikrocontrollers ist mehr als nur eine nette Information. Thermisch stark wechselnde Umweltbedingungen können einem Aktuator viel abverlangen. Das Entwicklerteam lernt hier die thermischen Grenzen des Produkts kennen und kann entsprechende Maßnahmen einleiten, ehe es zum Versagen kommt.

Motor-Temperatur

Verlange ich dem verwendeten Aktuator zu viel ab? Die Temperatur des Motors gibt zuverlässig Auskunft darüber, ob ein Aktuator am Limit betrieben wird. Gerade bei stark schwankenden thermischen Bedingungen ist dieses Feedback von größter Bedeutung.

Zyklenzähler

Wie viele Zyklen macht hat der verwendete Aktuator während eines Einsatzes? Wie viele Teile wurden positioniert? Wann muss der Aktuator getauscht werden, weil die maximale Zyklenzahl erreicht wurde. Einige unserer Aktuatoren liefern dieses Feedback bequem im Protokoll.

MOTORTYPEN-ÜBERSICHT

Bürstenmotoren

Bürstenbehaftete Gleichstrommotoren (Bürstenmotoren) zeichnen sich primär durch den günstigen Preis, aber auch ihre hohe Überlastfähigkeit aus (gute Wärmeableitung). Diese Motoren werden vorwiegend in Analogservos verwendet. Sie sind für Applikationen mit eher geringen Leistungsanforderungen, bzw. einer verhältnismäßig niedrigen Anzahl von Zyklen (z. B. Schließmechanismen) eine gute Wahl. Die Nachteile sind, neben dem Verschleiß der Schleifer, ein erhöhtes Rastmoment und eine geringere Effizienz. Die Motorhochlaufzeit (Beschleunigung) liegt -je nach Typ- zwischen 22 und 40ms.

Glockenanker- / kernloser Motor (Coreless)

Diese äußerst effizienten Motoren (keine Ummagnetisierungsverluste) glänzen durch sehr schnelle Motorhochlaufzeiten (Beschleunigung) von nur 7 bis 11 ms und eine gute Kraftentfaltung. Eisenkernlose Motoren haben bauartbedingt kein Rastmoment, was sich in einem besonders ruhigen Motorlauf widerspiegelt. Der Verschleiß ist gering und bezieht sich lediglich auf den Konduktor, der der Kommutierung dient, und die Lagerung. Ein Nachteil der kernlosen Bauform ist die geringe Überlastfähigkeit, bedingt durch die schlechte Wärmeableitung. Der Einsatz empfiehlt sich daher in anspruchsvolleren Applikationen, bei denen zwischen den Zyklen auch gelegentliche Ruhephasen vorhanden sind, um ein Abkühlen zu ermöglichen oder aber auch Steuerungs- und Regelungsaufgaben im niedrigen Lastbereich.

Bürstenloser Gleichstrommotor (Brushless)

Leistungsstarke BLDC-Motoren vereinen viele Vorteile moderner Antriebstechnik und gelten als nahezu verschleißfrei (keine Schleifer). Neben der hohen Effizienz und ruhigen Laufkultur bieten sensorgesteuerte bürstenlose Motoren ebenso eine schnelle Motorhochlaufzeit (Beschleunigung) von nur 11 bis 14ms und bereits aus dem Stand heraus ein hohes Drehmoment. Im Gegensatz zu Glockenanker-Motoren erfolgt eine gute Wärmeableitung über das Blechpaket, wodurch thermische Probleme im Dauerbetrieb minimiert werden können. Diese Motoren sind deswegen besonders empfehlenswert für anspruchsvolle Anwendungen mit häufigen Korrekturmaßnahmen. Die meisten Hochlast-Aktuatoren sind deshalb mit BLDC-Motoren ausgestattet.

HITEC



DMSZ
 zertifiziert nach
DIN EN ISO 9001

22118

DMSZ

Z E R T I F I K A T

Die

Deutsche Managementsystem Zertifizierungsgesellschaft mbH

bescheinigt hiermit, dass das Unternehmen



Multiplex Modellsport GmbH & Co. KG

Westliche Gewerbestr.1
 75015 Bretten

für den Geltungsbereich

Produktion, Entwicklung und Handel von Flugmodellen, Fernsteuersystemen,
 Aktualoren sowie Lade-, Antriebs- und Regeltechnologie im
 Modellsport und Industriebereich.

ein

Qualitätsmanagementsystem

eingeführt hat und anwendet.

Durch ein Audit, dokumentiert in einem Bericht, wurde der Nachweis erbracht,
 dass dieses Qualitätsmanagementsystem die Forderungen der folgenden Norm erfüllt:

DIN EN ISO 9001:2015

Ausgabe November 2015

Dieses Zertifikat ist gültig vom 05.12.2022 bis 04.12.2025

Zertifikat-Registrier-Nr.: QM 22118-Z02443

Griesheim, den 05.12.2022



D. Kaiser
 Dieter Kaiser
 (Geschäftsführer)

Hans-W. Lutz
 Hans-Werner Lutz
 (Leiter Zertifizierungsstelle)







HLS LINEAR
ACTUATORS



HLS12-30

HLS12-50

HLS12-100

Protocol & Feedback List

Series	Item Name	Available Protocol				
		PWM	TTL	RS485	CAN	UAVCAN/ DroneCAN
HS Series	HS-53	✓				
HS Series	HS-81	✓				
HS Series	HS-85MG	✓				
HS Series	HS-311	✓				
HS Series	HS-322HD	✓				
HS Series	HS-325HB	✓				
HS Series	HS-645MG	✓				
HS Series	HS-646WP	✓				
HS Series	HS-1005SGT	✓				
HS Series	HS-1100WP	✓				
HS Series	HS-5125MG	✓				
HS Series	HS-5245MG	✓				
HS Series	HS-5565MH	✓				
HS Series	HS-7955TG	✓				
HS Series	HS-M7990TH	✓				
D Series	D485HW	✓	✓			
D Series	D646WP	✓	✓			
D Series	D951TW	✓	✓			
D Series	D954SW	✓	✓			
D Series	D980TW	✓	✓			
DB Series	DB778WP	✓	✓			
DB Series	DB961WP	✓	✓			
HLS12 Series	HLS12 Linear Servo	✓				
HSB Series	HSB-9465SH	✓				
HSB Series	HSB-9485SH	✓				
HSB Series	HSB-9381TH	✓				
HSB Series	HSB-M9381TH	✓				
HSR Series	HSR-2645CRH	✓				
MD Series	MD1100WP	✓	✓			
MD Series	MD250MW	✓	✓			
MD Series	MD261SW	✓	✓			
MD Series	MD485HW	✓	✓			
MD Series	MD85MG	✓	✓			
MDB Series	MDB1200WP	✓	✓			
MDB-CAN Series	MDB961WP-CAN 28V				✓	✓
MDB-CAN Series	MDB778WP-CAN DroneCAN				✓	✓
MDB-CAN Series	MDB777WP-CAN DroneCAN				✓	✓
MD-CAN Series	MD145SW-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD245MW-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD250MW-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD65MG-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD70MH-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD85MG-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD89MW-CAN UAVCAN/DroneCAN				✓	✓
MD-CAN Series	MD950TW-CAN UAVCAN/DroneCAN				✓	✓
MDR Series	MDR845WP	✓	✓			
MD-RS485 Series	MD245MW-RS485			✓		
MD-RS485 Series	MD250MW-RS485			✓		
MD-RS485 Series	MD950TW-RS485			✓		
MD-RS485 Series	MD980TW-RS485			✓		
SG Series	SG33BL-T-12V (DSUB)	✓	✓	✓		
SG Series	SG33BL-T-24V (DSUB)	✓	✓	✓		
SG Series	SG33BL-T-24V (Gland Cable)	✓	✓	✓		
SG-CAN Series	SG33BL-T-CAN-12V (Circular)				✓	✓
SG-CAN Series	SG33BL-T-CAN-24V (Circular)				✓	✓
SG-CAN Series	SG33BL-T-CAN-12V (Gland Cable)				✓	✓
SG-CAN Series	SG33BL-T-CAN-24V (Gland Cable)				✓	✓
SG-CAN Series	SG50BL-CAN 24V (Circular)				✓	✓

TORQUE* No value is read for the torque, instead the load on the servo is read out.

✓ ** The number of revolutions is read out via the position feedback. There is no separate counter.

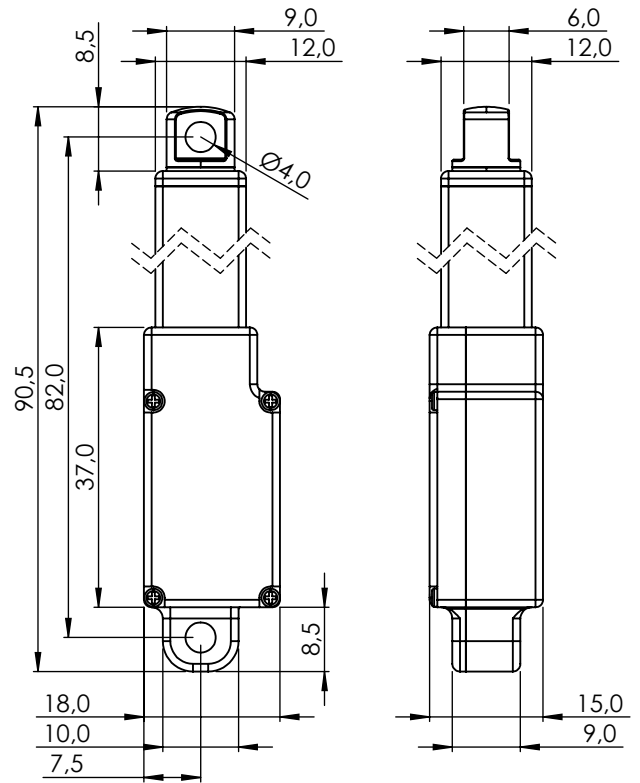
Series	Item Name	Available Feedback							
		POSITION	SPEED	TORQUE*	VOLTAGE	CURRENT	TURN COUNT	TEMP (MCU)	TEMP (MOTOR)
HS Series	HS-53								
HS Series	HS-81								
HS Series	HS-85MG								
HS Series	HS-311								
HS Series	HS-322HD								
HS Series	HS-325HB								
HS Series	HS-645MG								
HS Series	HS-646WP								
HS Series	HS-1005SGT								
HS Series	HS-1100WP								
HS Series	HS-5125MG								
HS Series	HS-5245MG								
HS Series	HS-5565MH								
HS Series	HS-7955TG								
HS Series	HS-M7990TH								
D Series	D485HW	✓							
D Series	D646WP	✓							
D Series	D951TW	✓							
D Series	D954SW	✓							
D Series	D980TW	✓							
DB Series	DB778WP	✓							
DB Series	DB961WP	✓							
HLS12 Series	HLS12 Linear Servo	✓							
HSB Series	HSB-9465SH								
HSB Series	HSB-9485SH								
HSB Series	HSB-9381TH								
HSB Series	HSB-M9381TH								
HSR Series	HSR-2645CRH								
MD Series	MD1100WP	✓							
MD Series	MD250MW	✓							
MD Series	MD261SW	✓							
MD Series	MD485HW	✓							
MD Series	MD85MG	✓							
MDB Series	MDB1200WP	✓							
MDB-CAN Series	MDB961WP-CAN 28V	✓	✓	✓	✓	✓	✓	✓	✓
MDB-CAN Series	MDB778WP-CAN DroneCAN	✓	✓	✓	✓	✓	✓	✓	✓
MDB-CAN Series	MDB777WP-CAN DroneCAN	✓	✓	✓	✓	✓	✓	✓	✓
MD-CAN Series	MD145SW-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD245MW-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD250MW-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD65MG-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD70MH-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD85MG-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MD-CAN Series	MD89MW-CAN UAVCAN/DroneCAN	✓	✓	✓	✓	✓	✓	✓	✓
MD-CAN Series	MD950TW-CAN UAVCAN/DroneCAN	✓	✓	✓	✓		✓	✓	
MDR Series	MDR845WP	✓	✓	✓	✓		✓ **	✓	
MD-RS485 Series	MD245MW-RS485	✓							
MD-RS485 Series	MD250MW-RS485	✓							
MD-RS485 Series	MD950TW-RS485	✓							
MD-RS485 Series	MD980TW-RS485	✓							
SG Series	SG33BL-T-12V (DSUB)	✓	✓	✓	✓		✓ **	✓	✓
SG Series	SG33BL-T-24V (DSUB)	✓	✓	✓	✓		✓ **	✓	✓
SG Series	SG33BL-T-24V (Gland Cable)	✓	✓	✓	✓		✓ **	✓	✓
SG-CAN Series	SG33BL-T-CAN-12V (Circular)	✓	✓	✓	✓	✓	✓	✓	✓
SG-CAN Series	SG33BL-T-CAN-24V (Circular)	✓	✓	✓	✓	✓	✓	✓	✓
SG-CAN Series	SG33BL-T-CAN-12V (Gland Cable)	✓	✓	✓	✓	✓	✓	✓	✓
SG-CAN Series	SG33BL-T-CAN-24V (Gland Cable)	✓	✓	✓	✓	✓	✓	✓	✓
SG-CAN Series	SG50BL-CAN 24V (Circular)	✓	✓	✓	✓	✓	✓	✓	✓

TORQUE* No value is read for the torque, instead the load on the servo is read out.

✓ ** The number of revolutions is read out via the position feedback. There is no separate counter.

HLS12-3050, HLS12-30210, HLS12-30380

#1-02453, #1-02454, #1-02455



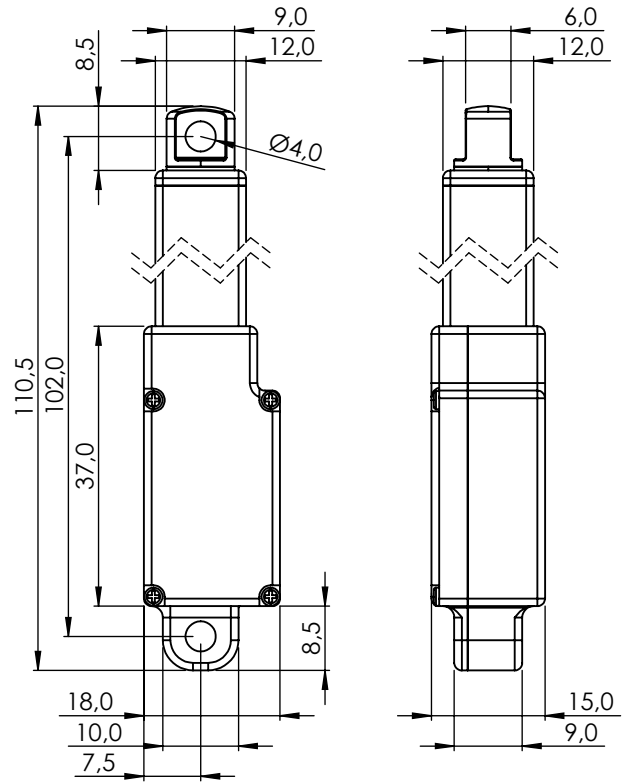
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GENERAL SPECIFICATION

HLS12-30XXX												
Control System	PWM 1000usec ~ 2000usec											
Position Sensor Type	-											
Operating Voltage Range	4.0 ~ 8.4V											
Motor Type	Cored Metal Brush											
Amplifier / MCU	32bits programmable Digital											
Lead Screw	Lead 5mm											
Stroke Option	30mm											
Repeatability	±0.2mm											
Gear Ratio	50:1			100:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V			At 7.4V		
Speed at no Load	30.9mm/s			16.1mm/s			7.5mm/s			4.1mm/s		
Running Current at no Load	130mA			130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (11.8N)	23.5mm/s	250mA	2.1kg (20.6N)	12.7mm/s	250mA	4.4kg (43.2N)	5.6mm/s	250mA	8.0kg (78.5N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	3.8kg (37.3N)	8.6mm/s	370mA	7.7kg (75.5N)	4.0mm/s	370mA	12.4kg (121.6N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.5N)	8.2mm/s	490mA	5.2kg (51.0N)	4.0mm/s	490mA	9.9kg (97.1N)	2.8mm/s	490mA	14.8kg (145.2N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.4N)			6.2kg (60.8N)			12.4kg (121.6N)			22.2kg (217.8N)		
Stall Current	620mA											
Max Static Force	25.2kg (247N) (above)											
Max Side Load (Extended)	4.1kg (40N)											
Operating Temperature Range	-10°C ~ +50°C (14°F ~ +122°F)											
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)											
Vibrations at no Load	-											
Connector Wire Length	160mm											
Connector Wire Gauge	24AWG											
Connector Wire Strand Count	40/0.08											
External Dimensions	82.0 x 15.0 x 18.0mm											
Weight	34.0g											
Ball Bearing	Flange Bearing											
Case Material	Engineering Plastic & Aluminum Pipe											
Gear Material	4 Metal Gears											
IP-Rating	IP4X											
Revision	Rev. 1.1 / 02.01.2024											
Changelog	-											

HLS12-5050, HLS12-50210, HLS12-50380

#1-02456, #1-02457, #1-02458

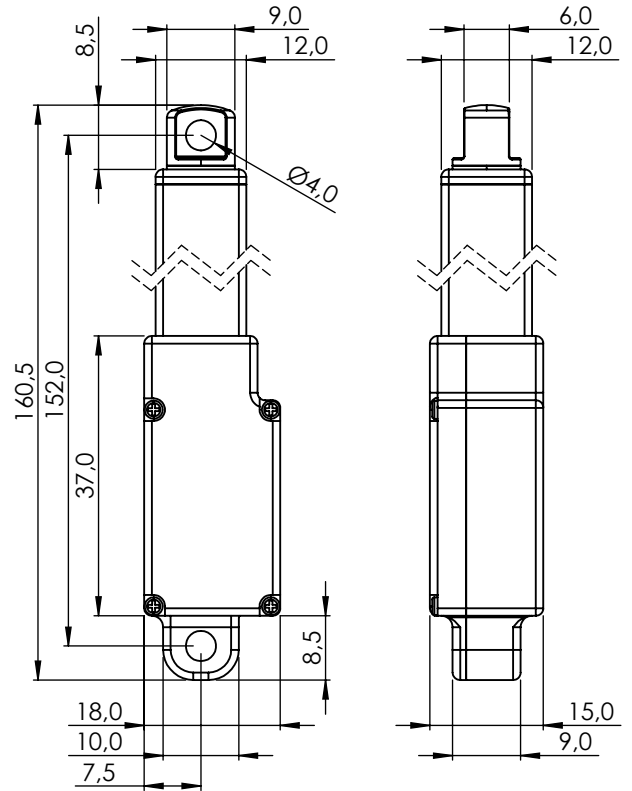
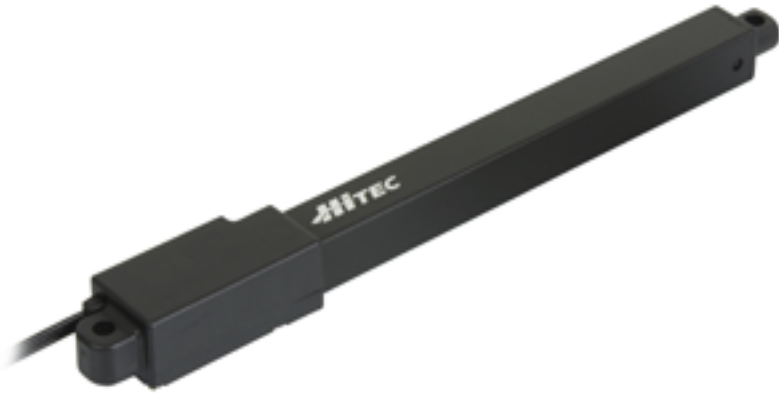


GENERAL SPECIFICATION

HLS12-50XXX												
Control System	PWM 1000usec ~ 2000usec											
Position Sensor Type	-											
Operating Voltage Range	4.0 ~ 8.4V											
Motor Type	Cored Metal Brush											
Amplifier / MCU	32bits programmable Digital											
Lead Screw	Lead 5mm											
Stroke Option	50mm											
Repeatability	±0.3mm											
Gear Ratio	50:1			100:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V			At 7.4V		
Speed at no Load	30.9mm/s			16.1mm/s			7.5mm/s			4.1mm/s		
Running Current at no Load	130mA			130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (11.8N)	23.5mm/s	250mA	2.1kg (20.6N)	12.7mm/s	250mA	4.4kg (43.2N)	5.6mm/s	250mA	8.0kg (78.5N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	3.8kg (37.3N)	8.6mm/s	370mA	7.7kg (75.5N)	4.0mm/s	370mA	12.4kg (121.6N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.5N)	8.2mm/s	490mA	5.2kg (51.0N)	4.0mm/s	490mA	9.9kg (97.1N)	2.8mm/s	490mA	14.8kg (145.2N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.4N)			6.2kg (60.8N)			12.4kg (121.6N)			22.2kg (217.8N)		
Stall Current	620mA											
Max Static Force	25.2kg (247N) (above)											
Max Side Load (Extended)	3.1kg (30N)											
Operating Temperature Range	-10°C ~ +50°C (14°F ~ +122°F)											
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)											
Vibrations at no Load	-											
Connector Wire Length	160mm											
Connector Wire Gauge	24AWG											
Connector Wire Strand Count	40/0.08											
External Dimensions	102.0 x 15.0 x 18.0mm											
Weight	40.0g											
Ball Bearing	Flange Bearing											
Case Material	Engineering Plastic & Aluminum Pipe											
Gear Material	4 Metal Gears											
IP-Rating	IP4X											
Revision	Rev. 1.1 / 02.01.2024											
Changelog	-											

HLS-10050, HLS-100210, HLS-100380

#1-02496, #1-02460, #1-02461



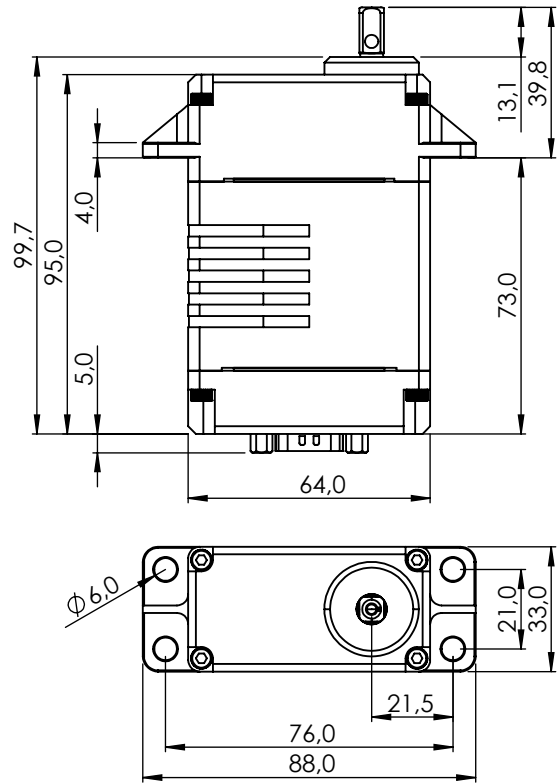
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GENERAL SPECIFICATION

HLS12-100XX												
Control System	PWM 1000usec ~ 2000usec											
Position Sensor Type	-											
Operating Voltage Range	4.0 ~ 8.4V											
Motor Type	Cored Metal Brush											
Amplifier / MCU	32bits programmable Digital											
Lead Screw	Lead 5mm											
Stroke Option	100mm											
Repeatability	±0.5mm											
Gear Ratio	50:1			100:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V			At 7.4V		
Speed at no Load	30.9mm/s			16.1mm/s			7.5mm/s			4.1mm/s		
Running Current at no Load	130mA			130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (11.8N)	23.5mm/s	250mA	2.1kg (20.6N)	12.7mm/s	250mA	4.4kg (43.2N)	5.6mm/s	250mA	8.0kg (78.5N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	3.8kg (37.3N)	8.6mm/s	370mA	7.7kg (75.5N)	4.0mm/s	370mA	12.4kg (121.6N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.5N)	8.2mm/s	490mA	5.2kg (51.0N)	4.0mm/s	490mA	9.9kg (97.1N)	2.8mm/s	490mA	14.8kg (145.2N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.4N)			6.2kg (60.8N)			12.4kg (121.6N)			22.2kg (217.8N)		
Stall Current	620mA											
Max Static Force	25.2kg (247N) (above)											
Max Side Load (Extended)	1.5kg (15N)											
Operating Temperature Range	-10°C ~ +50°C (14°F ~ +122°F)											
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)											
Vibrations at no Load	-											
Connector Wire Length	160mm											
Connector Wire Gauge	24AWG											
Connector Wire Strand Count	40/0.08											
External Dimensions	152.0 x 15.0 x 18.0mm											
Weight	56.0g											
Ball Bearing	Flange Bearing											
Case Material	Engineering Plastic & Aluminum Pipe											
Gear Material	4 Metal Gears											
IP-Rating	IP4X											
Revision	Rev. 1.1 / 02.01.2024											
Changelog	-											

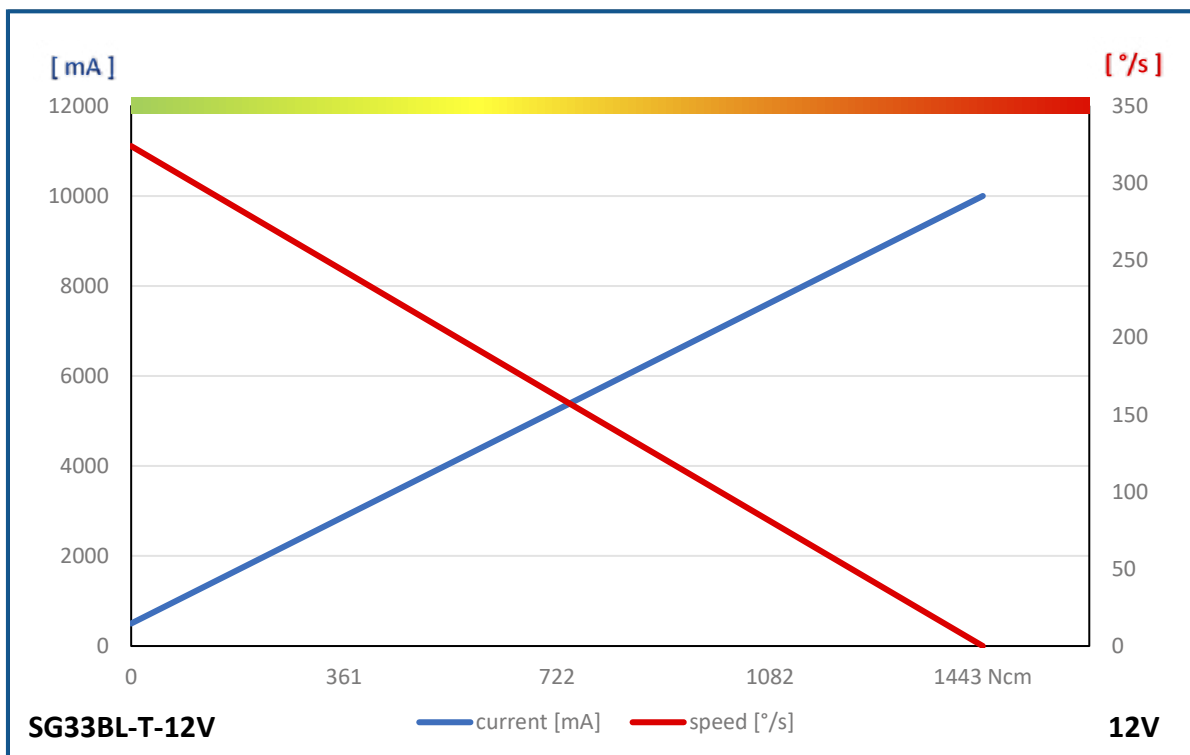
SG33BL-T-12V (DSUB)

#1-00932



1:2

PERFORMANCE CHART

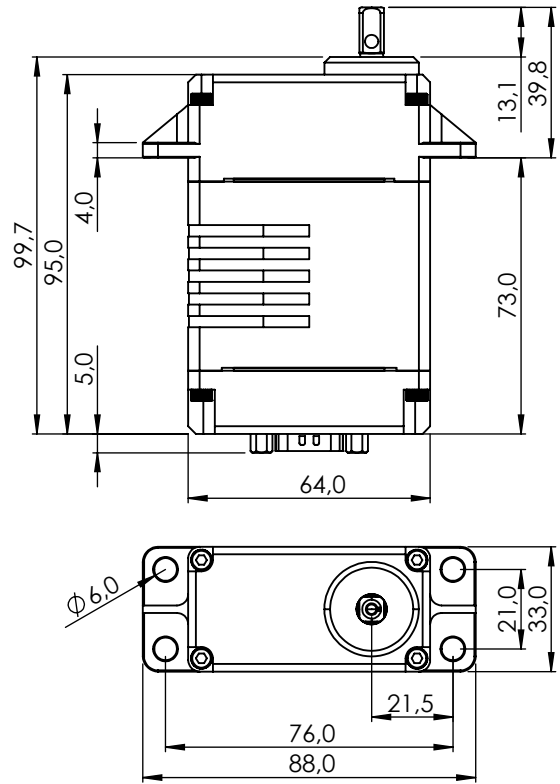


GENERAL SPECIFICATION

SG33BL-T-12V (DSUB)		
Control System	PWM / RS485 / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	D-Sub 9	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Amplifier / MCU	32bit programmable Digital	
Operating Voltage Range	9.0V ~ 15.0V	
Operating Voltage	At 12.0V	
Operating Speed at no Load	324°/s (54RPM)	
Stall Torque	147.0kgcm (1442.1Ncm)	
Rest Current	30mA	
Running Current at no Load	500mA	
Stall Current	10000mA	
Deadband Width	2µs	
Operating Travel	Default	±60°
	Programmable	±160°
	Multi Turn	±2880° (Max ±8 Turns)
	Continuous Rotation	n/a
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)	
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)	
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN60068-2-6	
Connector Wire Length	-	
Connector Wire Gauge	-	
Connector Wire Strand Count	-	
External Dimensions	64.0 x 33.0 x 95.0mm	
Weight*	480.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing	
Gear Material	4 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	Mounting Hardware, Servo Horn (I-MOS)	
IP-Rating	IP68	
MTTF	>1000h	
Revision & Stand	Rev. 1.2 / 01.02.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

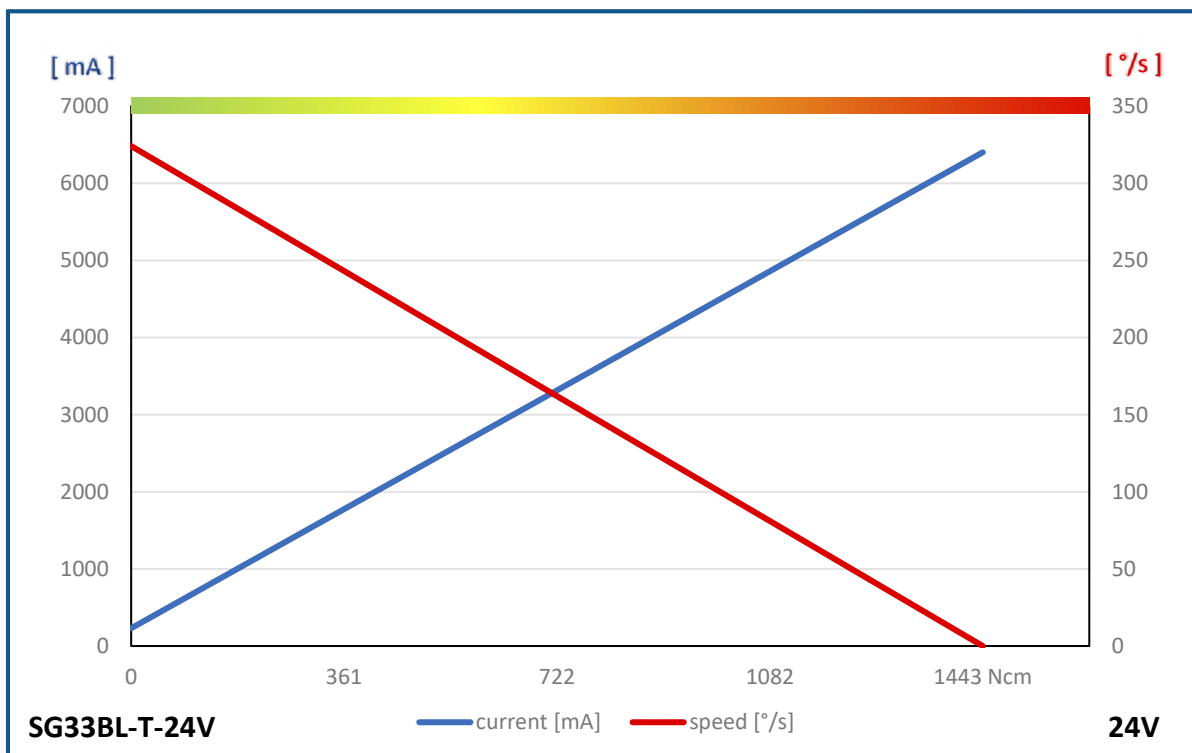
SG33BL-T-24V (DSUB)

#1-02462



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PERFORMANCE CHART

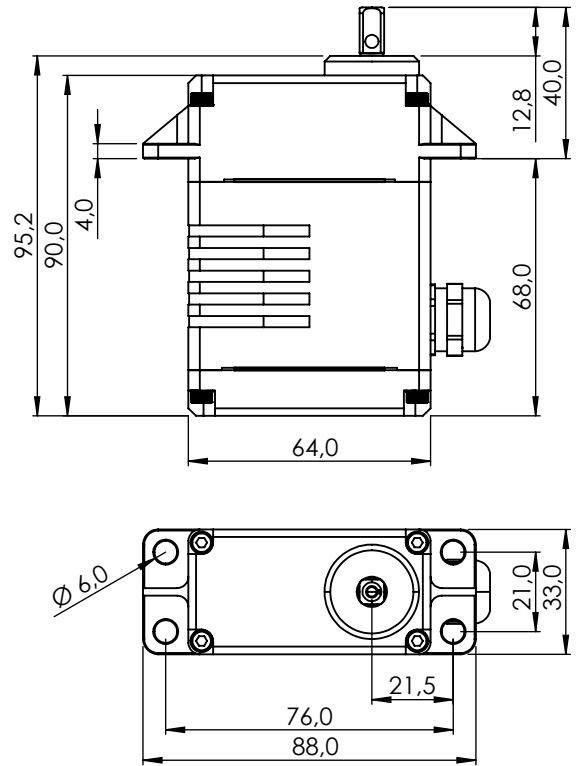


GENERAL SPECIFICATION

SG33BL-T-24V (DSUB)		
Control System	PWM / RS485 / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	D-Sub 9	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Amplifier / MCU	32bit programmable Digital	
Operating Voltage Range	22.0V ~ 26.0V	
Operating Voltage	At 24.0V	
Operating Speed at no Load	324°/s (54RPM)	
Stall Torque	147.00kgcm (1442.1Ncm)	
Idle Current	20mA	
No Load Running Current	230mA	
Stall Current	6400mA	
Deadband Width	2µs	
Operating Travel	Default	±60°
	Programmable	±160°
	Multi Turn	±2880° (Max ±8 Turns)
	Continuous Rotation	n/a
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)	
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)	
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN60068-2-6	
Connector Wire Length	-	
Connector Wire Gauge	-	
Connector Wire Strand Count	-	
External Dimensions	64.0 x 33.0 x 95.0mm	
Weight*	480.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing	
Gear Material	4 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	Mounting Hardware, Servo Horn (I-MOS)	
IP-Rating	IP68	
MTTF	>1000h	
Revision & Stand	Rev. 1.2 / 01.02.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

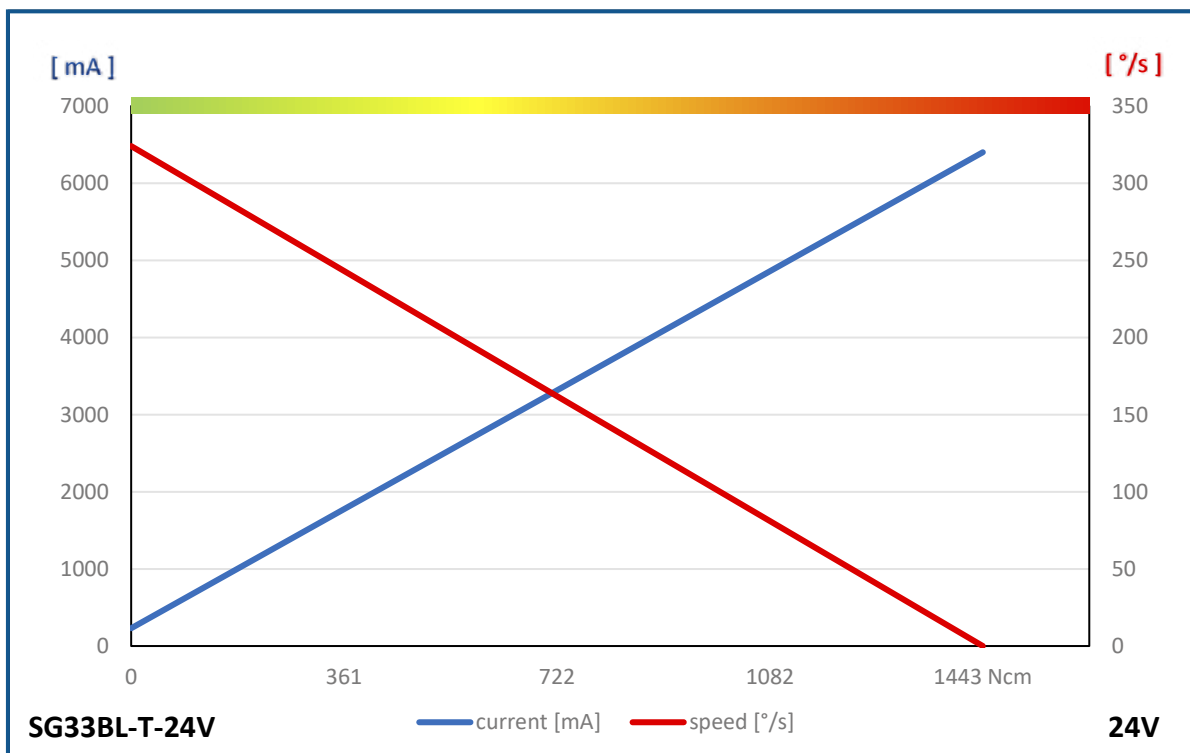
SG33BL-T-24V (GLAND CABLE)

#1-02463



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PERFORMANCE CHART

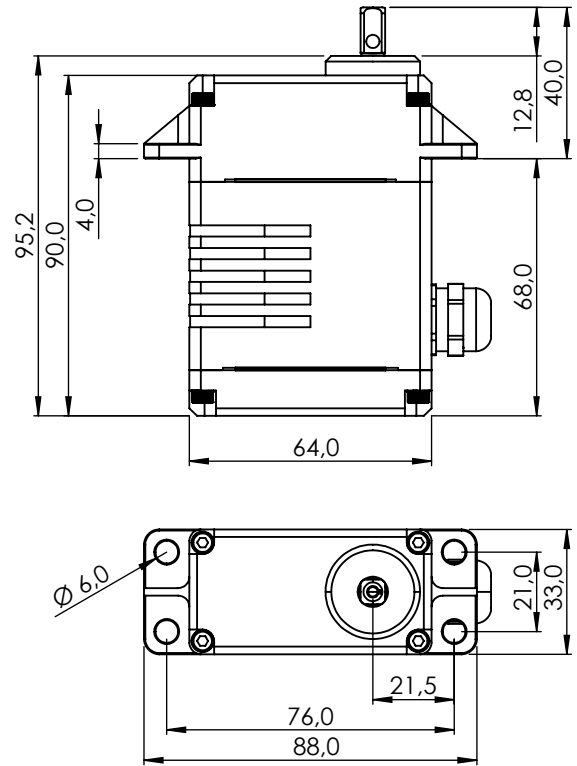


GENERAL SPECIFICATION

SG33BL-T-24V (Gland Cable)		
Control System	PWM / RS485 / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	-	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Amplifier / MCU	32bit programmable Digital	
Operating Voltage Range	22.0V ~ 26.0V	
Operating Voltage	At 24.0V	
Operating Speed at no Load	324°/s (54RPM)	
Stall Torque	147.00kgcm (1442.1Ncm)	
Rest Current	20mA	
Running Current at no Load	230mA	
Stall Current	6400mA	
Deadband Width	2µs	
Operating Travel	Default	±60°
	Programmable	±160°
	Multi Turn	±2880° (Max ±8 Turns)
	Continuous Rotation	n/a
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)	
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)	
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN 60068-2-6	
Connector Wire Length	400mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	64.0 x 33.0 x 90.0mm	
Weight*	500.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing	
Gear Material	4 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	Mounting Hardware, Servo Horn (I-MOS)	
IP-Rating	IP68	
MTTF	>1000h	
Revision & Stand	Rev. 1.2 / 01.02.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

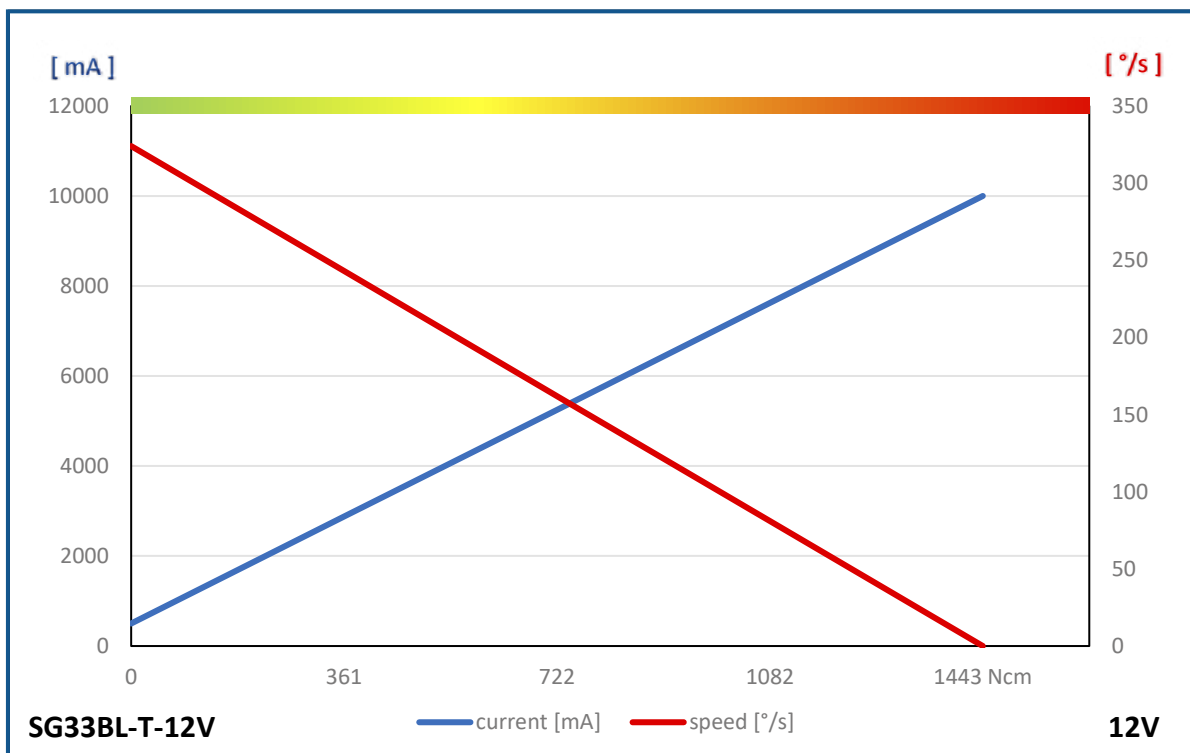
SG33BL-T-CAN-12V (GLAND CABLE)

#1-02345



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PERFORMANCE CHART

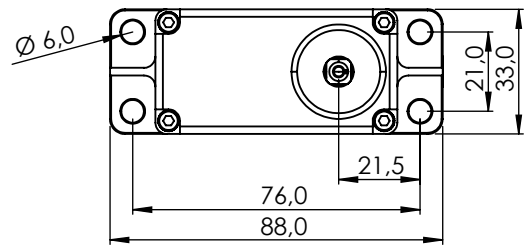
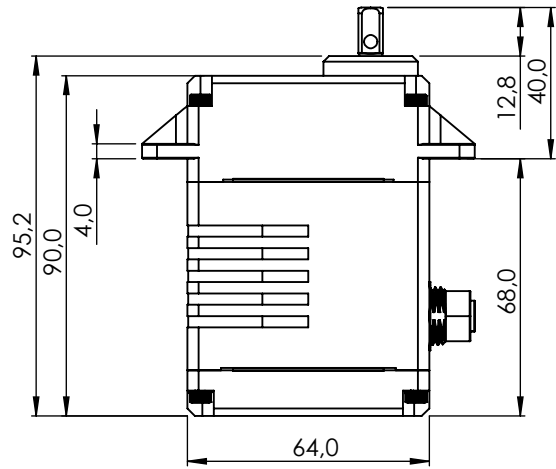


GENERAL SPECIFICATION

SG33BL-T-CAN-12V (Gland Cable)				
Control System	CAN 2.0A,B / DroneCAN (UAVCAN v0)			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	-			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	9.0 ~ 15.0V			
Operating Voltage	At 12.0V			
Operating Speed at no Load	324°/s (54RPM)			
Stall Torque	147.0kgcm (1442.1Ncm)			
Rest Current	30mA			
Running Current at no Load	500mA			
Stall Current	10000mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN 60068-2-6			
Connector Wire Length	400mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
External Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	500.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing			
Gear Material	4 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, Servo Horn (I-MOS)			
IP-Rating	IP68			
MTTF	>1000h			
Revision & Stand	Rev. 1.2 / 01.02.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

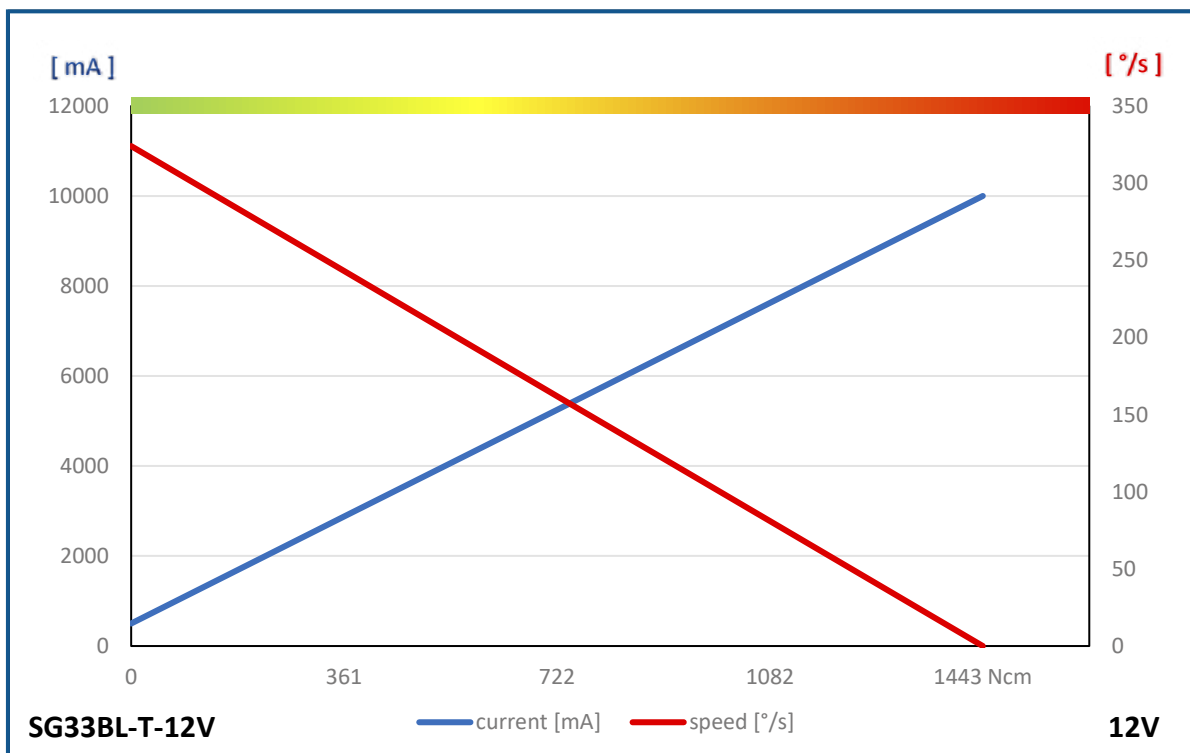
SG33BL-T-CAN-12V (CIRCULAR)

#1-02346



1:2

PERFORMANCE CHART

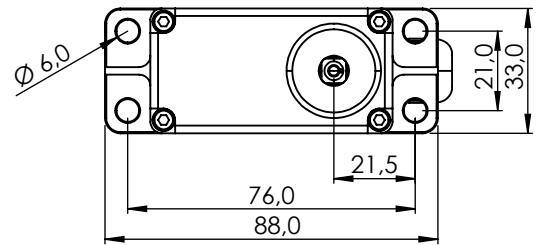
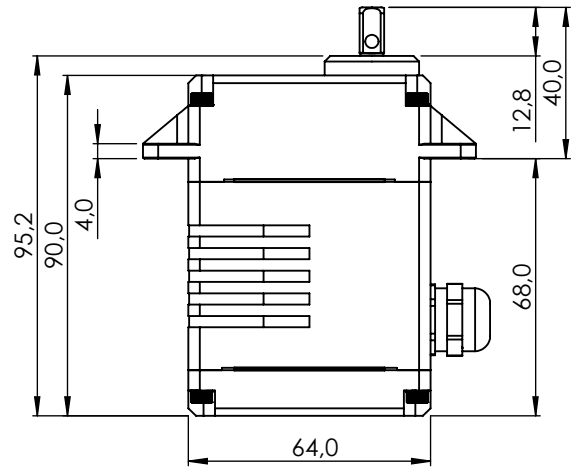


GENERAL SPECIFICATION

SG33BL-T-CAN-12V (Circular)				
Control System	CAN 2.0A,B / DroneCAN (UAVCAN v0)			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCan
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	9.0 ~ 15.0V			
Operating Voltage	At 12.0V			
Operating Speed at no Load	324°/s (54RPM)			
Stall Torque	147.0kgcm (1442.1Ncm)			
Rest Current	30mA			
Running Current at no Load	500mA			
Stall Current	10000mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN 60068-2-6			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	-			
External Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	480.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing			
Gear Material	4 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, Servo Horn (I-MOS)			
IP-Rating	IP68			
MTTF	>1000h			
Revision & Stand	Rev. 1.2 / 01.02.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

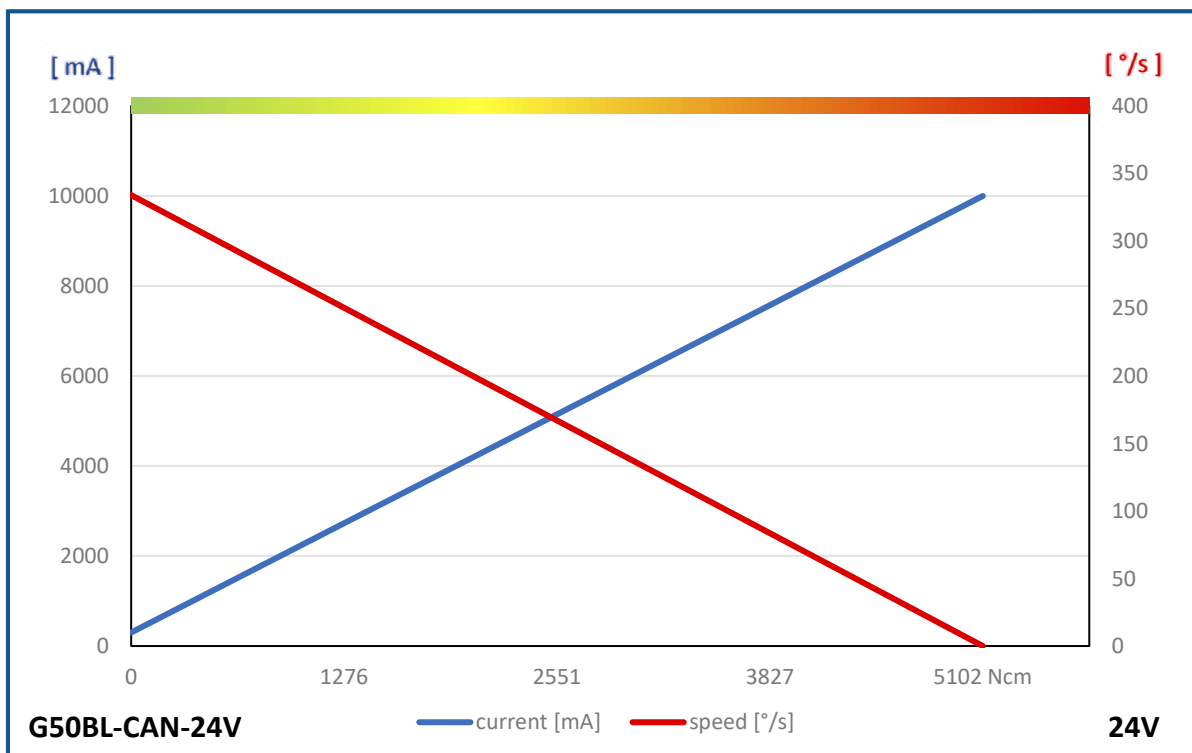
SG33BL-T-CAN-24V (GLAND CABLE)

#1-02464



1:2

PERFORMANCE CHART

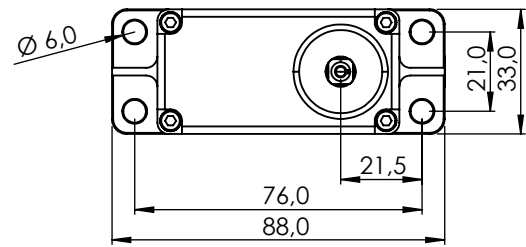
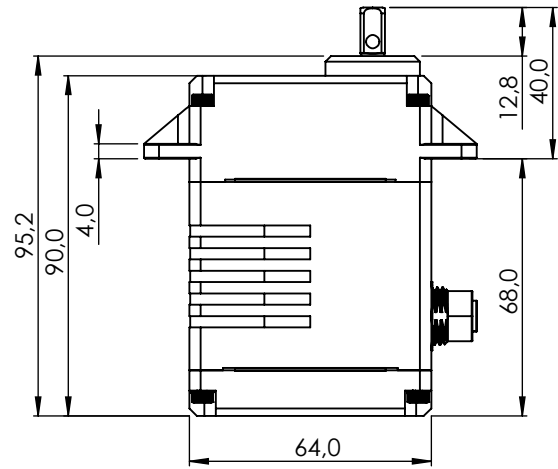


GENERAL SPECIFICATION

SG33BL-T-CAN-24V (Gland Cable)				
Control System	CAN2.0A,B / DroneCAN (UAVCAN v0)			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	-			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32Bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
Operating Speed at no Load	324°/s (54RPM)			
Stall Torque	147.0kgcm (1442.1Ncm)			
Rest Current	20mA			
Running Current at no Load	230mA			
Stall Current	6400mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN 60068-2-6			
Connector Wire Length	400mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
External Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	500.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing			
Gear Material	4 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, Servo Horn (I-MOS)			
IP-Rating	IP68			
MTTF	>1000h			
Revision & Stand	Rev. 1.2 / 01.02.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

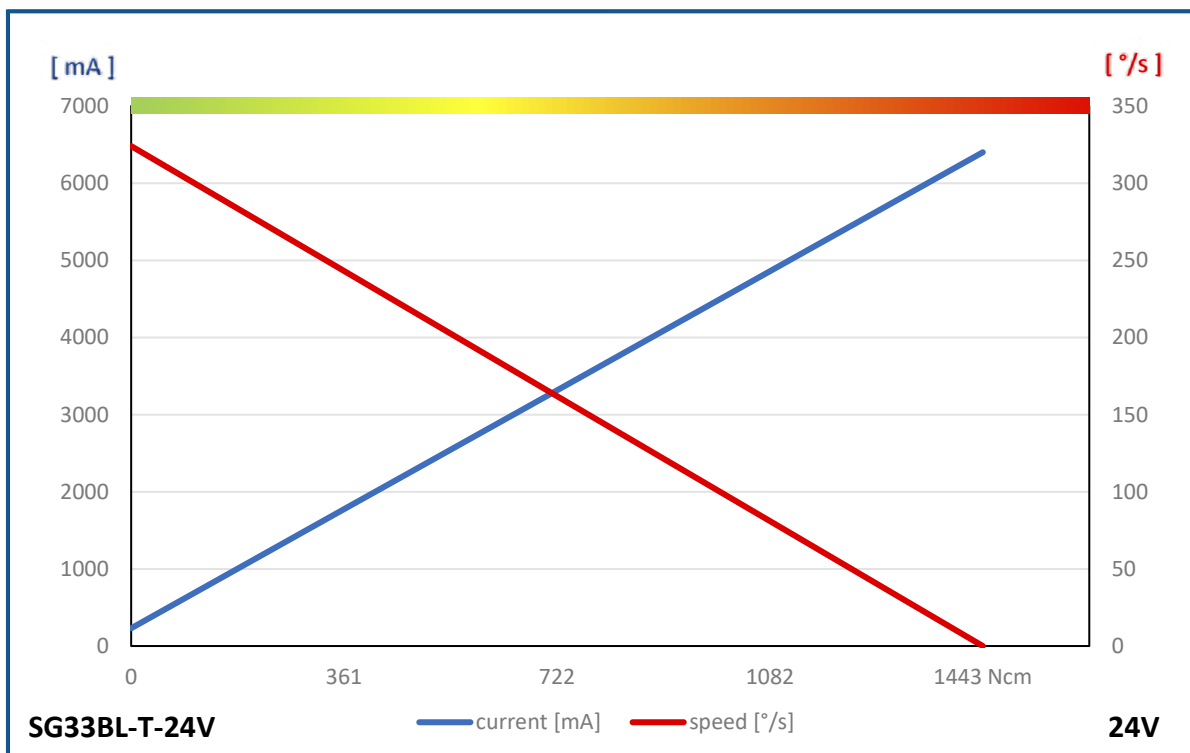
SG33BL-T-CAN-24V (CIRCULAR)

#1-02465



1:2

PERFORMANCE CHART

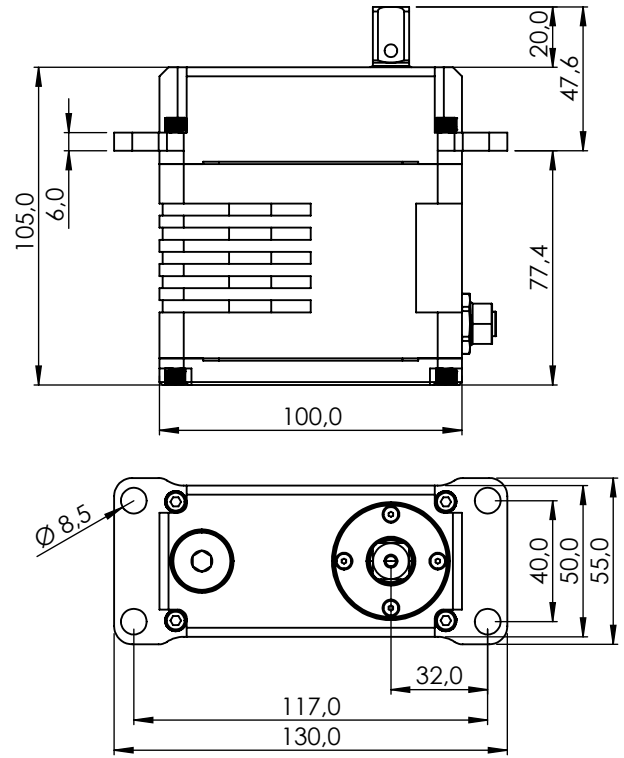


GENERAL SPECIFICATION

SG33BL-T-CAN-24V (Circular)				
Control System	CAN 2.0A,B / DroneCAN (UAVCAN v0)			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
Operating Speed at no Load	324°/s (54RPM)			
Stall Torque	147.0kgcm (1442.1Ncm)			
Rest Current	20mA			
Running Current at no Load	230mA			
Stall Current	6400mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII / EN 60068-2-6			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	-			
External Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	480.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing			
Gear Material	4 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, Servo Horn (I-MOS)			
IP-Rating	IP68			
MTTF	>1000h			
Revision & Stand	Rev. 1.2 / 01.02.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

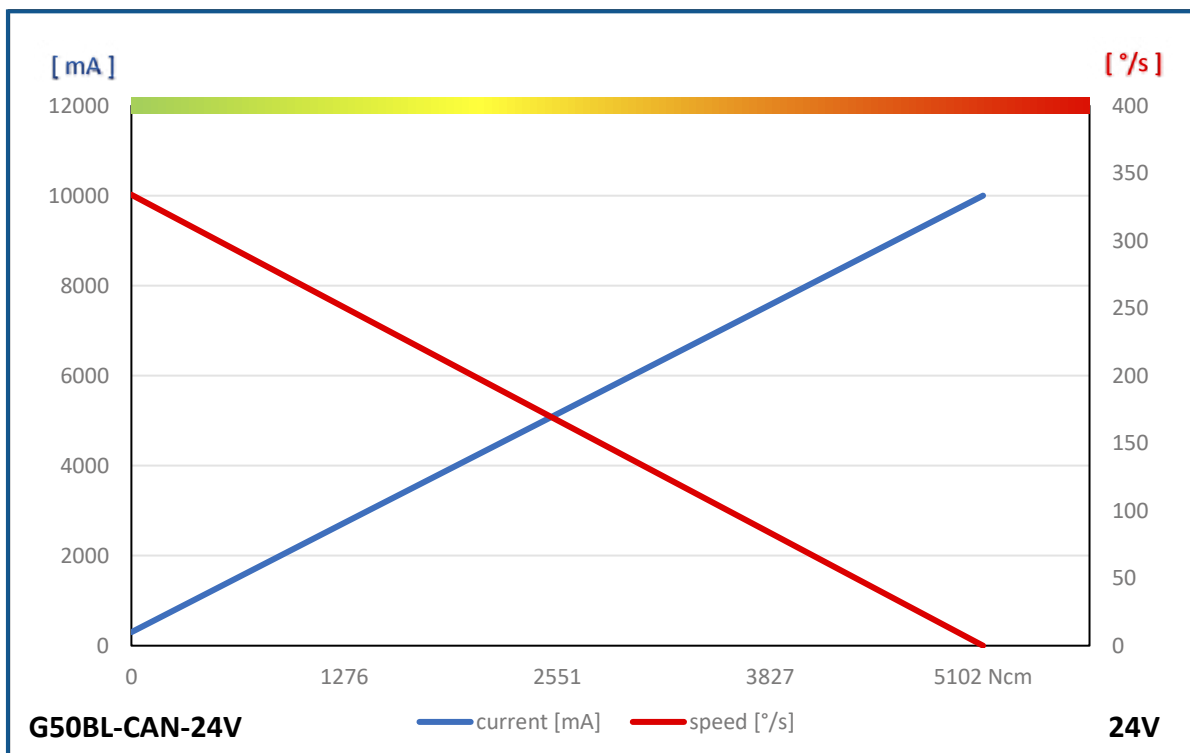
SG50BL-CAN-24V (CIRCULAR)

#1-02412



1:2,5

PERFORMANCE CHART



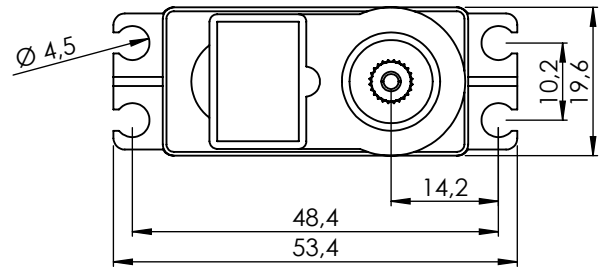
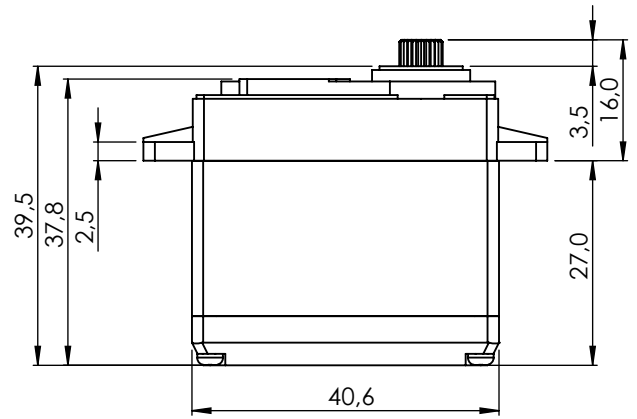
GENERAL SPECIFICATION

SG50BL-CAN-24V (Circular)				
Control System	CAN 2.0A,B / DroneCAN (UAVCAN v0)			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
Operating Speed at no Load	120°/s (20RPM)			
Stall Torque	520.0kgcm (5101.2Ncm)			
Rest Current	45mA			
Running Current at no Load	300mA			
Stall Current	10000mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-30°C ~ +70°C (-22°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at no Load	MIL-STD 810G 514.6C VII / EN 60068-2-6			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	-			
External Dimensions	100.0 x 50.0 x 105.0mm			
Weight*	1450g			
Ball Bearing	4 Angular Ball Bearings & 9 Needle Bearings			
Case Material	Rugged Aluminum Alloy With Hardcoat Anodizing			
Gear Material	5 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	Square 12.0 x 12.0			
Accessories	Mounting Hardware, Servo Horn (I-MOS12)			
IP-Rating	IP68			
MTTF	>1000h			
Revision & Stand	Rev. 1.2 / 01.02.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

HSR-2645CRH

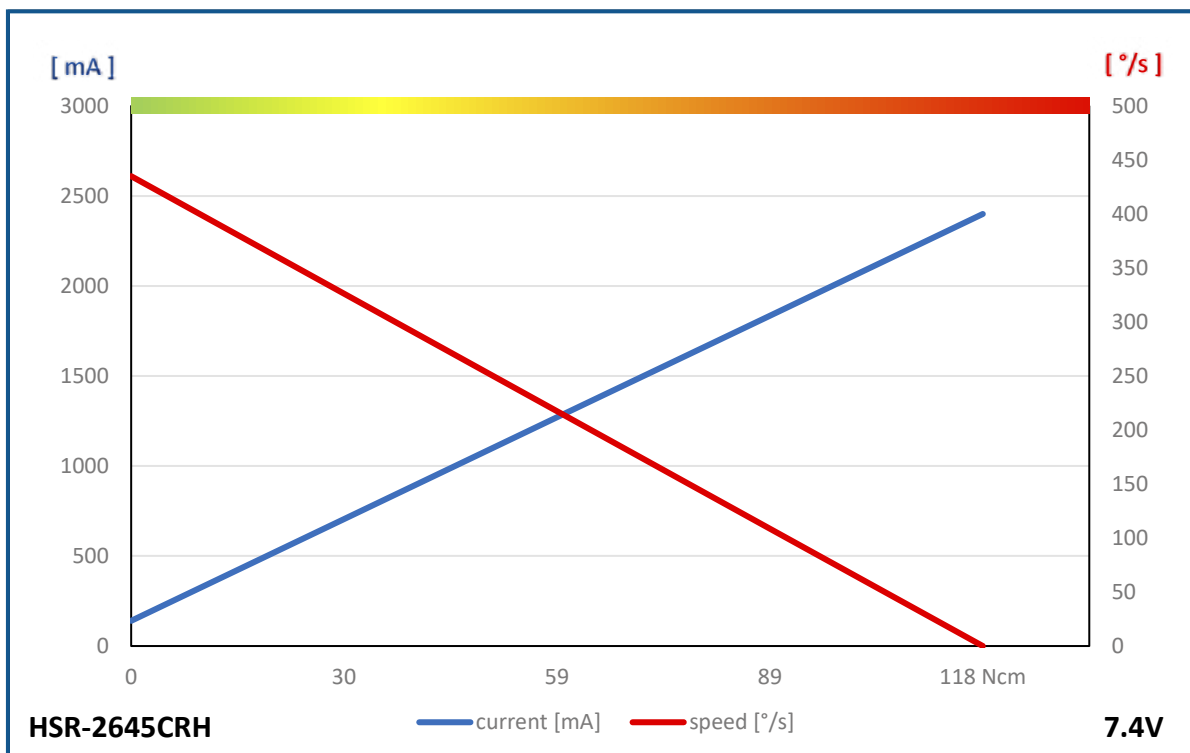
#138645

#1-02360 GP 24 Stück



1:1

PERFORMANCE CHART



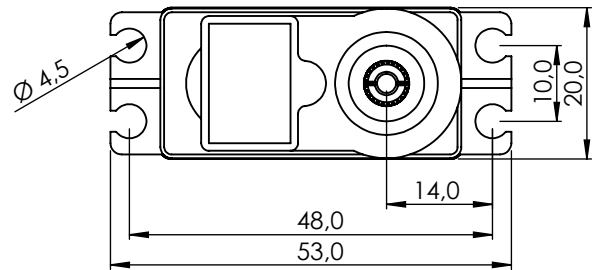
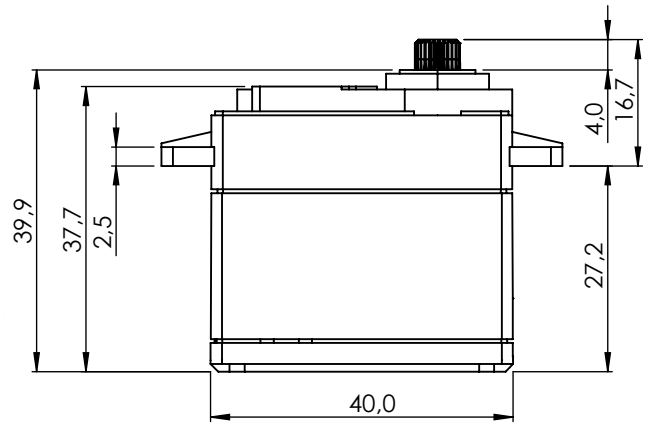
GENERAL SPECIFICATION

HSR-2645CRH		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	-	
Motor Type	Cored Carbon Brush	
Amplifier / MCU	8bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	3.5V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	347°/s (58RPM)	435°/s (72RPM)
Stall Torque	10.0kgcm (98.1Ncm)	12.0kgcm (117.7Ncm)
Peak Efficiency Torque	2.0kgcm (19.6Ncm)	2.4kgcm (23.5Ncm)
Rest Current	3mA	3mA
Running Current at no Load	120mA	140mA
Stall Current	2000mA	2400mA
Deadband Width	-	
Operating Travel	Default	Continuous Rotation
	Programmable	Yes
	Multi Turn/Continuous Rotation	Yes / Yes
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count	60/0.08	
External Dimensions	40.6 x 19.6 x 37.8mm	
Weight*	53.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	H24T Ø6.0	
Accessories	Mounting Hardware, Servo Horn (R-O)	
IP-Rating	IP4X	
Revision	Rev. 1.0 / 02.01.2024	
Changelog	-	
* of the servo only w/o horns and accessories		

HSB-9465SH

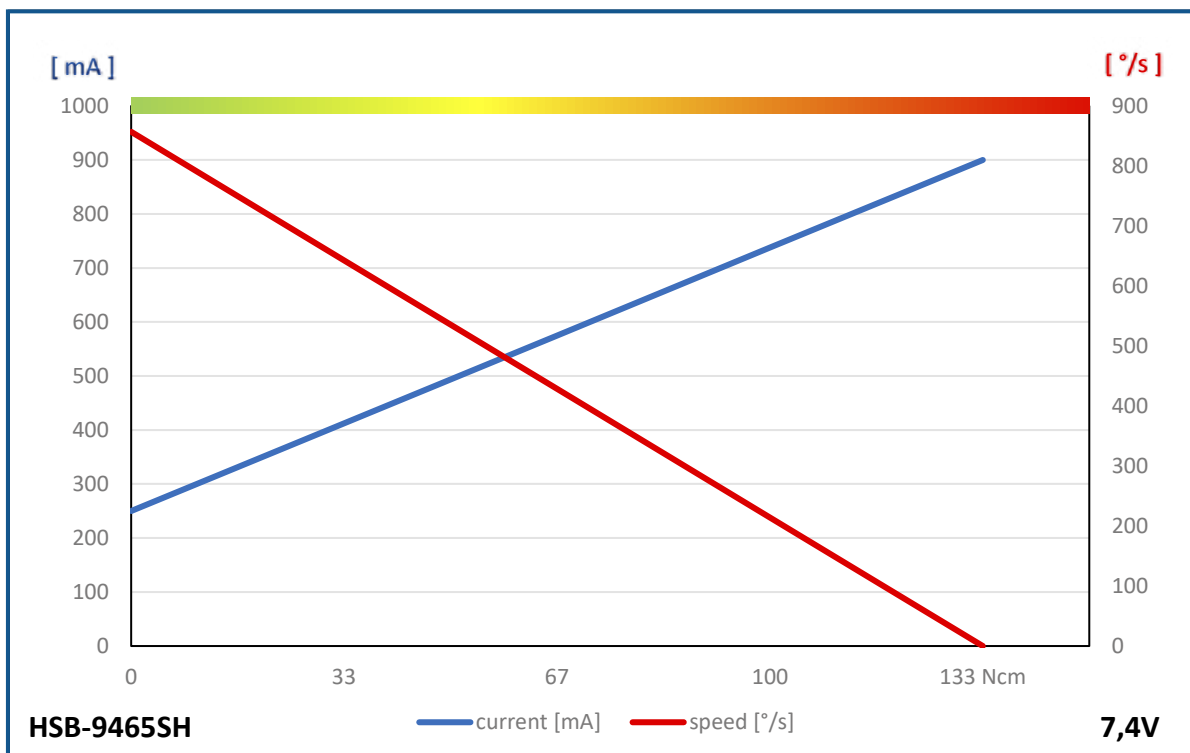
#116465

#1-02355 GP 24 STÜCK



1:1

PERFORMANCE CHART



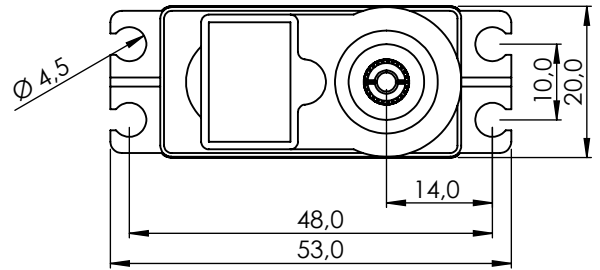
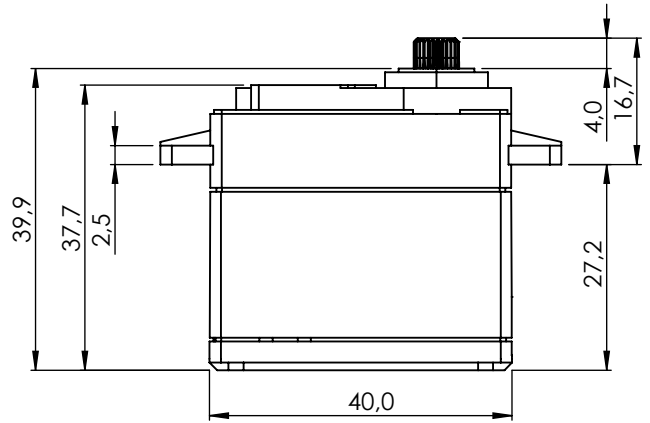
GENERAL SPECIFICATION

HSB-9465SH		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	667°/s (111RPM)	857°/s (143RPM)
Stall Torque	13.5kgcm (132.4Ncm)	13.5kgcm (132.4Ncm)
Peak Efficiency Torque	2.7kgcm (26.5Ncm)	2.7kgcm (26.5Ncm)
Rest Current	30mA	30mA
Running Current at no Load	250mA	250mA
Stall Current	1100mA	900mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 160°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 37.7mm	
Weight*	62.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25	
IP-Rating	IP54	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo w/o horns and accessories		

HSB-9485SH

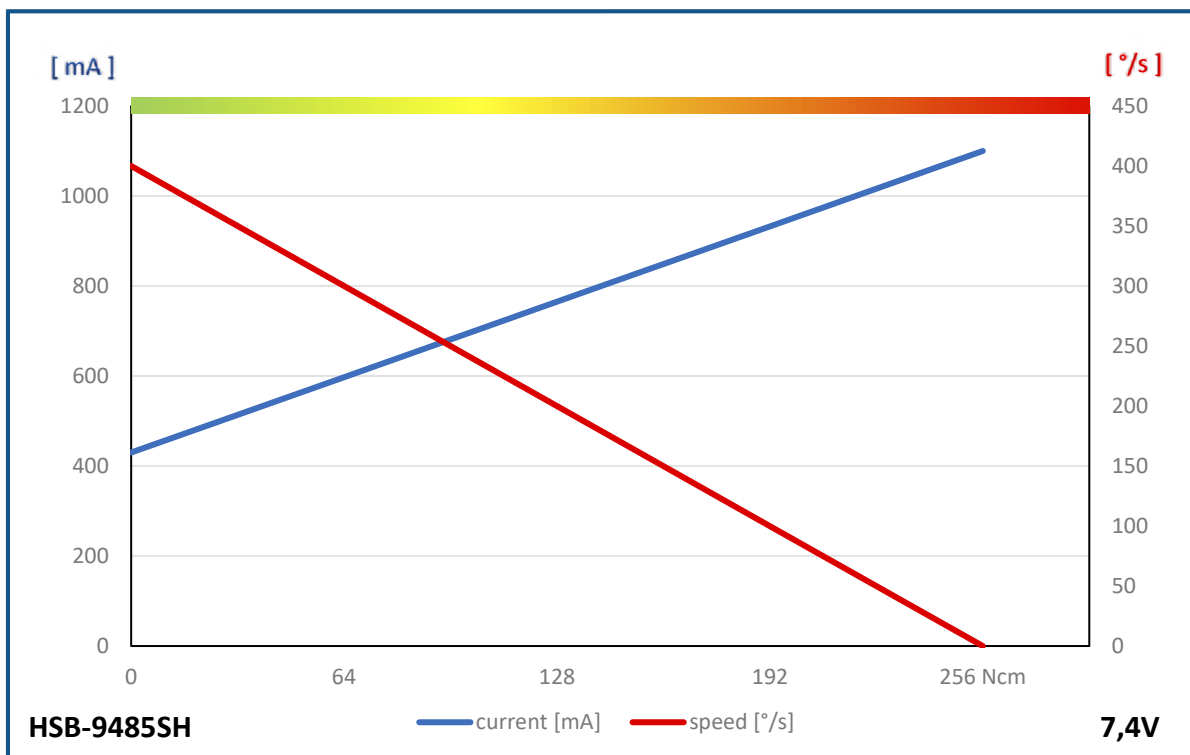
#116485

#1-02356 GP 24 STÜCK



1:1

PERFORMANCE CHART



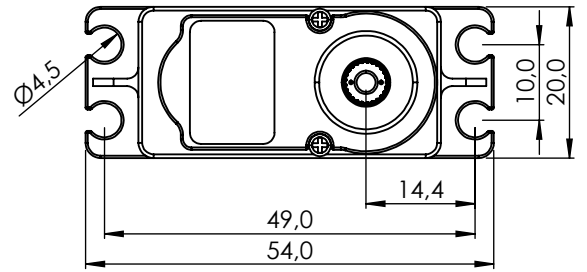
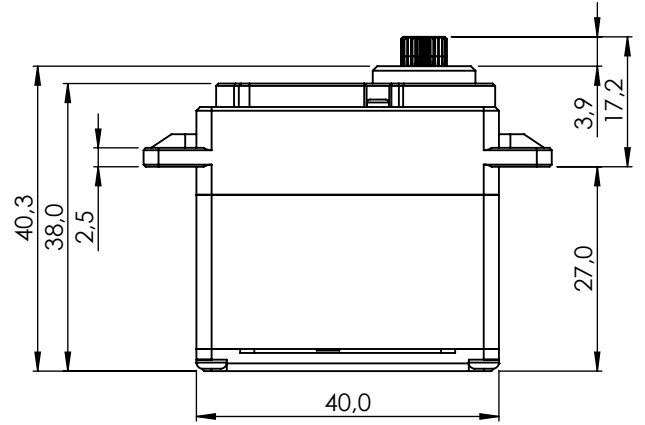
GENERAL SPECIFICATION

HSB-9485SH		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	333°/s (56RPM)	400°/s (67RPM)
Stall Torque	26.0kgcm (255.1Ncm)	26.0kgcm (255.1Ncm)
Peak Efficiency Torque	5.2kgcm (51.0Ncm)	5.2kgcm (51.0Ncm)
Rest Current	30mA	30mA
Running Current at no Load	360mA	430mA
Stall Current	1300mA	1100mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 160° **
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 37.7mm	
Weight*	62.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25)	
IP-Rating	IP54	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo w/o horns and accessories		
** also available with 270°		

HSB-9381TH

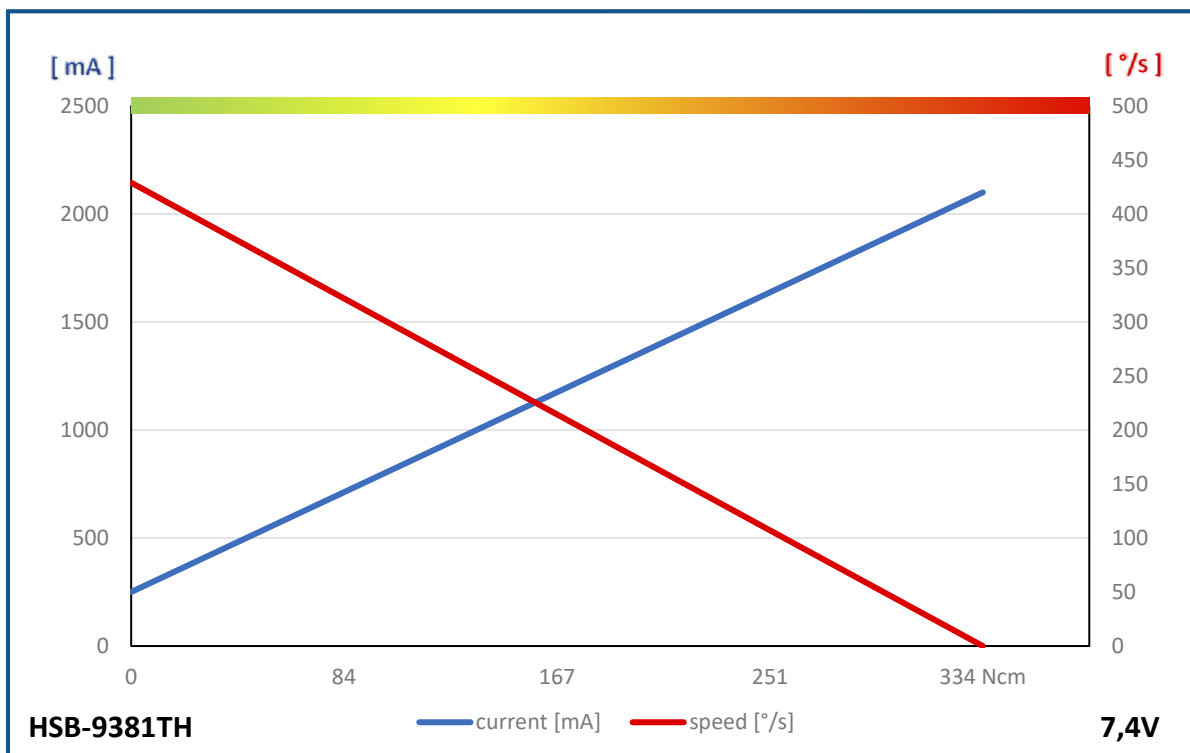
#1-00074

#1-02357 GP 24 Stück



1:1

PERFORMANCE CHART



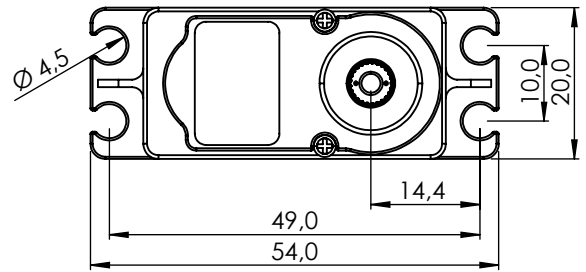
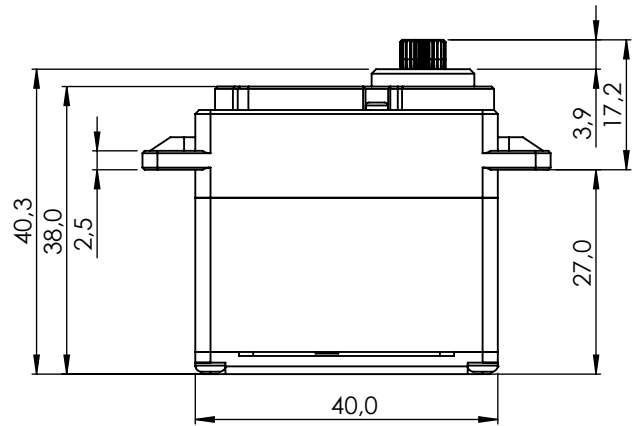
GENERAL SPECIFICATION

HSB-9381TH		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	34.0kgcm (333.5Ncm)	34.0kgcm (333.5Ncm)
Peak Efficiency Torque	6.8kgcm (66.7Ncm)	6.8kgcm (66.7Ncm)
Rest Current	27mA	27mA
Running Current at no Load	250mA	250mA
Stall Current	2700mA	2100mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 160°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 38.0mm	
Weight*	79.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Aluminum Alloy	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)	
IP-Rating	IP54	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo w/o horns and accessories		

HSB-M9381TH

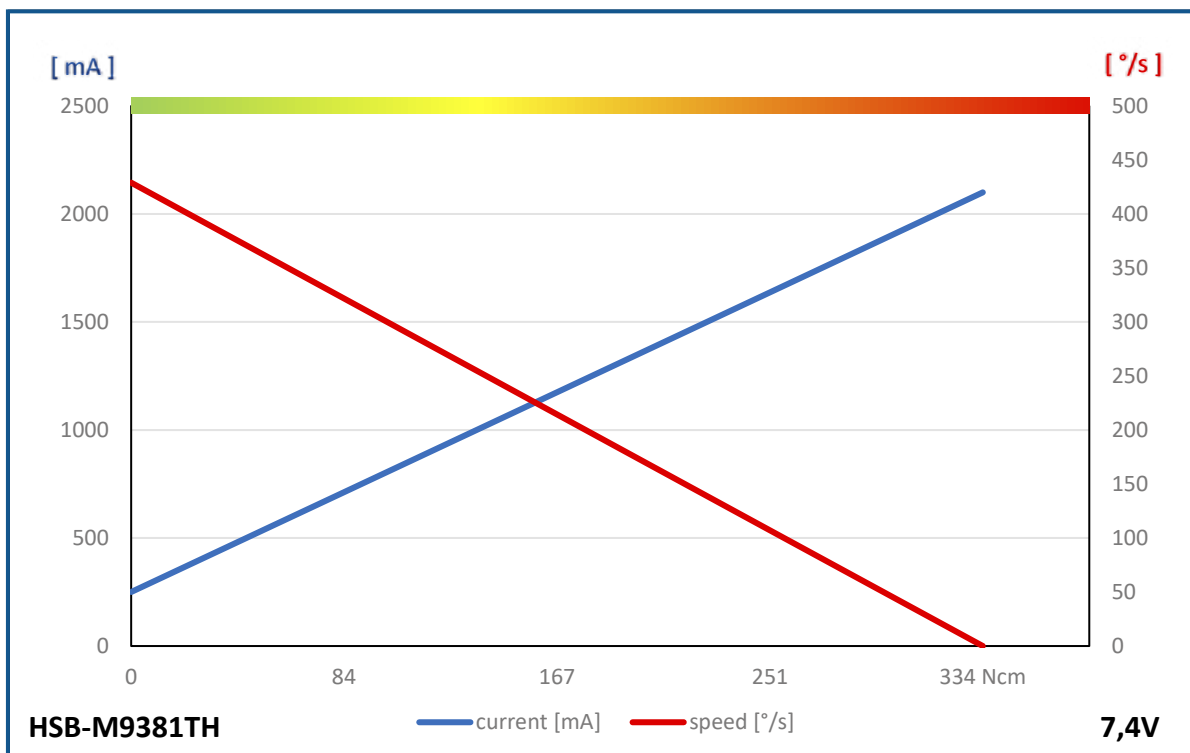
#1-01191

#1-02353 GP 24 Stück



1:1

PERFORMANCE CHART

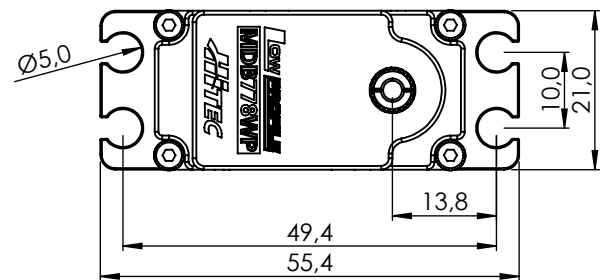
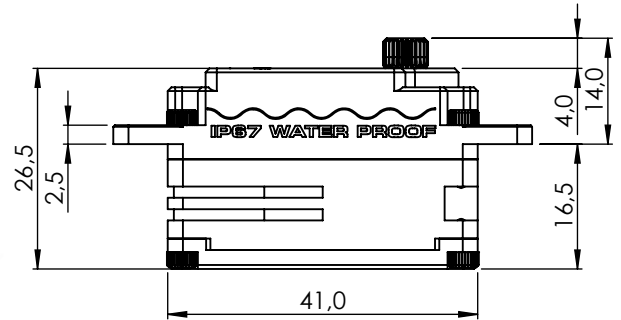


GENERAL SPECIFICATION

HSB-M9381TH		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	34.0kgcm (333.5Ncm)	34.0kgcm (333.5Ncm)
Peak Efficiency Torque	6.8kgcm (66.7Ncm)	6.8kgcm (66.7Ncm)
Rest Current	27mA	27mA
Running Current at no Load	250mA	250mA
Stall Current	2700mA	2100mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 300°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +70°C (-4°F ~ +158°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 38.0mm	
Weight*	78.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Aluminum Alloy	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)	
IP-Rating	IP54	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo w/o horns and accessories		

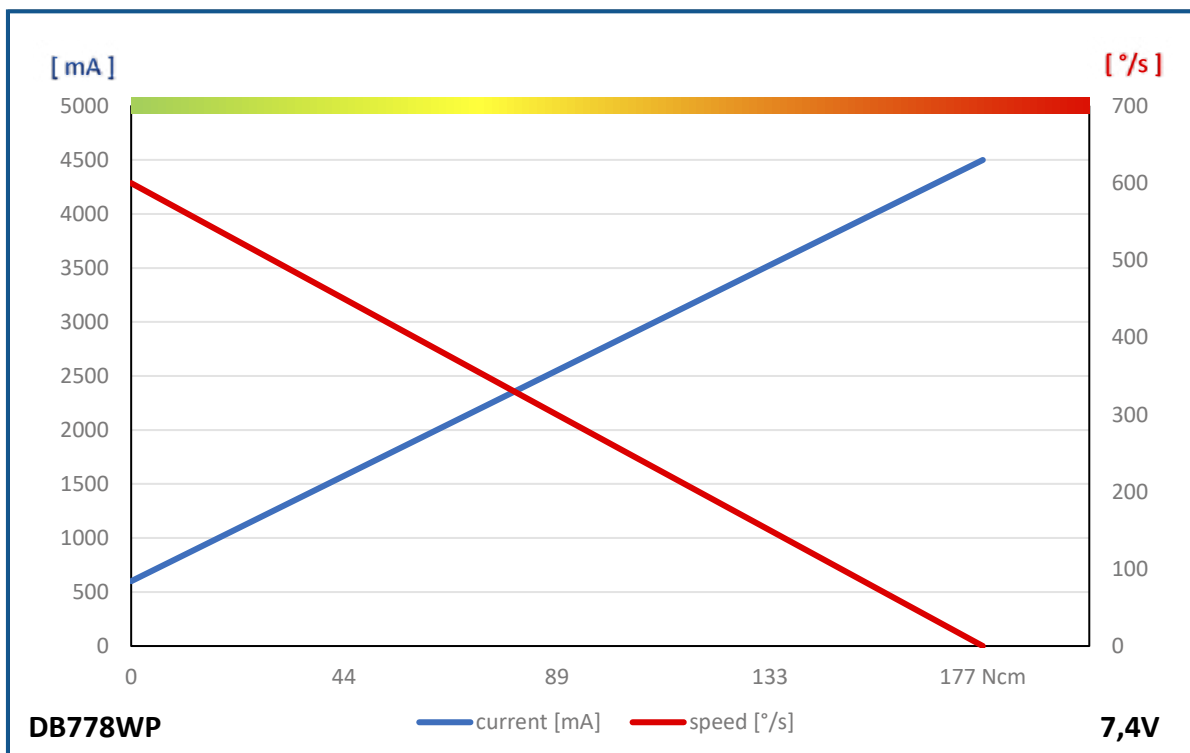
DB778WP

#1-02853



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PERFORMANCE CHART

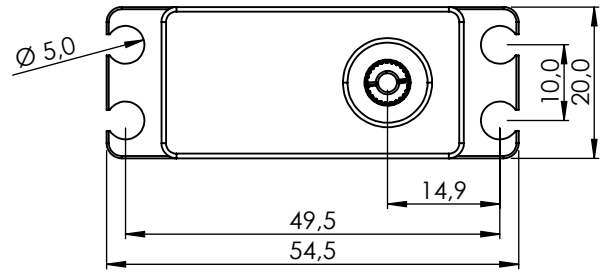
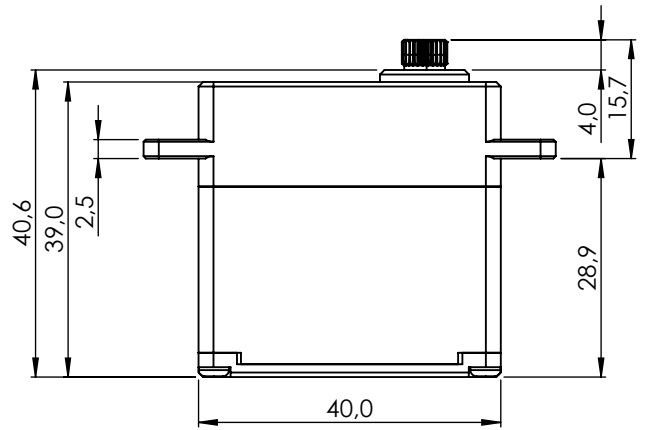


GENERAL SPECIFICATION

DB778WP		
Control System	PWM / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	BLDC	
Amplifier / MCU	32bit programmable Digital	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	500°/s (83RPM)	600°/s (100RPM)
Stall Torque	15.0kgcm (147.2Ncm)	18.0kgcm (175.6Ncm)
Peak Efficiency Torque	3.0kgcm (29.4Ncm)	3.6kgcm (35.3Ncm)
Rest Current	28mA	28mA
Running Current at no Load	500mA	600mA
Stall Current	3500mA	4500mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 175°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +70°C (-4°F ~ +158°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	200mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	41.0 x 21.0 x 26.5mm	
Weight*	66.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Rugged Aluminum Alloy	
Gear Material	5 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Hex Screw, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)	
IP-Rating	IP67	
Revision	Rev. 1.0 / 09.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

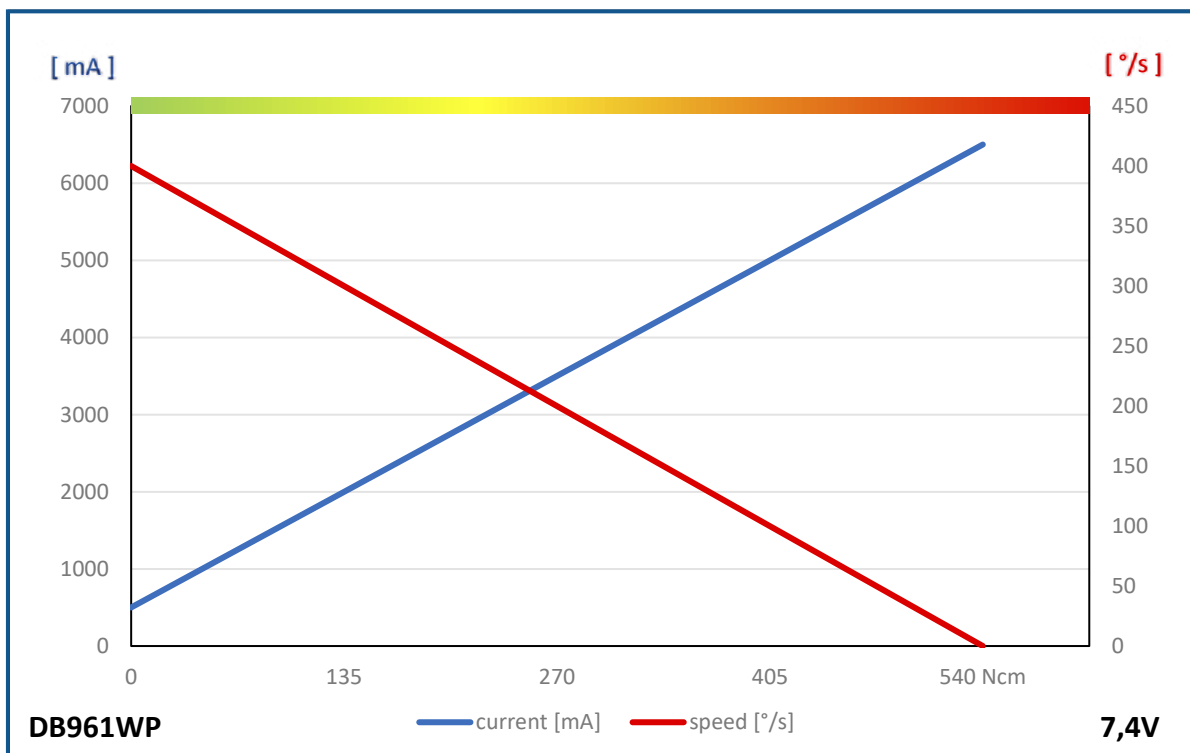
DB961WP

#1-02571



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PERFORMANCE CHART

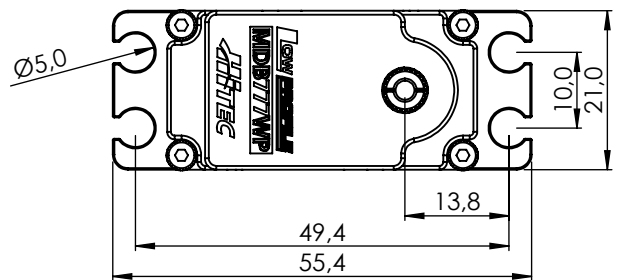
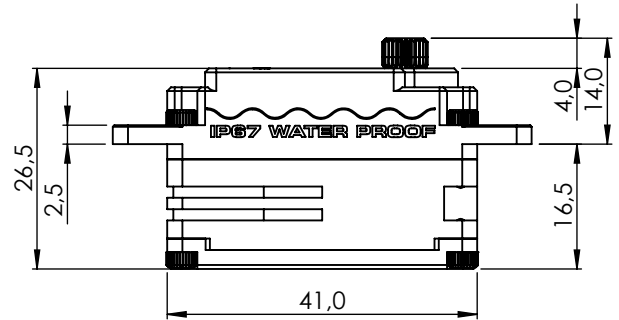


GENERAL SPECIFICATION

DB961WP		
Control System	PWM / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital	
Operating Voltage Range	4.0 ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	333°/s (56RPM)	400°/s (67RPM)
Stall Torque	55.0kgcm (539.6Ncm)	55.0kgcm (539.6Ncm)
Peak Efficiency Torque	11.0kgcm (107.9Ncm)	11.0kgcm (107.9Ncm)
Rest Current	35mA	35mA
Running Current at no Load	500mA	500mA
Stall Current	8000mA	6500mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 260°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	MIL-STD-810G 514.6C-VII	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 39.0mm	
Weight*	90.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Aluminum Alloy	
Gear Material	5 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
IP-Rating	IP67	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

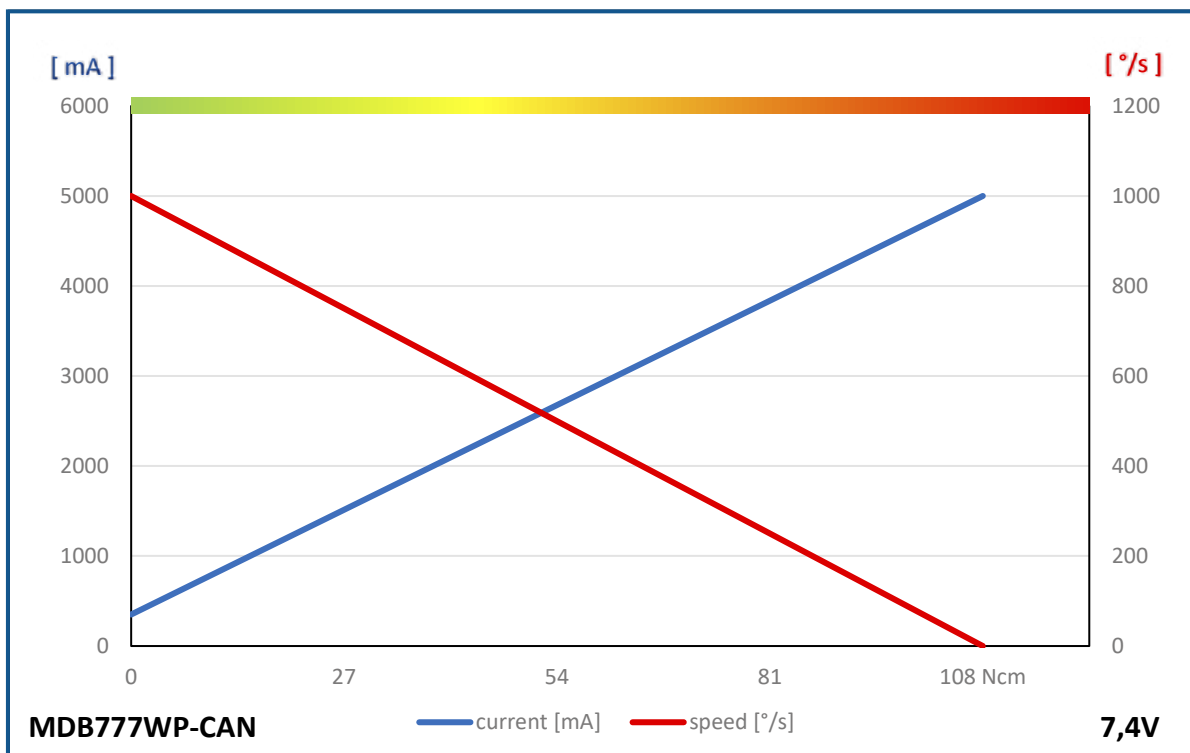
MDB-777WP-CAN/DRONECAN

#1-03030 #1-03031



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PERFORMANCE CHART

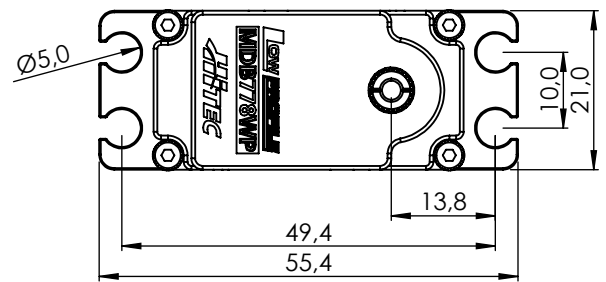
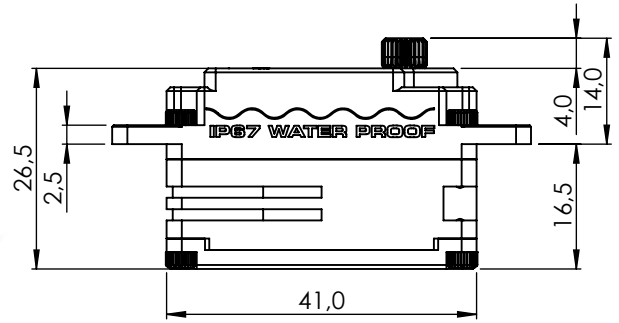


GENERAL SPECIFICATION

MDB777WP-CAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 6.0V	At 7.4V		
Operating Speed at no Load	750°/s (125RPM)	1000°/s (167RPM)		
Stall Torque	8.0kgcm (78.5Ncm)	11.0kgcm (107.9Ncm)		
Peak Efficiency Torque	1.6kgcm (15.7Ncm)	2.2kgcm (21.6Ncm)		
Rest Current	26mA	26mA		
Running Current at no Load	320mA	350mA		
Stall Current	4000mA	5000mA		
Deadband Width	n/a	n/a		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	-			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
External Dimensions	41.0 x 21.0 x 26.5mm			
Weight*	70.0g			
Ball Bearing	Dual Ball Bearing			
Case Material	Aluminum Alloy			
Gear Material	5 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)			
IP-Rating	IP67			
Revision	Rev. 1.0 / 09.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

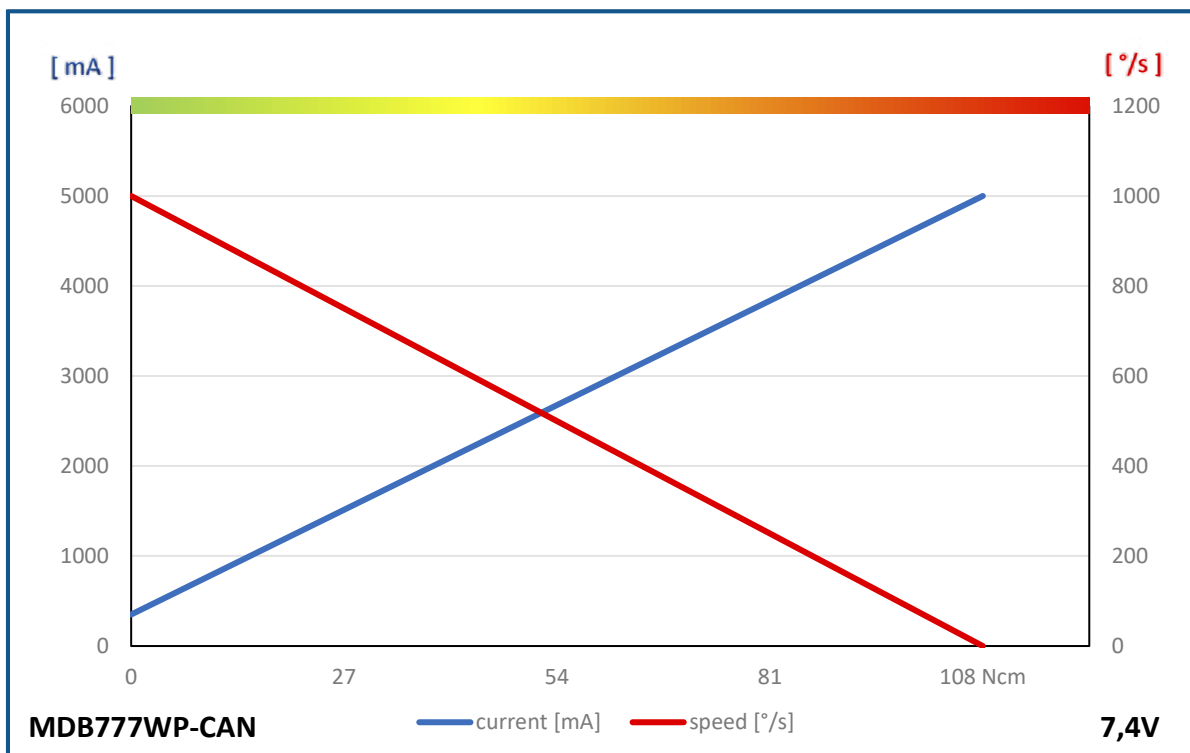
MDB778WP-CAN/DRONECAN

#1-03032 #1-03033



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PERFORMANCE CHART

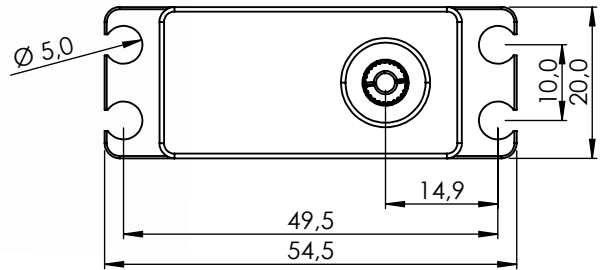
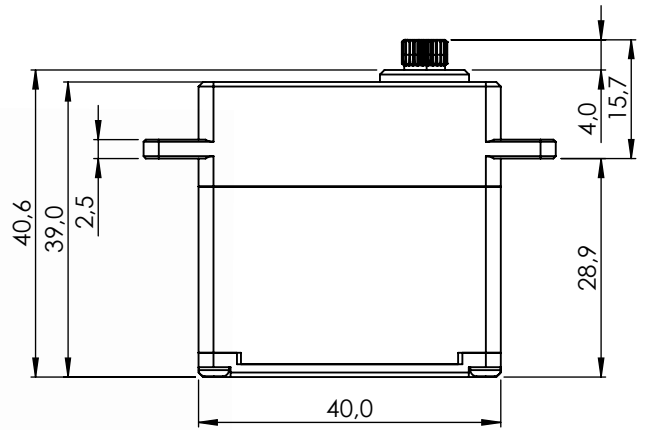


GENERAL SPECIFICATION

MDB778WP-CAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 6.0V	At 7.4V		
Operating Speed at no Load	462°/s (77RPM)	600°/s (100RPM)		
Stall Torque	14.0kgcm (137.3Ncm)	16.0kgcm (157.0Ncm)		
Peak Efficiency Torque	2.8kgcm (27.5Ncm)	3.3kgcm (32.4Ncm)		
Rest Current	50mA	50mA		
Running Current at no Load	400mA	500mA		
Stall Current	4000mA	5000mA		
Deadband Width	n/a	n/a		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	-			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
External Dimensions	41.0 x 21.0 x 26.5mm			
Weight*	70.0g			
Ball Bearing	Dual Ball Bearing			
Case Material	Aluminum Alloy			
Gear Material	5 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)			
IP-Rating	IP67			
Revision	Rev. 1.0 / 09.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

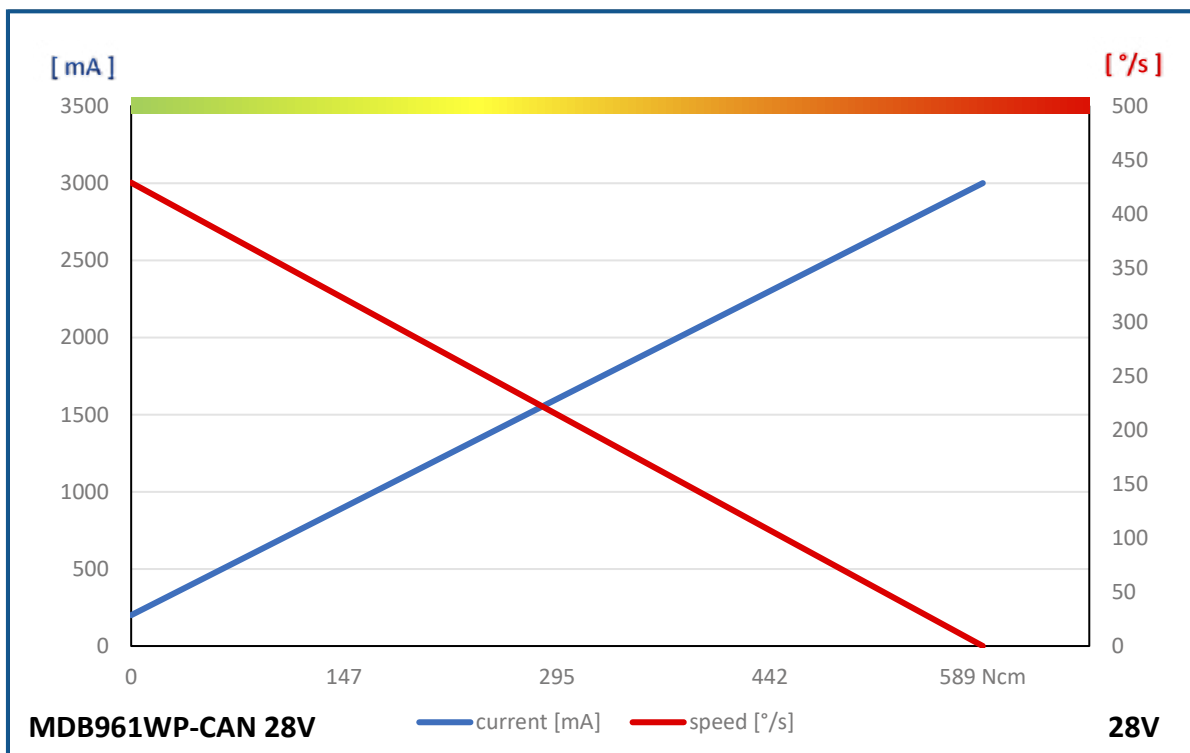
MDB961WP-CAN 28V

#1-03003



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PERFORMANCE CHART

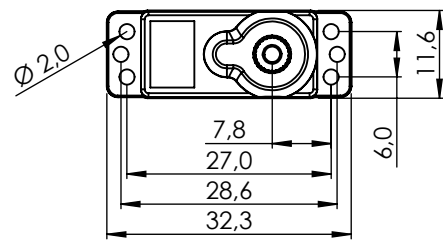
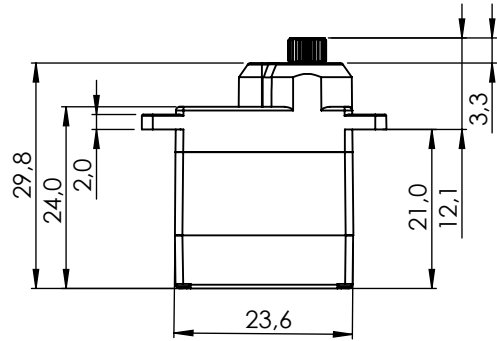


GENERAL SPECIFICATION

MDB961WP-CAN 28V				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A		Extended 2.0B
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	8.0V ~ 32.0V			
Operating Voltage	At 12.0V	At 24.0V	At 28.0V	
Operating Speed at no Load	429°/s (71RPM)	429°/s (71RPM)	429°/s (71RPM)	
Stall Torque	60.0kgcm (588.6Ncm)	60.0kgcm (588.6Ncm)	60.0kgcm (588.6Ncm)	
Peak Efficiency Torque	12.0kgcm (117.7Ncm)	12.0kgcm (117.7Ncm)	12.0kgcm (117.7Ncm)	
Rest Current	18mA	10mA	9mA	
Running Current at no Load	500mA	300mA	200mA	
Stall Current	6700mA	3400mA	3000mA	
Deadband Width	n/a	n/a	n/a	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	-			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
External Dimensions	40.0 x 20.0 x 39.0mm			
Weight*	90.0g			
Ball Bearing	Dual Ball Bearing			
Case Material	Aluminum Alloy			
Gear Material	5 Hardened Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-OS25, HD-X25)			
IP-Rating	IP67			
Revision	Rev. 1.0 / 09.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

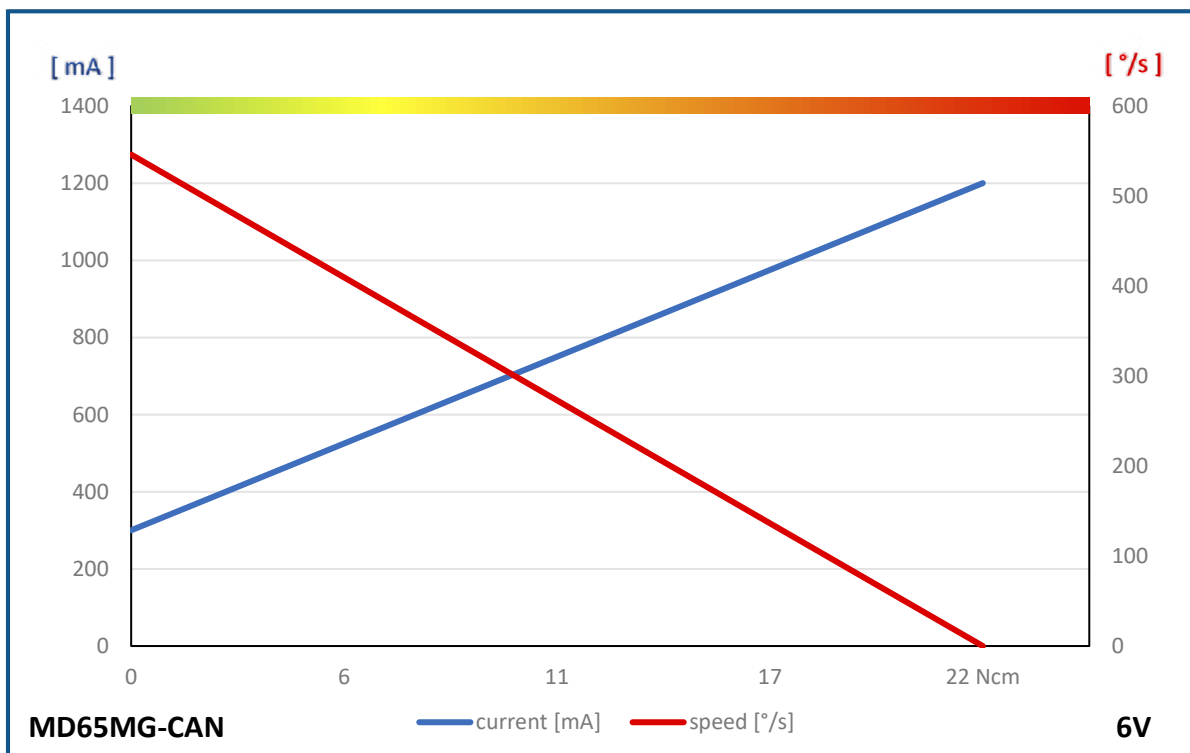
MD65MG-CAN/UAV/DRONECAN

#1-01707, #1-01643



1:1

PERFORMANCE CHART

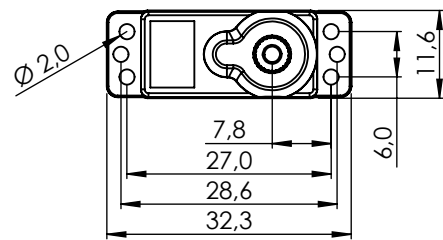
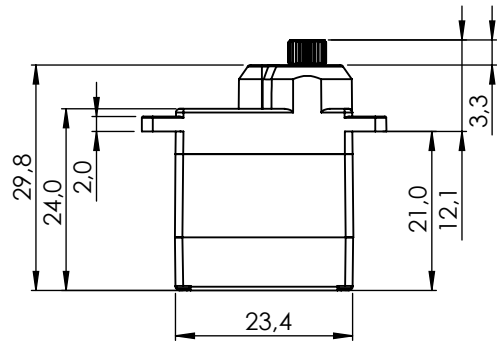


GENERAL SPECIFICATION

MD65MG-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored Metal Brush			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V		
Operating Speed at no Load	429°/s (71RPM)	546°/s (91RPM)		
Stall Torque	1.8kgcm (17.7Ncm)	2.2kgcm (21.6Ncm)		
Peak Efficiency Torque	0.4kgcm (3.9Ncm)	0.4kgcm (3.9Ncm)		
Rest Current	30mA	30mA		
Running Current at no Load	180mA	220mA		
Stall Current	960mA	1200mA		
Deadband Width	4Step	4Step		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	28AWG			
Connector Wire Strand Count	20/0.08			
External Dimensions	23.6 x 11.6 x 24.0mm			
Weight*	12.8g			
Ball Bearing	Single Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	1 Heavy Duty Resin & 4 Metal Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	25T Ø5.0			
Accessories	Tapping Screw, Servo Horns (MS-I25, MS-L25, MS-X25)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

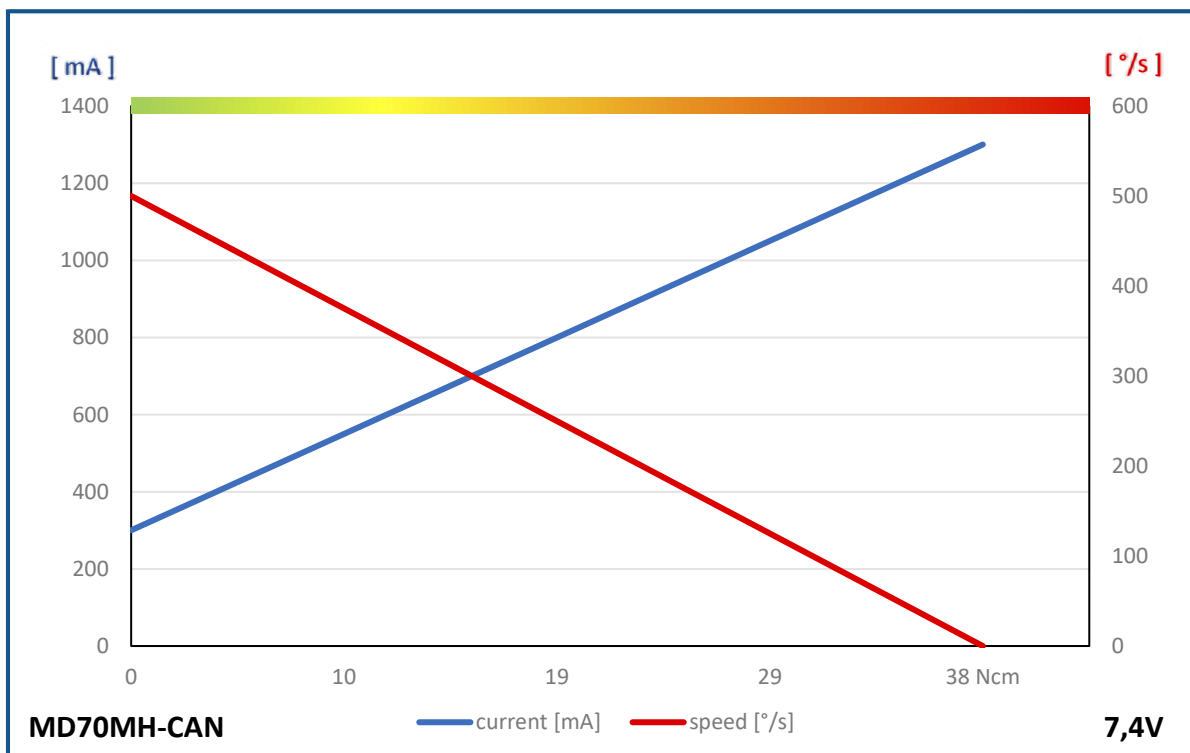
MD70MH-CAN/UAVCAN/DRONECAN

#1-01201, #1-01644



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PERFORMANCE CHART

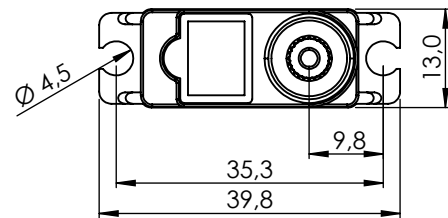
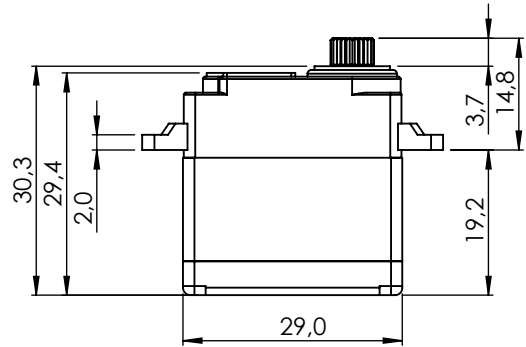


GENERAL SPECIFICATION

MD70MH-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored Metal Brush			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 6.0V	At 7.4V		
Operating Speed at no Load	400°/s (67RPM)	500°/s (83RPM)		
Stall Torque	3.1kgcm (30.4Ncm)	3.8kgcm (37.3Ncm)		
Peak Efficiency Torque	0.6kgcm (5.9Ncm)	0.8kgcm (7.9Ncm)		
Rest Current	30mA	30mA		
Running Current at no Load	200mA	240mA		
Stall Current	1000mA	1300mA		
Deadband Width	n/a	n/a		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	-			
Connector Wire Length	300mm			
Connector Wire Gauge	28AWG			
Connector Wire Strand Count	20/0.08			
External Dimensions	23.4 x 11.4 x 24.0mm			
Weight*	14.1g			
Ball Bearing	Single Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	1 Heavy Duty Resin & 4 Metal Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	25T Ø5.0			
Accessories	Tapping Screw, Servo Horns (MS-I25, MS-L25, MS-X25)			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

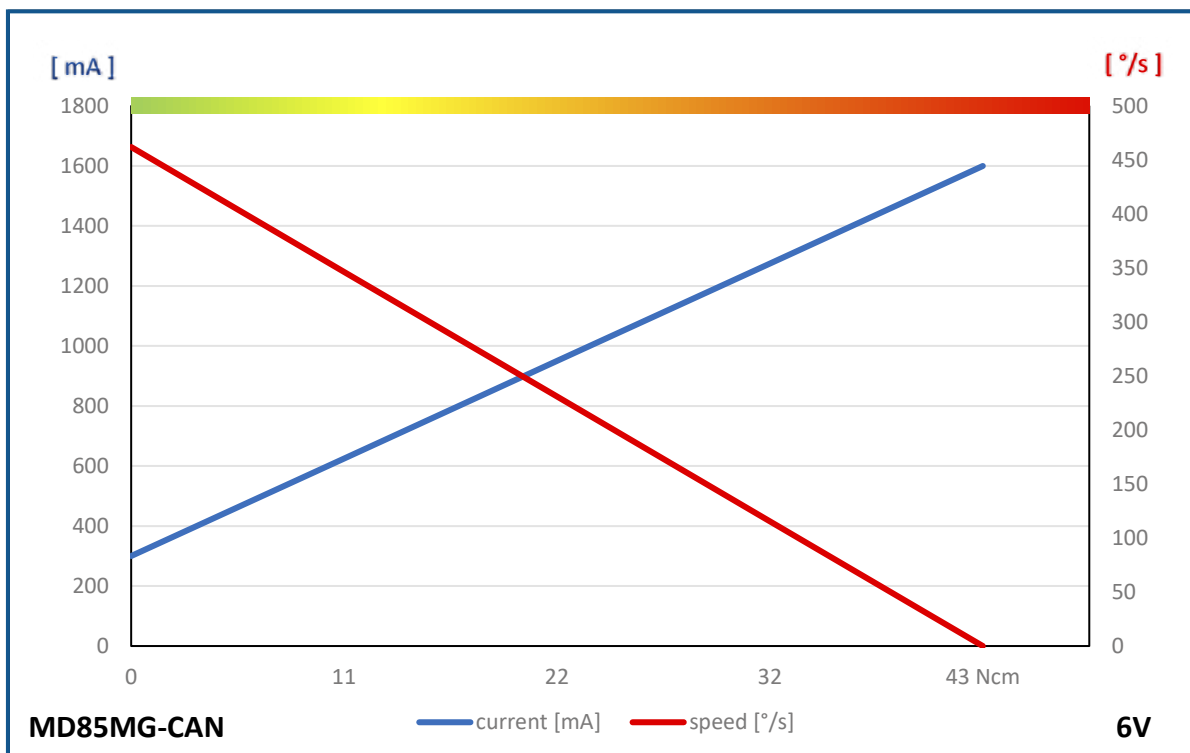
MD85MG-CAN/UAVCAN/DRONECAN

#1-01573, #1-01645



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PERFORMANCE CHART

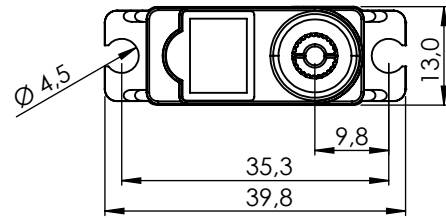
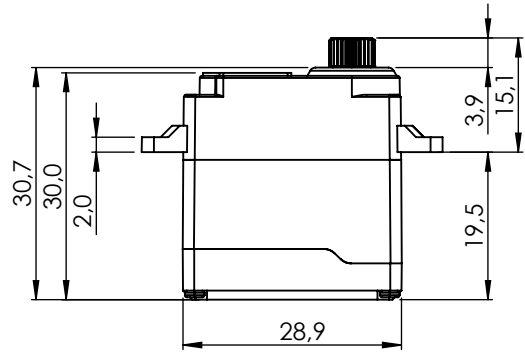


GENERAL SPECIFICATION

MD85MG-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored Carbon Brush			
Amplifier / MCU	32bit programmable Digital with Mosfet Drive			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V		
Operating Speed at no Load	353°/s (59RPM)	462°/s (77RPM)		
Stall Torque	3.6kgcm (35.3Ncm)	4.3kgcm (42.2Ncm)		
Peak Efficiency Torque	0.7kgcm (6.9Ncm)	0.9kgcm (8.8Ncm)		
Rest Current	30mA	30mA		
Running Current at no Load	260mA	300mA		
Stall Current	1300mA	1600mA		
Deadband Width	4Step	4Step		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	28AWG			
Connector Wire Strand Count	20/0.08			
External Dimensions	29.0 x 13.0 x 29.4mm			
Weight*	22.7g			
Ball Bearing	Single Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	5 Metal Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	24T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (M-I, M-X, M-O)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

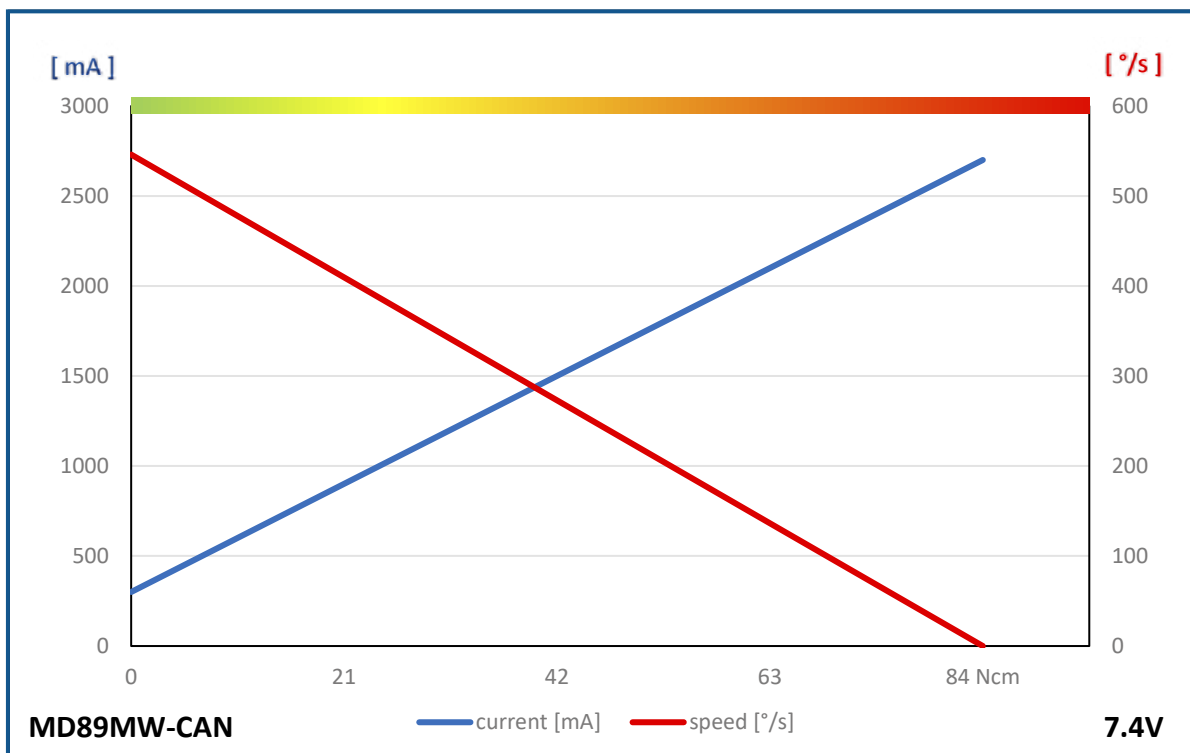
MD89MW-CAN/UAVCAN/DRONECAN

#1-01972, #1-01973



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PERFORMANCE CHART

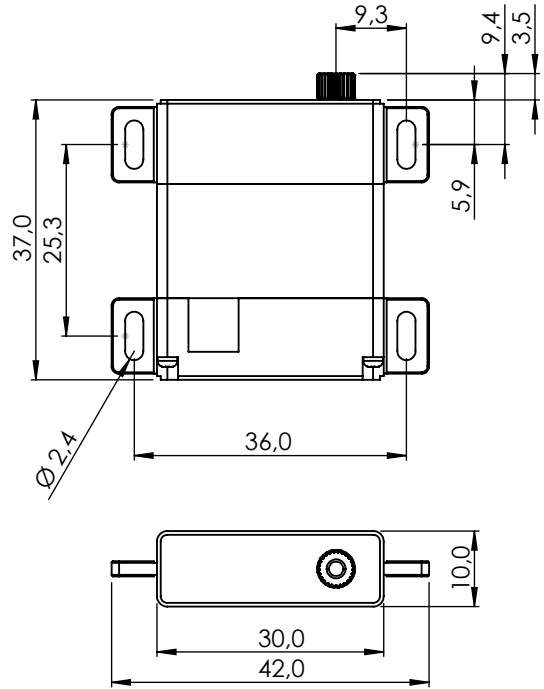


GENERAL SPECIFICATION

MD89MW-CAN/UAVCANDroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Coreless			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0 ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
Operating Speed at no Load	353°/s (59RPM)	462°/s (77RPM)	546°/s (91RPM)	
Stall Torque	5.3kgcm (52.0Ncm)	6.4kgcm (62.8Ncm)	8.5kgcm (83.4Ncm)	
Peak Efficiency Torque	1.1kgcm (10.8Ncm)	1.3kgcm (12.8Ncm)	1.7kgcm (16.7Ncm)	
Rest Current	30mA	30mA	30mA	
Running Current at no Load	200mA	250mA	300mA	
Stall Current	1800mA	2200mA	2700mA	
Deadband Width	n/a	n/a	n/a	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	-			
Connector Wire Length	300mm			
Connector Wire Gauge	22AWG			
Connector Wire Strand Count	60/0.08			
External Dimensions	28.9 x 13.0 x 30.0mm			
Weight*	28.0g			
Ball Bearing	Dual Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	5 Metal Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	25T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (M-I, M-X, M-O)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

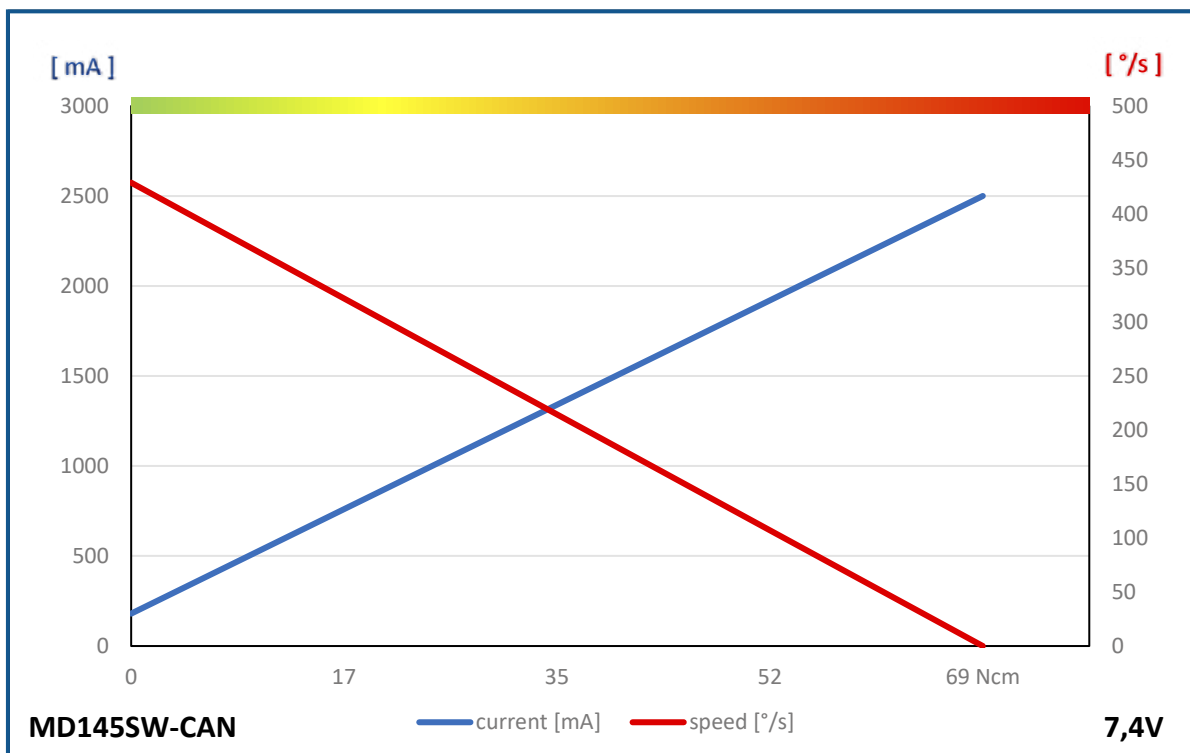
MD145SW-CAN/UAVCAN/DRONECAN

#1-01787, #1-01641



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PERFORMANCE CHART

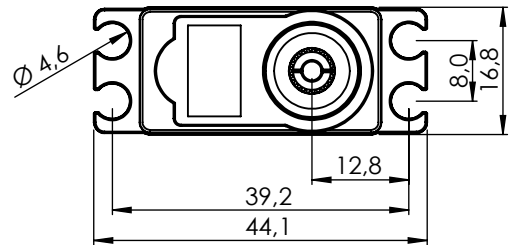
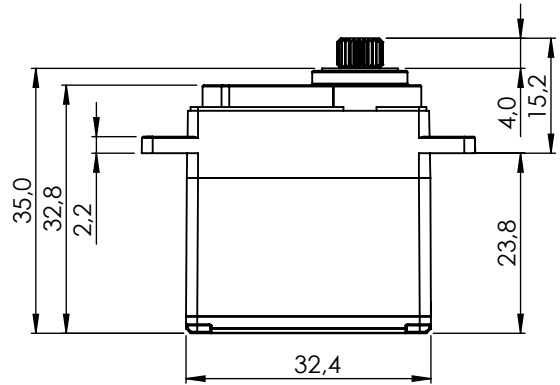


GENERAL SPECIFICATION

MD145SW-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored Carbon Brush			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
Operating Speed at no Load	286°/s (48RPM)	353°/s (59RPM)	429°/s (71RPM)	
Stall Torque	4.9kgcm (16.7Ncm)	5.9kgcm (57.9Ncm)	7.0kgcm (68.7Ncm)	
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.2kgcm (11.8Ncm)	1.4kgcm (13.7Ncm)	
Rest Current	30mA	30mA	30mA	
Running Current at no Load	120mA	180mA	180mA	
Stall Current	1,600mA	2,500mA	2,500mA	
Deadband Width	4Step	4Step	4Step	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	24AWG			
Connector Wire Strand Count	40/0.08			
External Dimensions	30.0 x 10.0 x 37.0mm			
Weight*	27.6g			
Ball Bearing	Dual Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	1 Metal-Plastic & 4 Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	25T Ø5.0			
Accessories	Mounting Hardware, Servo Horns (MS-L25, MS-ML25)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

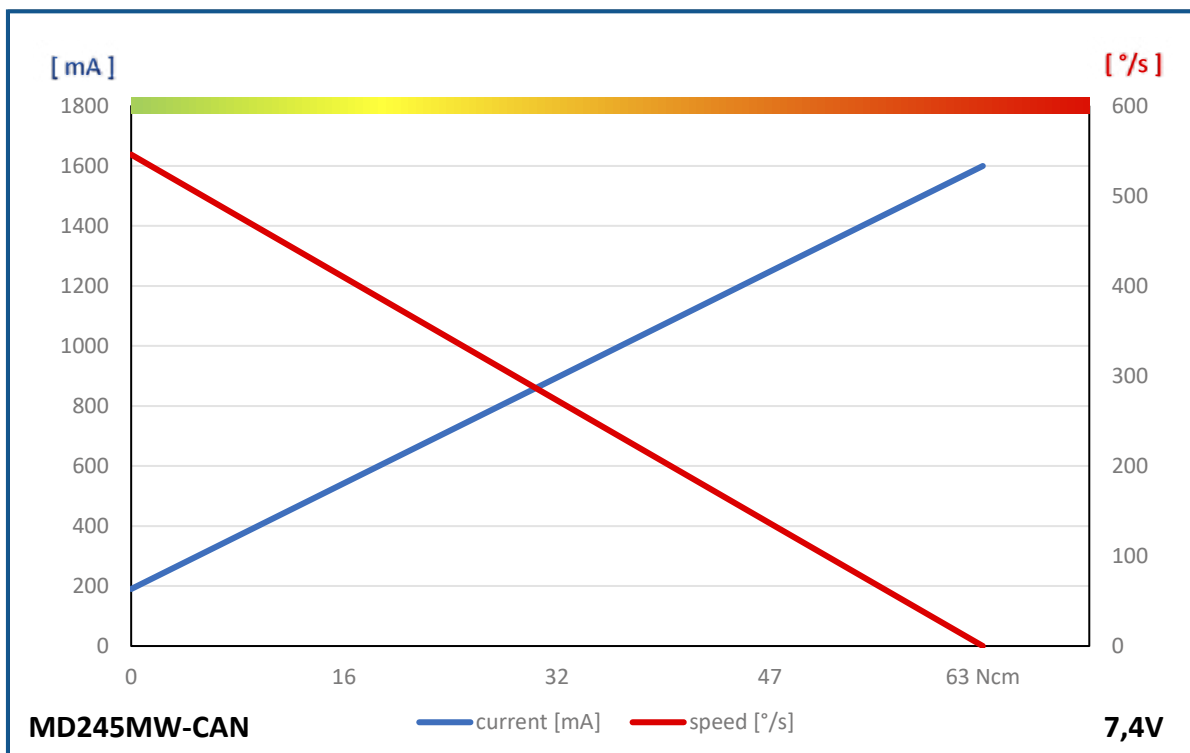
MD245MW-CAN/UAVCAN/DRONECAN

#1-01574, #1-01642



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PERFORMANCE CHART

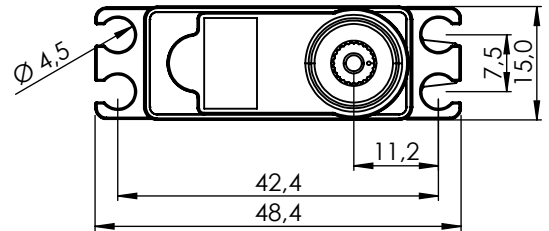
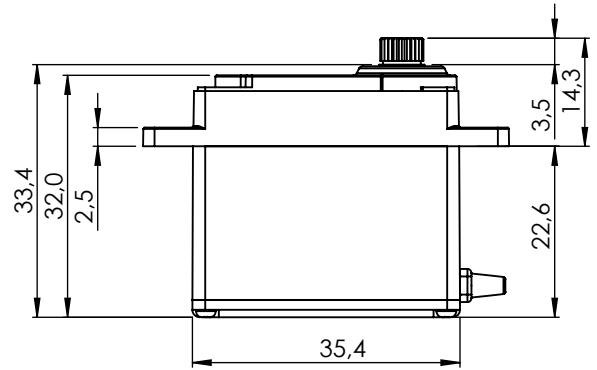


GENERAL SPECIFICATION

MD245MW-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Coreless Metal Brush			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
Operating Speed at no Load	353°/s (59RPM)	462°/s (77RPM)	546°/s (91RPM)	
Stall Torque	4.2kgcm (41.2Ncm)	5.2kgcm (51.0Ncm)	6.4kgcm (62.8Ncm)	
Peak Efficiency Torque	0.8kgcm (7.9Ncm)	1.0kgcm (9.8Ncm)	1.3kgcm (12.8Ncm)	
Rest Current	30mA	30mA	30mA	
Running Current at no Load	110mA	150mA	190mA	
Stall Current	1000mA	1300mA	1600mA	
Deadband Width	n/a	n/a	n/a	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	22AWG			
Connector Wire Strand Count	60/0.08			
External Dimensions	32.4 x 16.8 x 32.8mm			
Weight*	35.5g			
Ball Bearing	Dual Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	1 Metal-Plastic & 3 Metal Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horn (M-025)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

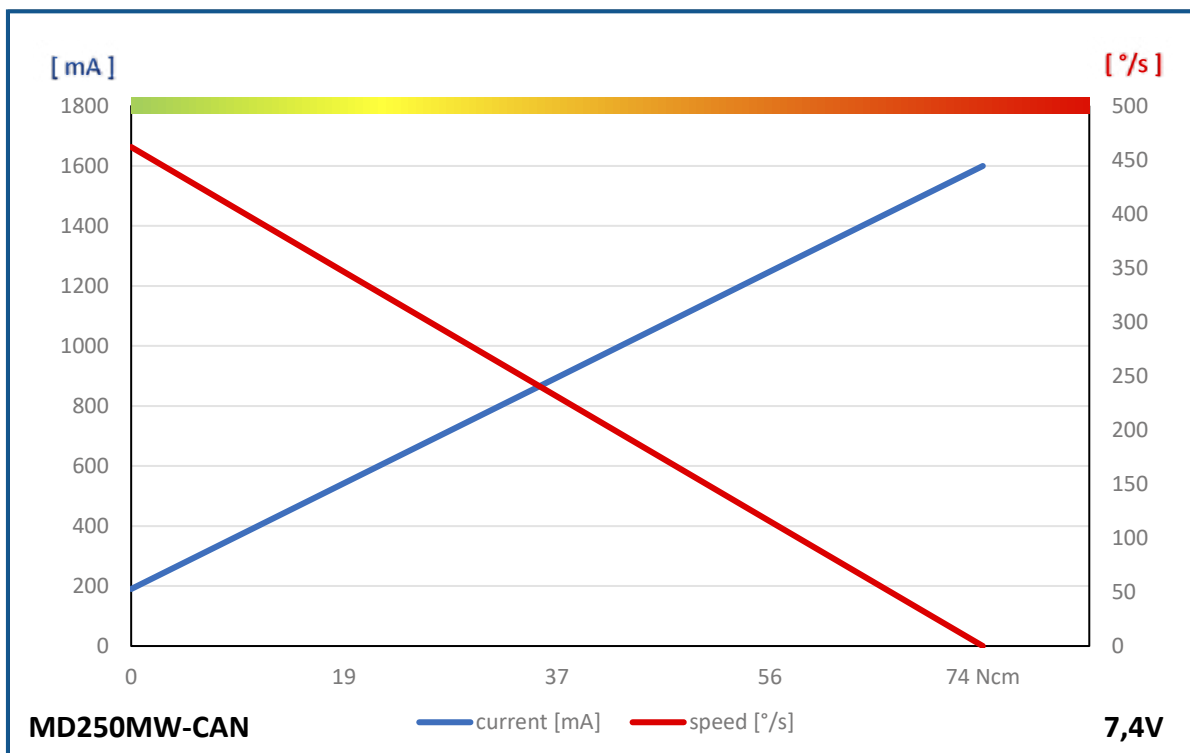
MD250MW-CAN/UAVCAN/DRONECAN

#1-01666, #1-01572



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PERFORMANCE CHART

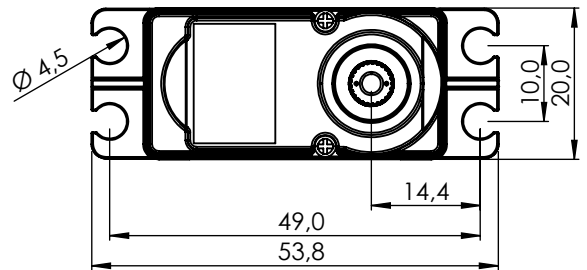
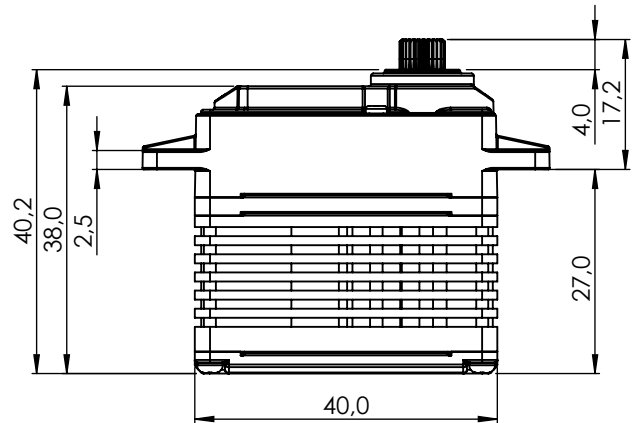


GENERAL SPECIFICATION

MD250MW-CAN/UAVCAN/DroneCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored Carbon Brush			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
Operating Speed at no Load	300°/s (50RPM)	375°/s (63RPM)	462°/s (77RPM)	
Stall Torque	4.9kgcm (48.1Ncm)	6.1kgcm (59.8Ncm)	7.5kgcm (73.6Ncm)	
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.2kgcm (11.8Ncm)	1.5kgcm (14.7Ncm)	
Rest Current	40mA	40mA	40mA	
Running Current at no Load	110mA	150mA	190mA	
Stall Current	1000mA	1300mA	1600mA	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-22°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +60°C (-80°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	22AWG			
Connector Wire Strand Count	60/0.08			
External Dimensions	35.4 x 15.0 x 32.0mm			
Weight*	38.8g			
Ball Bearing	Dual Ball Bearing			
Case Material	Engineering Plastic			
Gear Material	1 Metal-Plastic & 4 Steel Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horn (M-I25)			
IP-Rating	IP4X			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo only w/o horns and accessories				

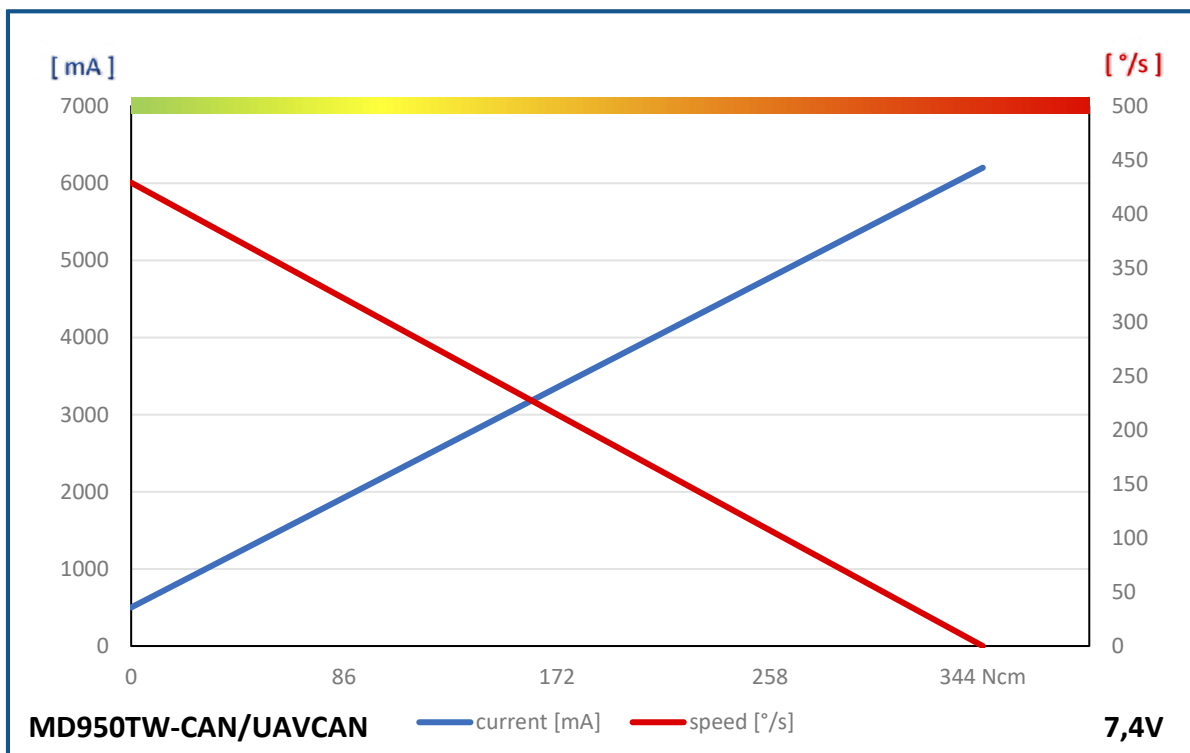
MD950TW-CAN/UAVCAN/DRONECAN

#1-01646, #1-01647



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PERFORMANCE CHART

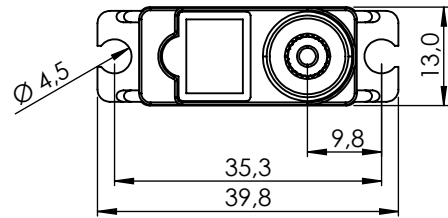
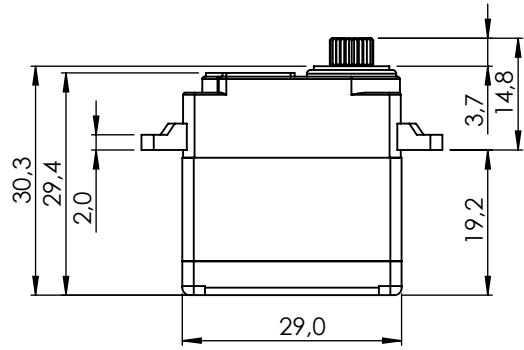


GENERAL SPECIFICATION

MD950TW-CAN/UAVCAN				
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN/DroneCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Coreless			
Amplifier / MCU	32bit programmable Digital			
Operating Voltage Range	4.0V ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
Operating Speed at no Load	261°/s (44RPM)	353°/s (59RPM)	429°/s (72RPM)	
Stall Torque	21.0kgcm (206.0Ncm)	29.0kgcm (284.5Ncm)	35.0kgcm (343.4Ncm)	
Peak Efficiency Torque	4.2kgcm (41.2Ncm)	5.8kgcm (56.9Ncm)	7.0kgcm (68.7Ncm)	
Rest Current	30mA	30mA	30mA	
Running Current at no Load	300mA	390mA	500mA	
Stall Current	3700mA	4800mA	6200mA	
Deadband Width	4Step	4Step	4Step	
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Right
	Pos Command	+1366	+8192	+15018
	Pos [°]	-150	0	+150
	Turn Mode	Left	Power On	Right
	Pos Command	-16383	0	+16383
	Pos [°]	-359	0	+359
Turn Range	-32760 ~ +32760 (CAN only)			
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)			
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)			
Vibrations at no Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80/0.08			
Extrenal Dimensions	40.0 x 20.0 x 38.0mm			
Weight*	66.4g			
Ball Bearing	Dual Ball Bearing			
Case Material	Engineering Plastic & Aluminum Heatsink			
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears			
Gear Train Backlash	Max. 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)			
IP-Rating	IP54			
Revision	Rev. 1.1 / 03.01.2024			
Changelog	-			
*of the servo w/o horns and accessories				

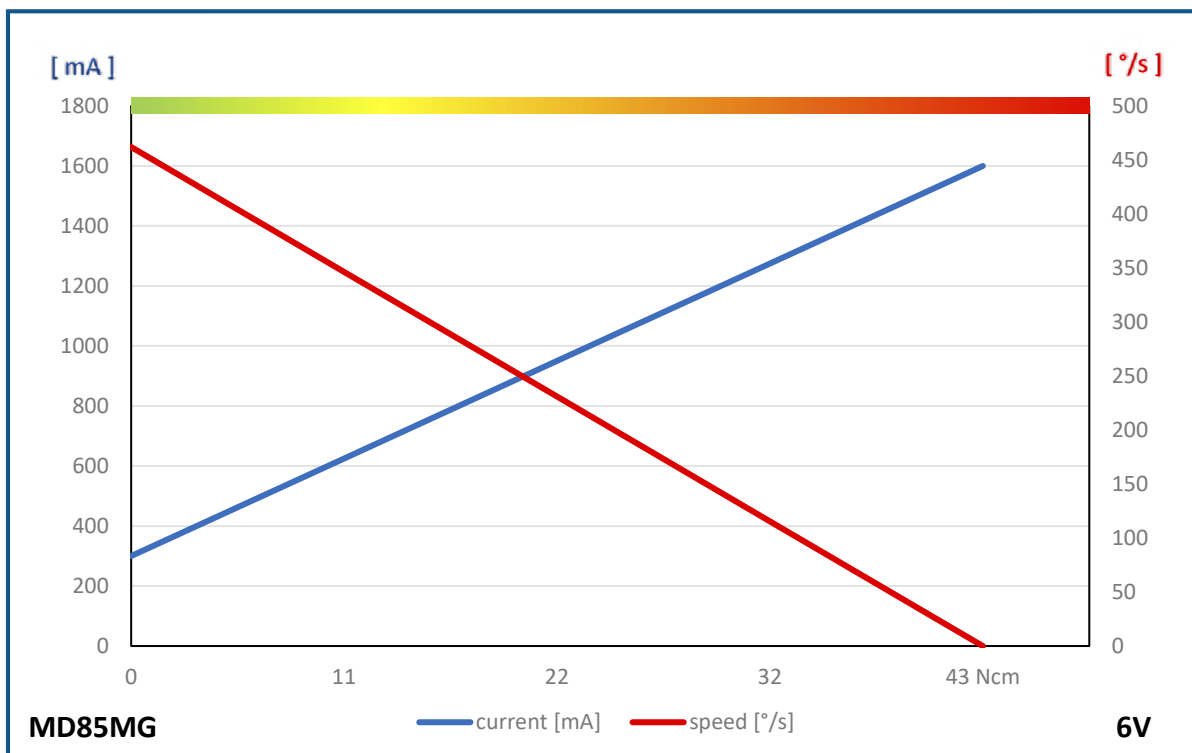
MD85MG

#1-01656



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PERFORMANCE CHART

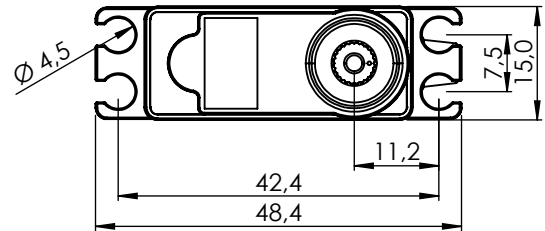
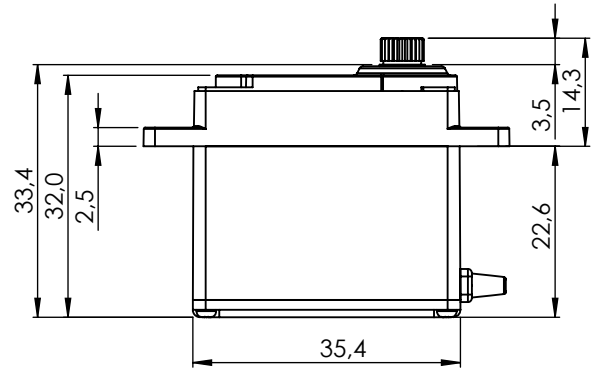


GENERAL SPECIFICATION

MD85MG		
Control System	PWM / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	Cored Carbon Brush	
Amplifier / MCU	32bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	353°/s (59RPM)	462°/s (77RPM)
Stall Torque	3.6kgcm (35.3Ncm)	4.3kgcm (42.2Ncm)
Peak Efficiency Torque	0.7kgcm (6.9Ncm)	0.9kgcm (8.8Ncm)
Rest Current	30mA	30mA
Running Current at no Load	260mA	300mA
Stall Current	1300mA	1600mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	Max. 320°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20/0.08	
External Dimensions	29.0 x 13.0 x 29.4mm	
Weight*	21.5g	
Ball Bearing	Single Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	5 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (M-I, M-X, M-O)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

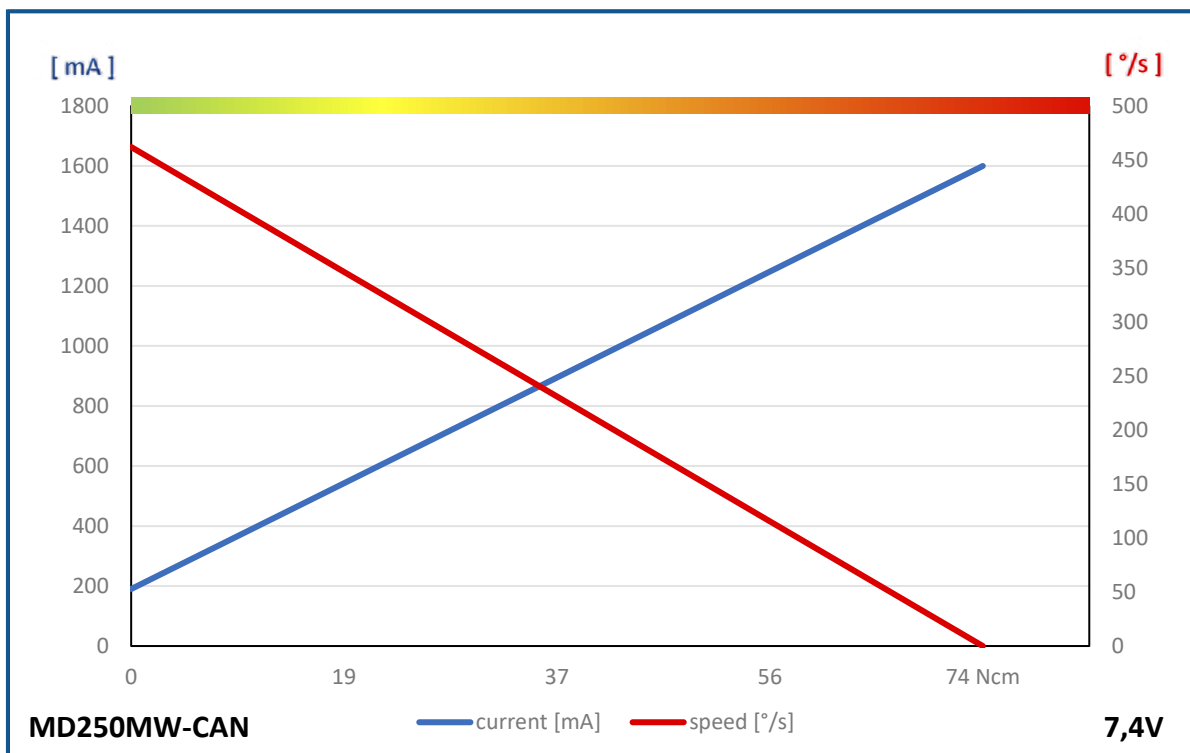
MD250MW

#1-00707



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PERFORMANCE CHART

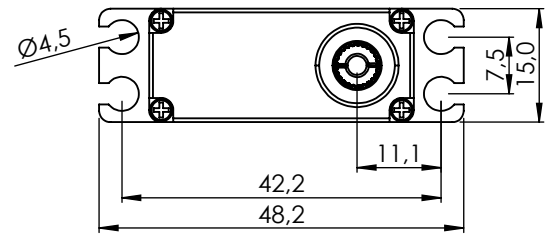
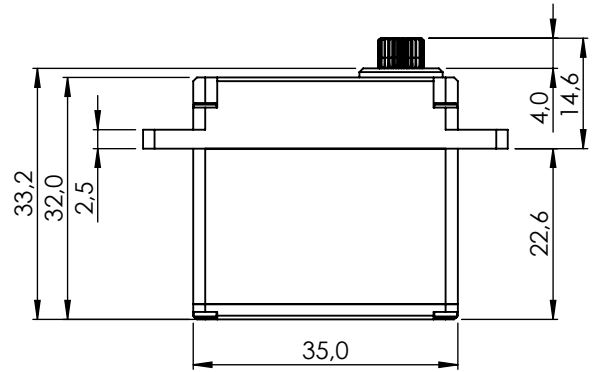


GENERAL SPECIFICATION

MD250MW			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32Bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	300°/s (50RPM)	375°/s (63RPM)	462°/s (77RPM)
Stall Torque	4.9kgcm (48.1Ncm)	6.1kgcm (59.8Ncm)	7.5kgcm (73.6Ncm)
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.2kgcm (11.8Ncm)	1.5kgcm (14.7Ncm)
Rest Current	40mA	40mA	40mA
Running Current at no Load	110mA	150mA	190mA
Stall Current	1000mA	1300mA	1600mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	22AWG		
Connector Wire Strand Count	60/0.08		
External Dimensions	35.4 x 15.0 x 32.0mm		
Weight*	38.3g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	1 Metal-Plastic & 4 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (M-I25, R-ML25)		
IP-Rating	IP4X		
Revision	Rev. 1.1 / 03.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

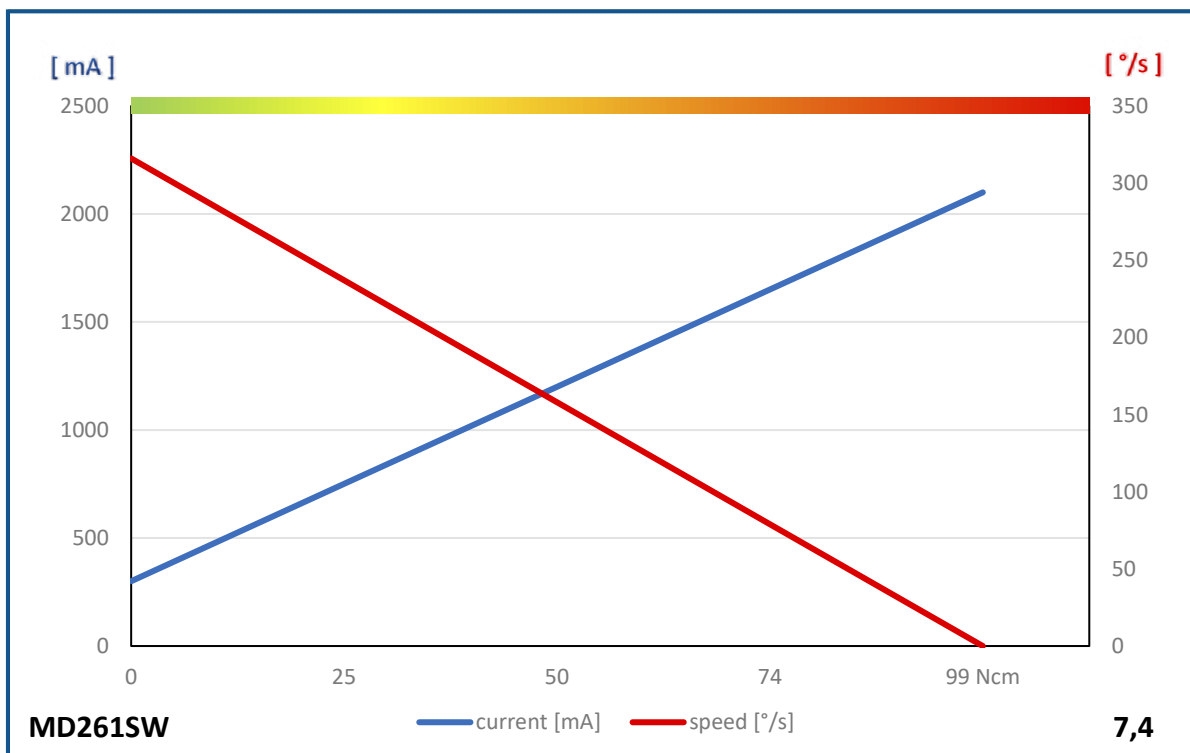
MD261SW

#1-03052



1:1

PERFORMANCE CHART



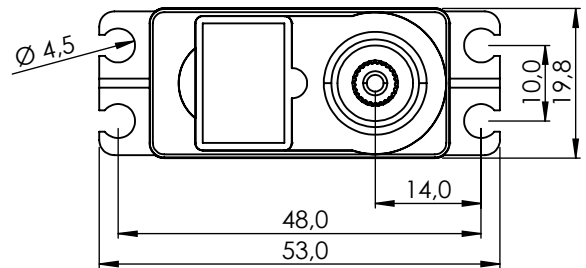
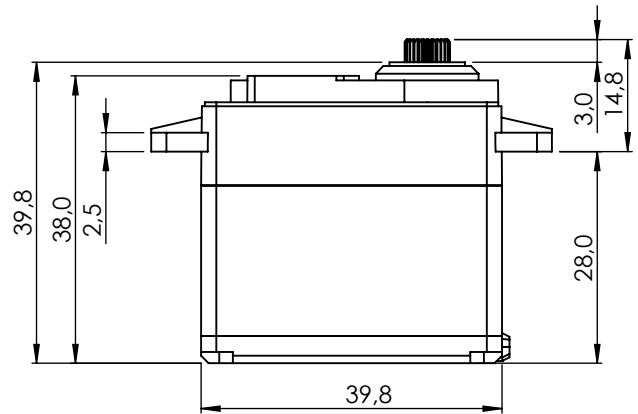
GENERAL SPECIFICATION

MD261SW			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32bit programmable Digital		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	200°/s (33RPM)	261°/s (44RPM)	316°/s (53RPM)
Stall Torque	6.5kgcm (63.7Ncm)	8.1kgcm (79.5Ncm)	10.0kgcm (98.1Ncm)
Peak Efficiency Torque	1.3kgcm (12.8Ncm)	1.6kgcm (15.7Ncm)	2.0kgcm (19.6Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	220mA	260mA	300mA
Stall Current	1400mA	1700mA	2100mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	22AWG		
Connector Wire Strand Count	60/0.08		
External Dimensions	35.0 x 15.0 x 32.0mm		
Weight*	50.6g		
Ball Bearing	Dual Ball Bearing		
Case Material	Aluminum Alloy		
Gear Material	5 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horn (M-I25)		
IP-Rating	IP4X		
Revision	Rev. 1.0 / 05.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

MD485HW

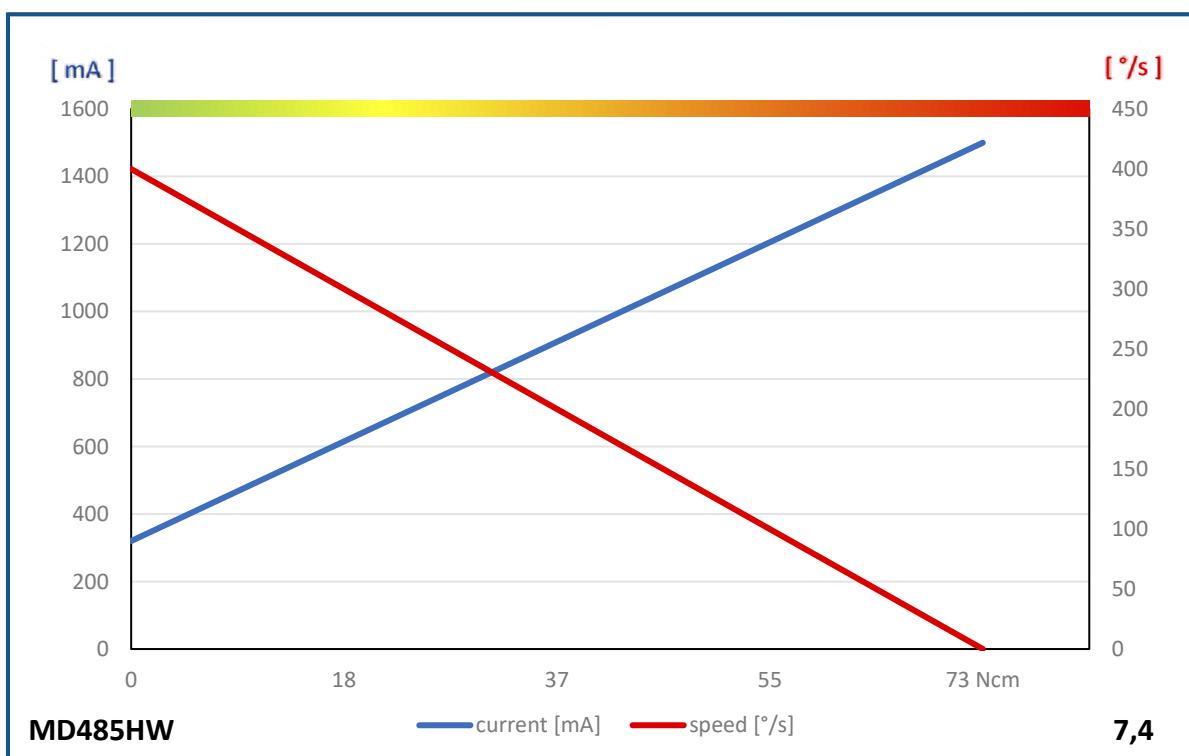
#1-01924

#1-02363 GP 30 Stück



1:1

PERFORMANCE CHART

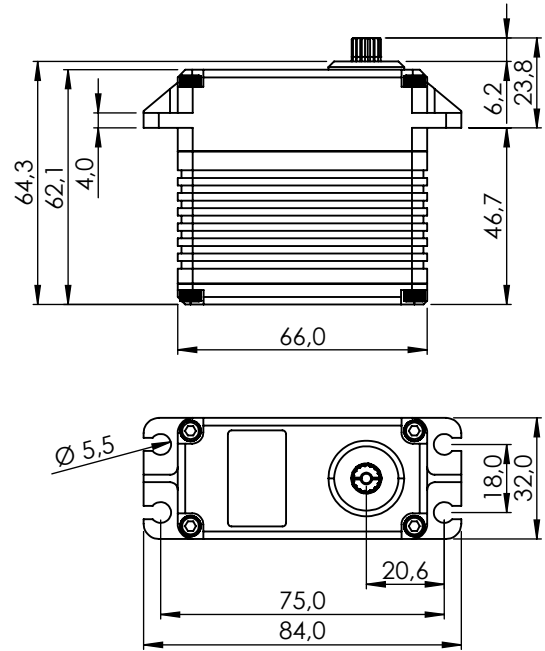


GENERAL SPECIFICATION

MD485HW			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32bit Programmable Digital Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	300°/s (50RPM)	353°/s (59RPM)	400°/s (67RPM)
Stall Torque	4.8kgcm (47.1Ncm)	6.0kgcm (58.8Ncm)	7.4kgcm (72.6Ncm)
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.2kgcm (11.8Ncm)	1.5kgcm (14.7Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	250mA	280mA	320mA
Stall Current	1000mA	1200mA	1500mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	24AWG		
Connector Wire Strand Count	40/0.08		
External Dimensions	39.8 x 19.8 x 38.0mm		
Weight*	43.3g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	4 Heavy Duty Resin Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)		
IP-Rating	IP4X		
Revision	Rev. 1.1 / 03.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

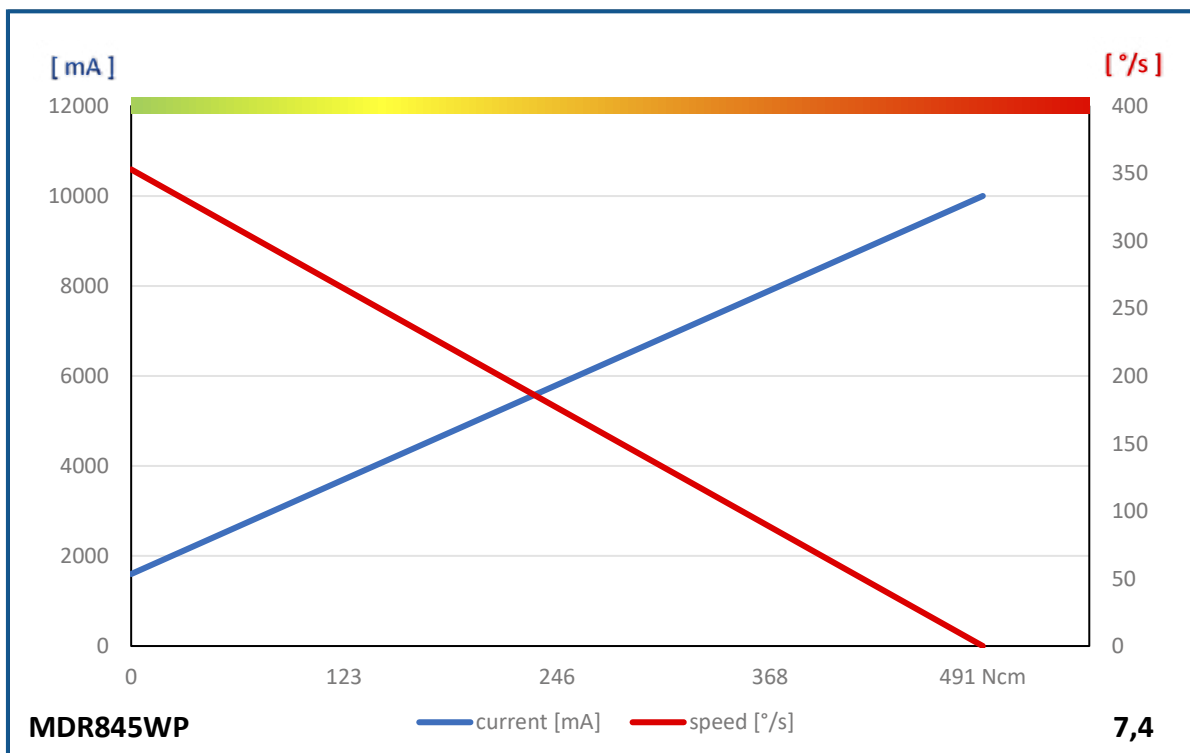
MDR845WP

#1-01329



1:1

PERFORMANCE CHART

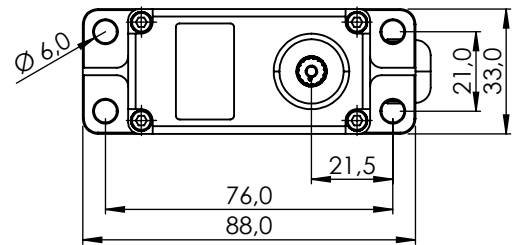
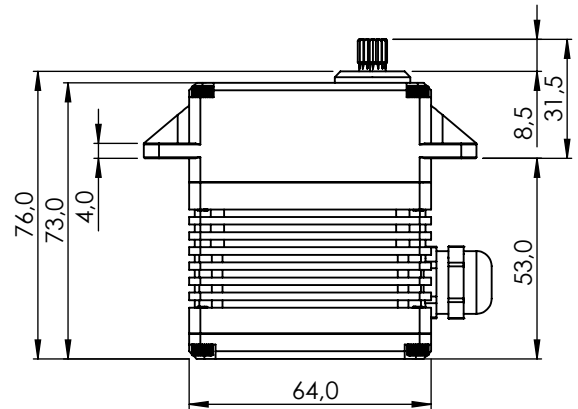


GENERAL SPECIFICATION

MDR845WP			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32bit programmable Digital		
Operating Voltage Range	4.0V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	231°/s (38RPM)	286°/s (48RPM)	353°/s (59RPM)
Stall Torque	32.5kgcm (318.8Ncm)	40.5kgcm (397.3Ncm)	50.0kgcm (490.5Ncm)
Peak Efficiency Torque	6.5kgcm (63.8Ncm)	8.1kgcm (79.5Ncm)	10.0kgcm (98.1Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	1100mA	1250mA	1600mA
Stall Current	6000mA	7000mA	10000mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±180°	
	Programmable	Max. ±8 Turns	
	Multi Turn/Continuous Rotation	Yes / Yes	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	20AWG		
Connector Wire Strand Count	80/0.08		
External Dimensions	66.0 x 32.0 x 62.1mm		
Weight*	229.4g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic & Aluminum Heatsink		
Gear Material	1 Metal-Plastic & 4 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	15T Ø8.0		
Accessories	Mounting Hardware, Servo Horns (Q-MIA, Q-XA, Q-MIA)		
IP-Rating	IP67		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

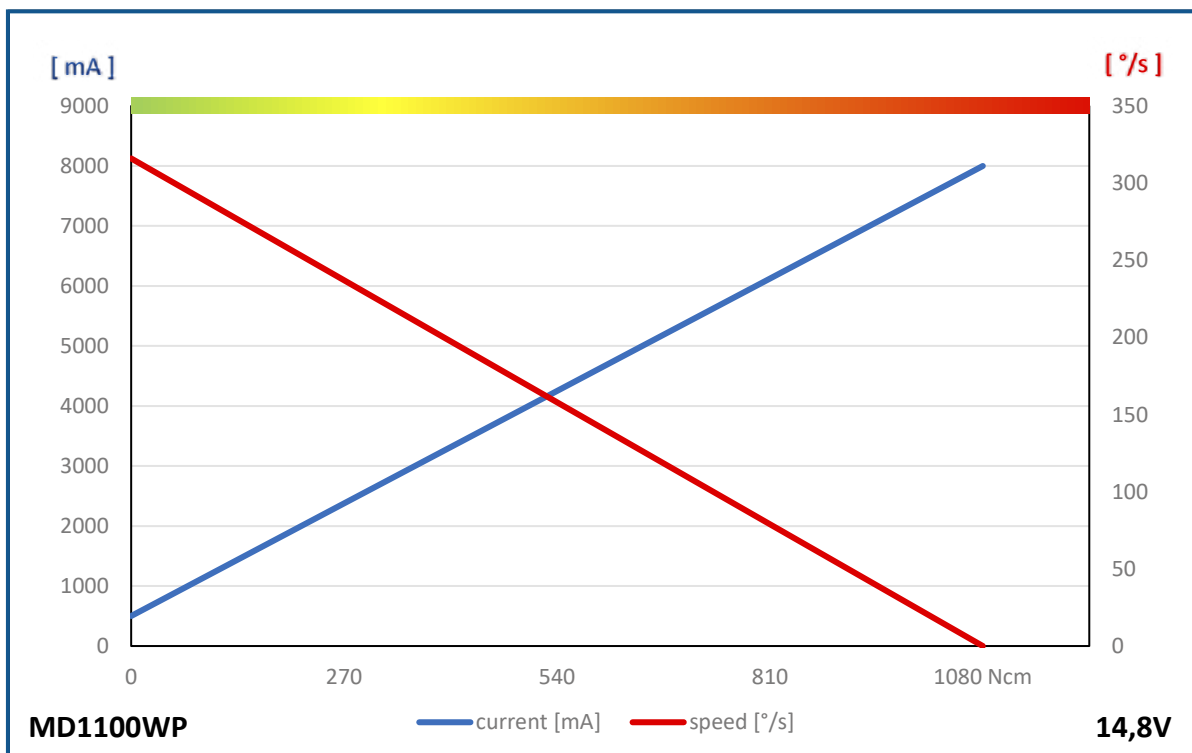
MD1100WP

#1-01638



1:2

PERFORMANCE CHART

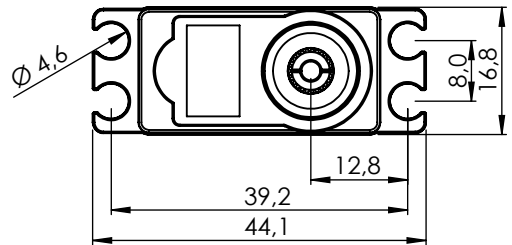
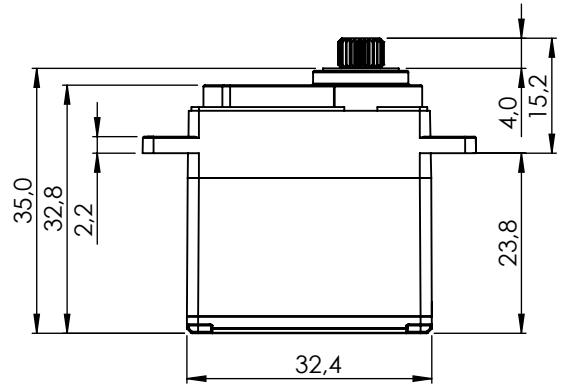


GENERAL SPECIFICATION

MD1100WP		
Control System	PWM / TTL (Half Duplex)	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	5 Poles DC Cored Carbon Brush	
Amplifier / MCU	32bit programmable Digital with Mosfet Drive	
Operating Voltage Range	9.0V ~ 16.8V	
Operating Voltage	At 11.1V	At 14.8V
Operating Speed at no Load	231°/s (38RPM)	316°/s (53RPM)
Stall Torque	84.0kgcm (824.0Ncm)	110.0kgcm (1079.1Ncm)
Peak Efficiency Torque	16.8kgcm (164.8Ncm)	22.0kgcm (215.8Ncm)
Rest Current	90mA	90mA
Running Current at no Load	550mA	500mA
Stall Current	6500mA	8000mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	Max. 320°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	IEC-60068-2-64	
Connector Wire Length	270mm	
Connector Wire Gauge	18AWG (Signal: 20AWG)	
Connector Wire Strand Count	120/0.08 (80/0.08)	
External Dimensions	64.0 x 33.0 x 73.0mm	
Weight*	324.3g	
Ball Bearing	Dual Ball Bearing & Dual Needle Bearing	
Case Material	Rugged Aluminum Alloy	
Gear Material	1 Metal-Plastic & 3 Hardened Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	15T Ø8.0	
Accessories	Mounting Hardware, Servo Horn (I-MO)	
IP-Rating	IP67	
Revision	Rev. 1.1 / 03.01.2024	
Changelog	-	
*of the servo w/o only horns and accessories		

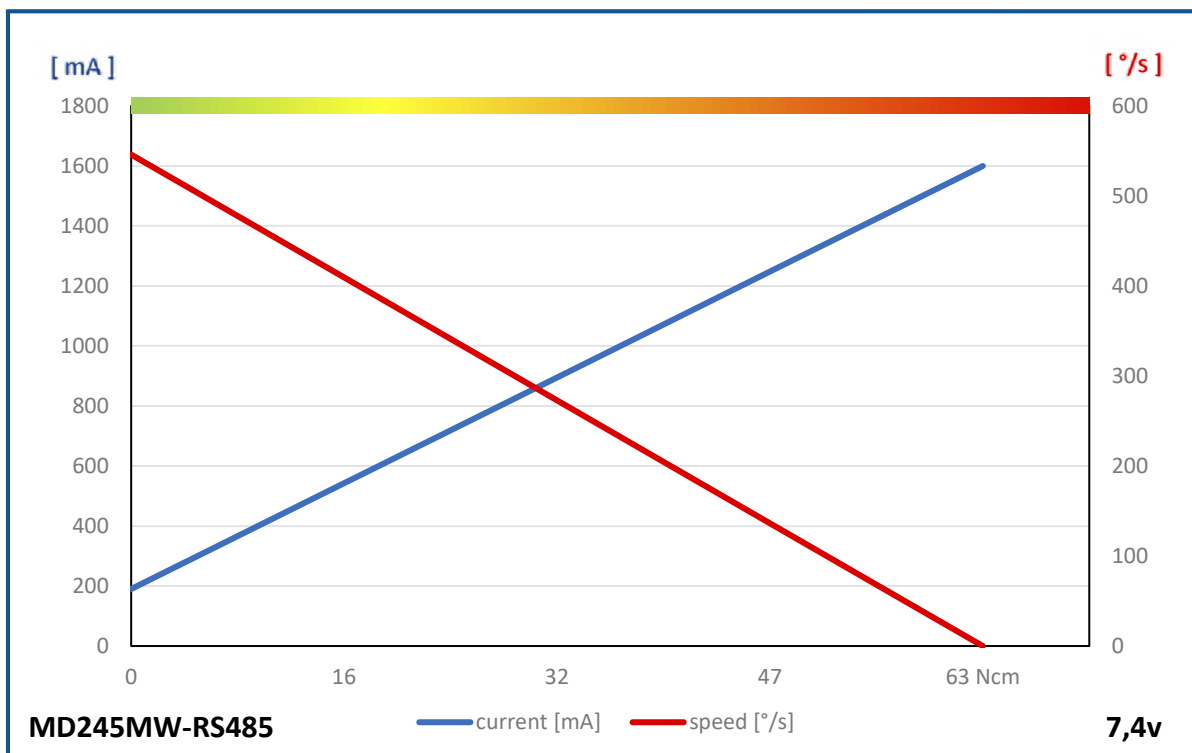
MD245MW-RS485

#1-01677



1:1

PERFORMANCE CHART

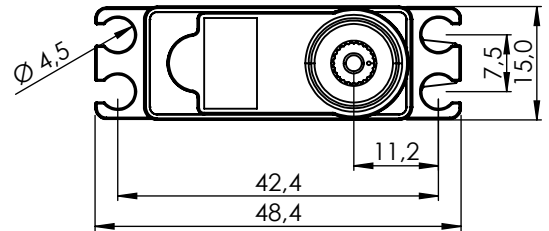
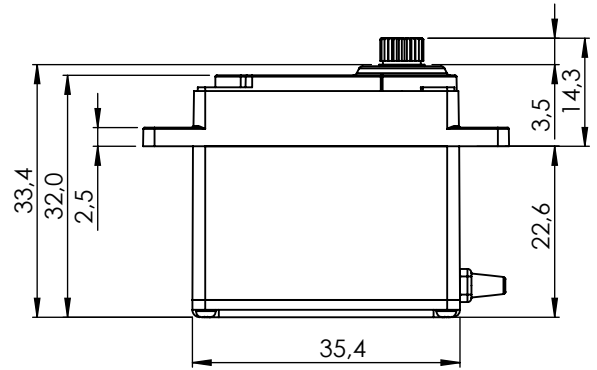


GENERAL SPECIFICATION

MD245MW-RS485			
Control System	RS485		
	Pulse Width -		
Connector Type	Hitec 4P		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Coreless		
Amplifier / MCU	32bit programmable Digital		
Operating Voltage Range	4.0V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	353°/s (59RPM)	462°/s (77RPM)	546°/s (91RPM)
Stall Torque	4.2kgcm (41.2Ncm)	5.2kgcm (51.0Ncm)	6.4kgcm (62.8Ncm)
Peak Efficiency Torque	0.9kgcm (8.8Ncm)	1.0kgcm (9.8Ncm)	1.3kgcm (12.8Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	110mA	150mA	190mA
Stall Current	1000mA	1300mA	1600mA
Deadband Width	n/a	n/a	n/a
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	22AWG		
Connector Wire Strand Count	60/0.08		
External Dimensions	32.4 x 16.8 x 32.8mm		
Weight*	35.2g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	1 Metal-Plastic & 3 Metal Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horn (M-025)		
IP-Rating	IP4X		
Revision	Rev. 1.0 / 05.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

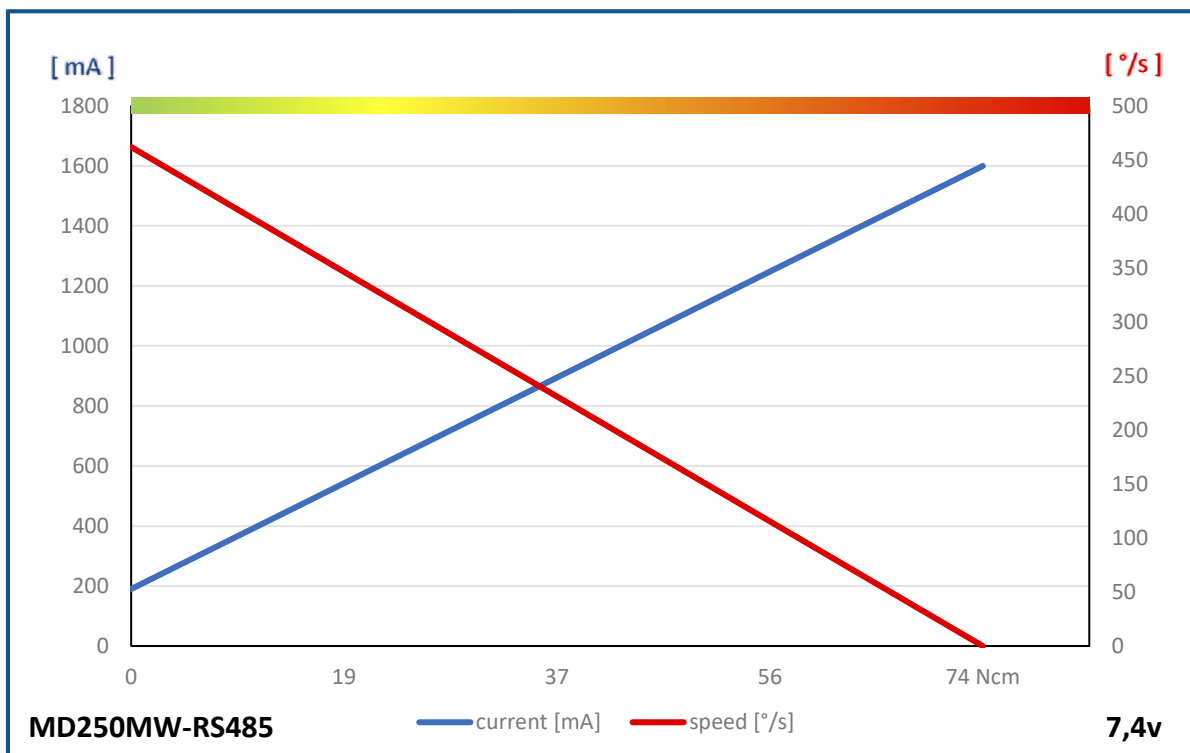
MD250MW-RS485

#1-01676



1:1

PERFORMANCE CHART

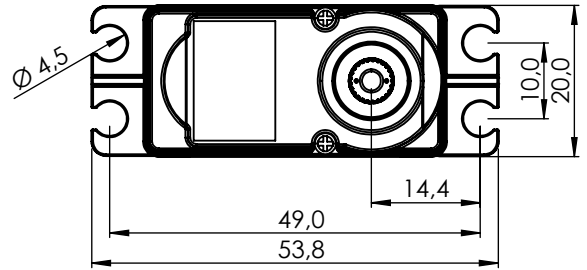
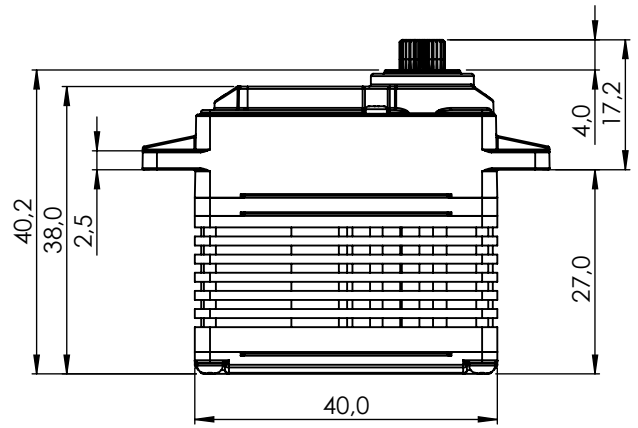


GENERAL SPECIFICATION

MD250MW-RS485			
Control System	RS485		
	Pulse Width -		
Connector Type	Hitec 4P		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32bit programmable Digital		
Operating Voltage Range	4.0V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	300°/s (50RPM)	375°/s (63RPM)	462°/s (77RPM)
Stall Torque	4.9kgcm (48.1Ncm)	6.1kgcm (59.8Ncm)	7.5kgcm (73.6Ncm)
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.2kgcm (11.8Ncm)	1.5kgcm (14.7Ncm)
Rest Current	40mA	40mA	40mA
Running Current at no Load	110mA	150mA	190mA
Stall Current	1000mA	1300mA	1600mA
Deadband Width	n/a	n/a	n/a
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	22AWG		
Connector Wire Strand Count	60/0.08		
External Dimensions	35.4 x 15.0 x 32.0mm		
Weight*	40.0g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	1 Metal-Plastic & 4 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horn (M-I25)		
IP-Rating	IP4X		
Revision	Rev. 1.0 / 05.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

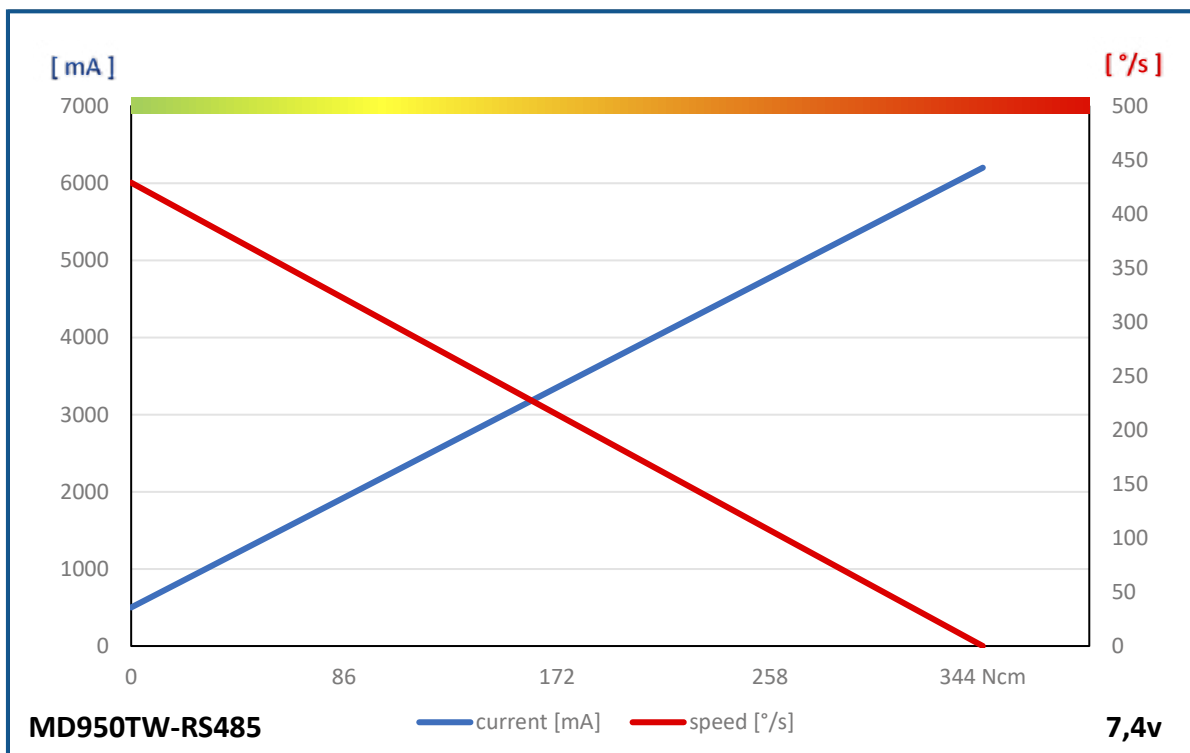
MD950TW-RS485

#1-01675



1:1

PERFORMANCE CHART



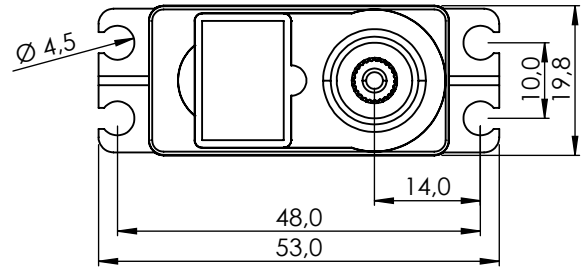
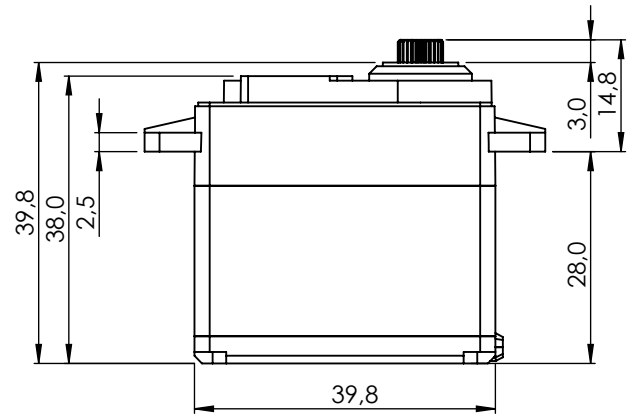
GENERAL SPECIFICATION

MD950TW-RS485			
Control System	RS485		
	Pulse Width -		
Connector Type	Hitec 4P		
Position Sensor Type	Contactless Magnetic Encoder		
Motor Type	Coreless		
Amplifier / MCU	32bit programmable Digital		
Operating Voltage Range	4.0V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	261°/s (44RPM)	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	21.0kgcm (206.0Ncm)	29.0kgcm (284.5Ncm)	35.0kgcm (343.4Ncm)
Peak Efficiency Torque	4.2kgcm (41.2Ncm)	5.8kgcm (56.9Ncm)	7.0kgcm (68.7Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	300mA	390mA	500mA
Stall Current	3700mA	4800mA	6200mA
Deadband Width	n/a	n/a	n/a
Operating Travel	Default	±60°	
	Programmable	Max. 320°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	20AWG		
Connector Wire Strand Count	80/0.08		
External Dimensions	40.0 x 20.0 x 38.0mm		
Weight*	66.3g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering plastic & Aluminum Heatsink		
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)		
IP-Rating	IP54		
Revision	Rev. 1.0 / 05.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

D485HW

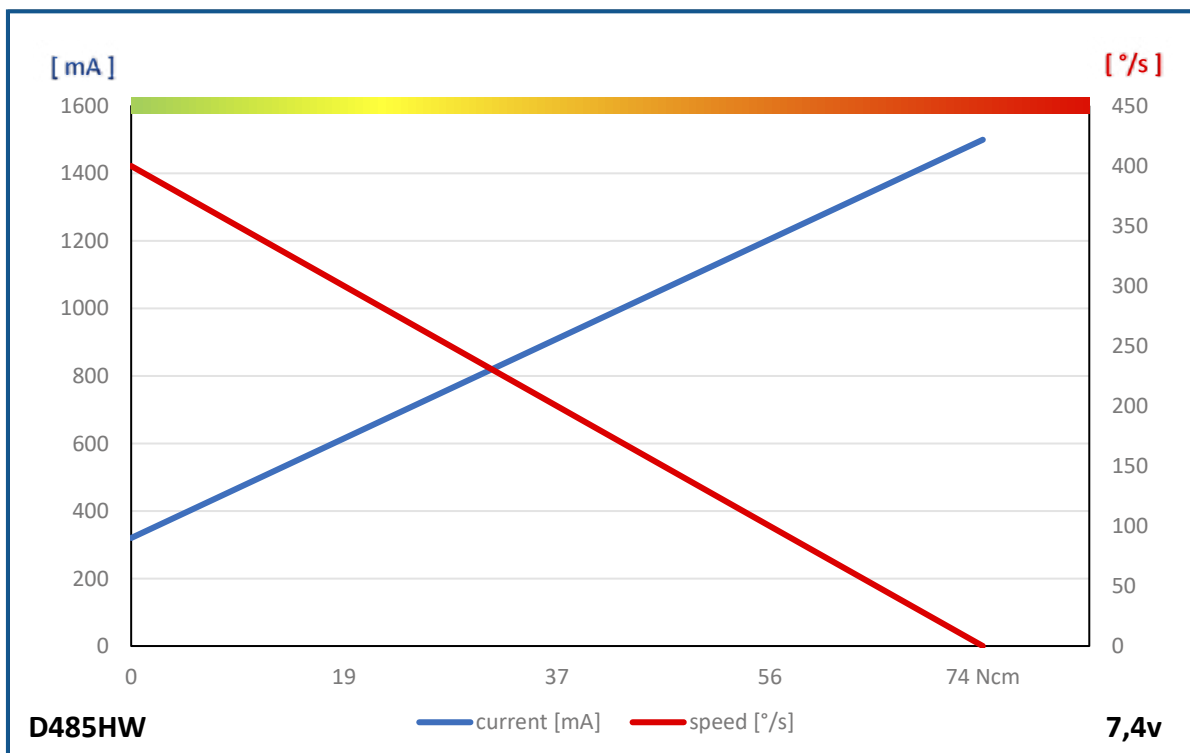
#1-00066

#1-02362 GP 30 Stück



1:1

PERFORMANCE CHART



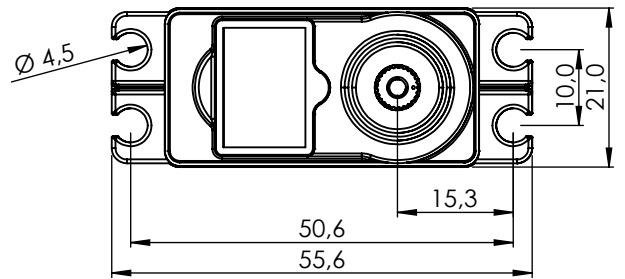
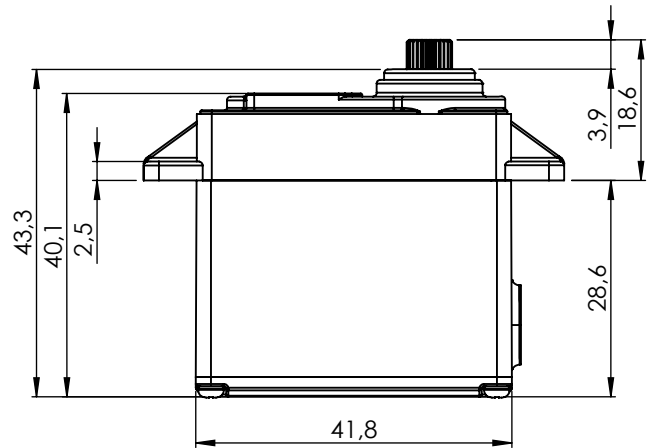
GENERAL SPECIFICATION

D485HW			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Indirect Drive / 1M Cycle Long Life		
Motor Type	Cored Metal Brush		
Amplifier / MCU	32bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	300°/s (50RPM)	353°/s (59RPM)	400°/s (67RPM)
Stall Torque	5.2kgcm (51.0Ncm)	6.4kgcm (62.8Ncm)	7.5kgcm (73.6Ncm)
Peak Efficiency Torque	1.0kgcm (9.8Ncm)	1.3kgcm (12.8Ncm)	1.5kgcm (14.7Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	250mA	280mA	320mA
Stall Current	1000mA	1200mA	1500mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±60°	
	Programmable	Max. 175°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	24AWG		
Connector Wire Strand Count	40/0.08		
External Dimensions	39.8 x 19.8 x 38.0mm		
Weight*	45.0g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	4 Heavy Duty Resin Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)		
IP-Rating	IP54		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

D646WP

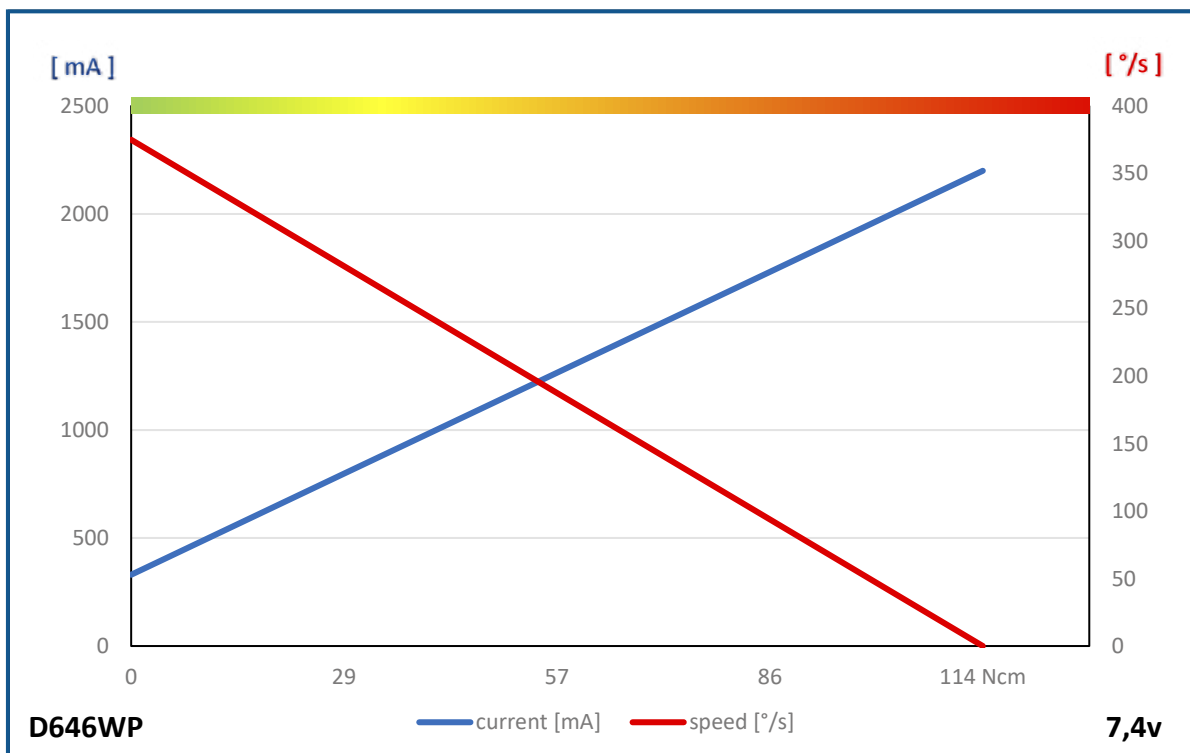
#1-00072

#1-02354 GP 24 Stück



1:1

PERFORMANCE CHART

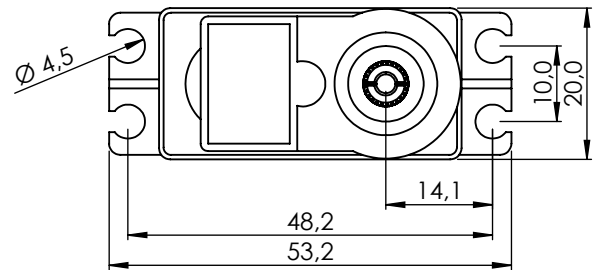
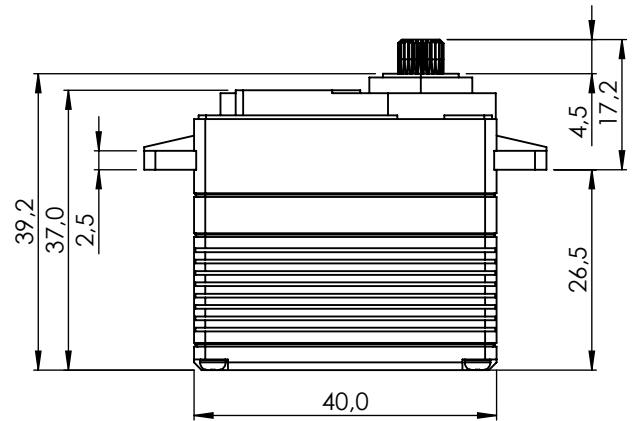


GENERAL SPECIFICATION

D646WP			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Contact Analog / 4 Slider / 1M Cycle Long Life		
Motor Type	Cored Carbon Brush		
Amplifier / MCU	32bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	250°/s (42RPM)	316°/s (33RPM)	375°/s (63RPM)
Stall Torque	7.5kgcm (73.6Ncm)	9.6kgcm (94.2Ncm)	11.6kgcm (113.8Ncm)
Peak Efficiency Torque	1.5kgcm (14.7Ncm)	1.9kgcm (18.6Ncm)	2.3kgcm (22.6Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	270mA	300mA	330mA
Stall Current	1500mA	1800mA	2200mA
Deadband Width	2µs	2µs	2µs
Operating Travel	Default	±60°	
	Programmable	Max. 170°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	22AWG		
Connector Wire Strand Count	60/0.08		
External Dimensions	41.8 x 21.0 x 40.1mm		
Weight*	61.0g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic		
Gear Material	1 Metal-Plastic & 3 Metal Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)		
IP-Rating	IP67		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

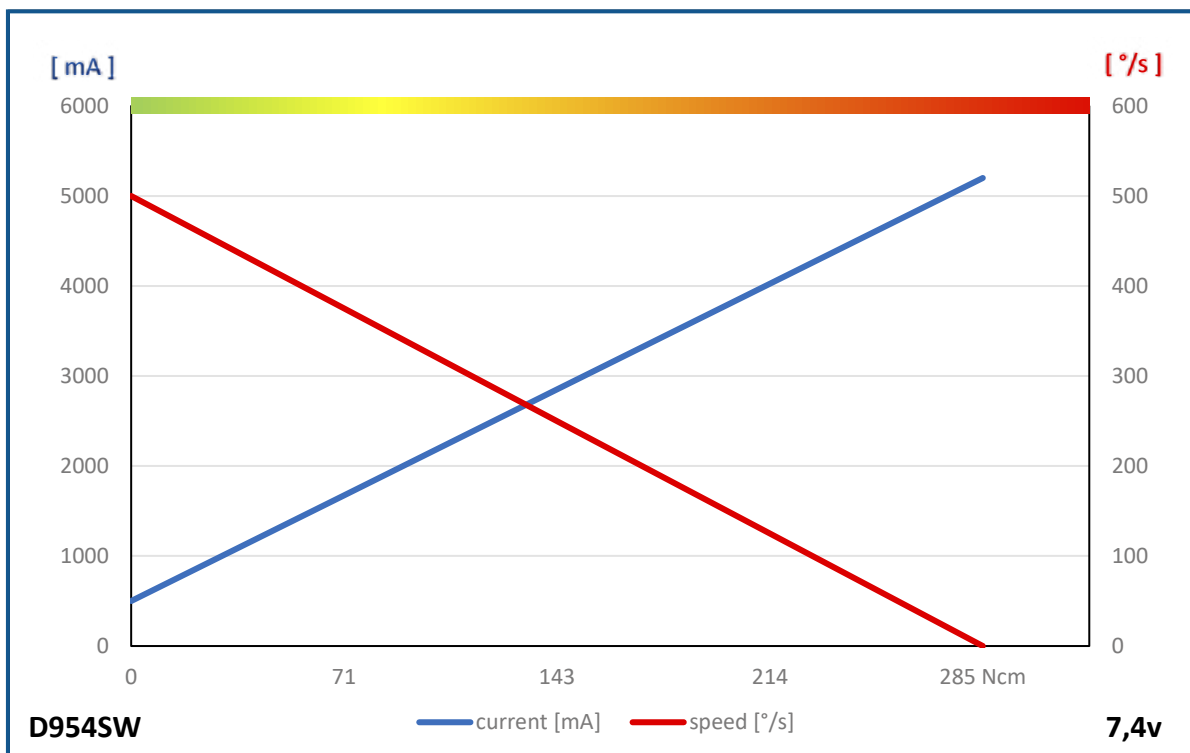
D954SW

#116954



1:1

PERFORMANCE CHART



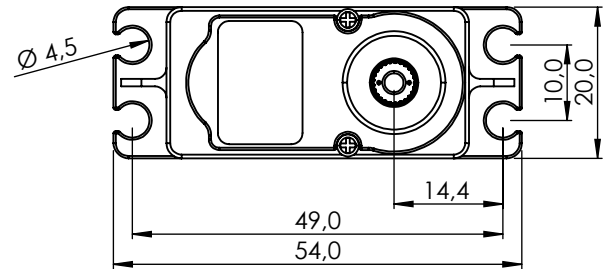
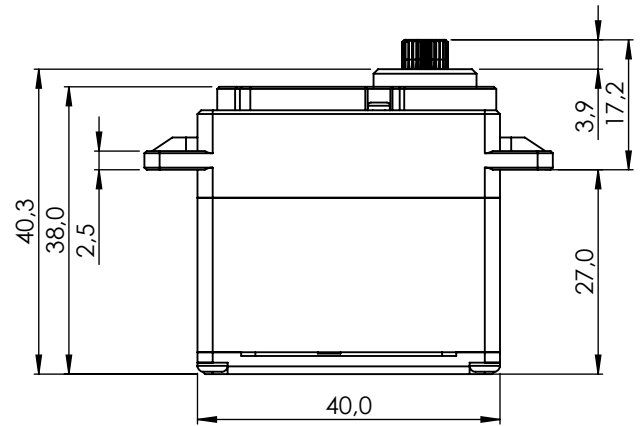
GENERAL SPECIFICATION

D954SW			
Control System	PWM / TTL (Half Duplex)		
	Pules Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Indirect Drive / 1M Cycle Long Life		
Motor Type	Coreless		
Amplifier / MCU	32bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	316°/s (53RPM)	400°/s (67RPM)	500°/s (83RPM)
Stall Torque	16.0kgcm (157.0Ncm)	24.0kgcm (235.4Ncm)	29.0kgcm (284.5Ncm)
Peak Efficiency Torque	3.6kgcm (35.3Ncm)	4.8kgcm (47.1Ncm)	5.8kgcm (56.9Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	300mA	400mA	500mA
Stall Current	3200mA	4200mA	5200mA
Deadband Width	1µs	1µs	1µs
Operating Travel	Default	±60° **	
	Programmable	Max. 175°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	20AWG		
Connector Wire Strand Count	80/0.08		
External Dimensions	40.0 x 20.0 x 37.0mm		
Weight*	66.0g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic & Aluminum Heatsink		
Gear Material	1 Metal-Plastic & 3 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25)		
IP-Rating	IP54		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			
** also available with 270°			

D951TW

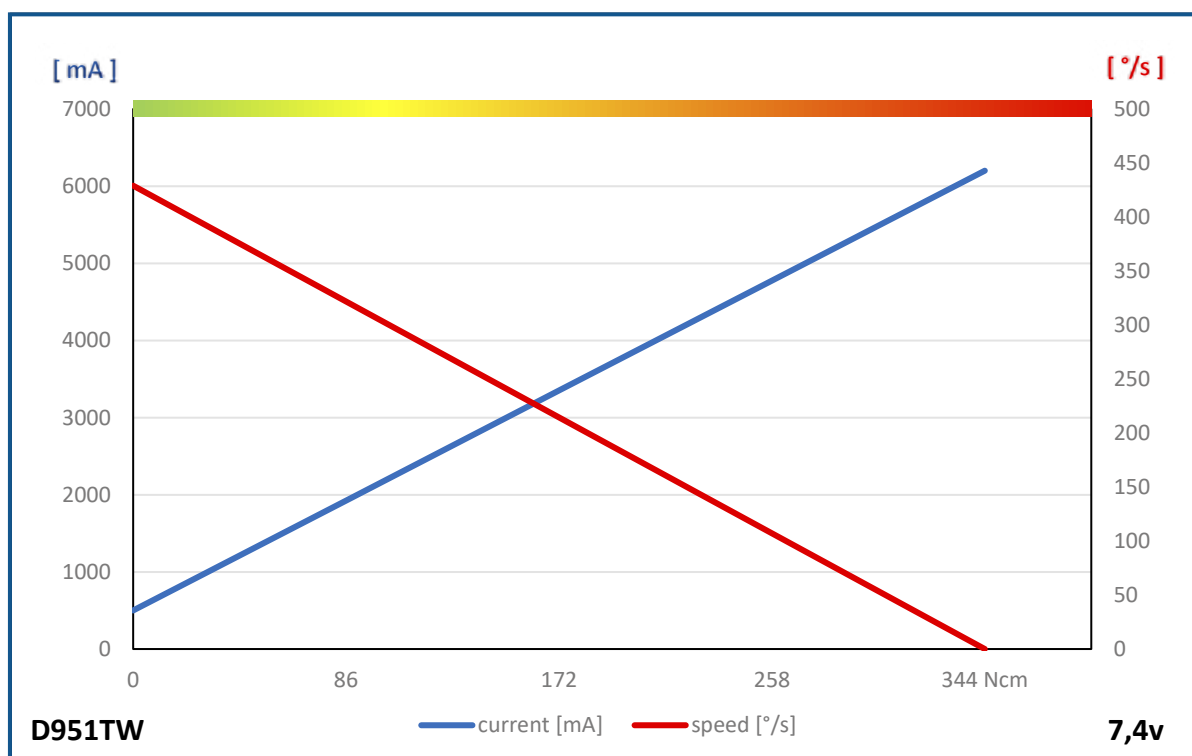
#116951

#1-02359 GP 24 Stück



1:1

PERFORMANCE CHART

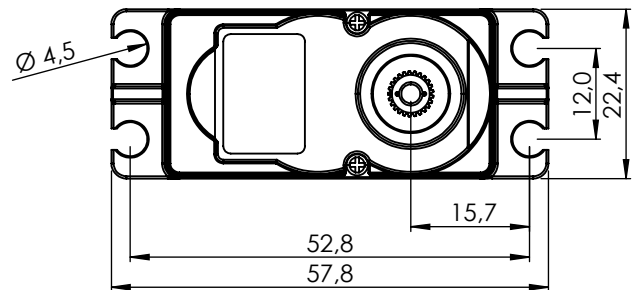
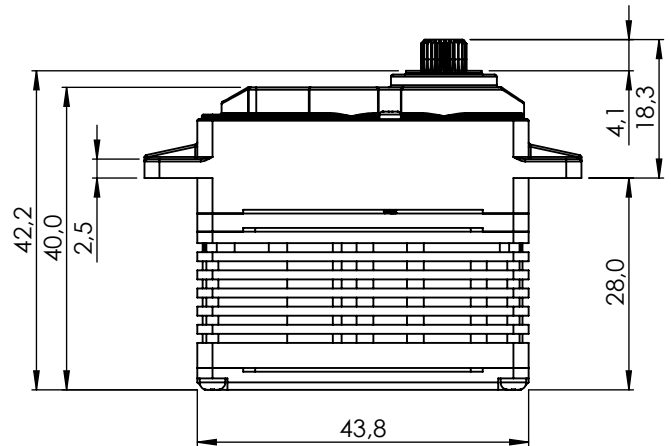


GENERAL SPECIFICATION

D951TW			
Control System	PWM / TTL (Half Duplex)		
	PWM Range 900µs 1500µs 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Indirect Drive / 1M Cycle Long Life		
Motor Type	Coreless		
Amplifier / MCU	32bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	261°/s (44RPM)	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	21.0kgcm (206.0Ncm)	29.0kgcm (284.5Ncm)	35.0kgcm (343.4Ncm)
Peak Efficiency Torque	4.2kgcm (41.2Ncm)	5.8kgcm (56.9Ncm)	7.0kgcm (68.7Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	300mA	390mA	500mA
Stall Current	3700mA	4800mA	6200mA
Deadband Width	1µs	1µs	1µs
Operating Travel	Default	±60°	
	Programmable	Max. 175°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	20AWG		
Connector Wire Strand Count	80/0.08		
External Dimensions	40.0 x 20.0 x 38.0mm		
Weight*	80.0g		
Ball Bearing	Dual Ball Bearing		
Case Material	Aluminum Alloy		
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25		
IP-Rating	IP54		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

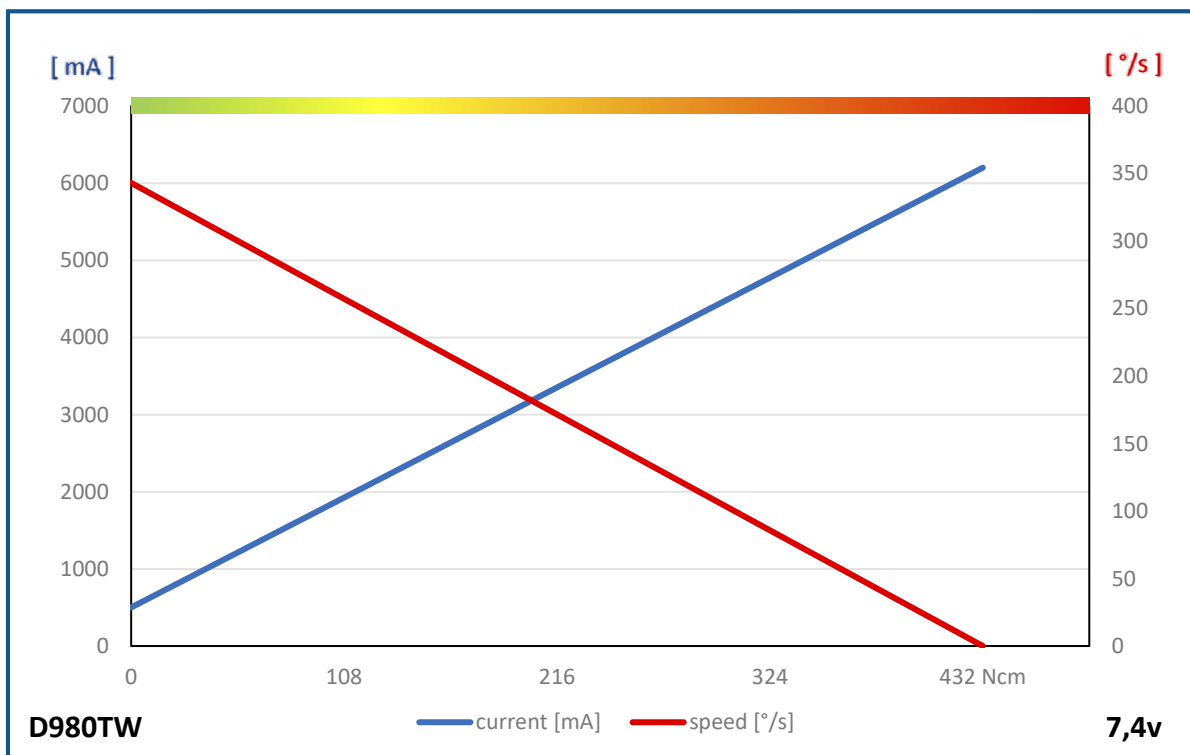
D980TW

#1-02982



1:1

PERFORMANCE CHART



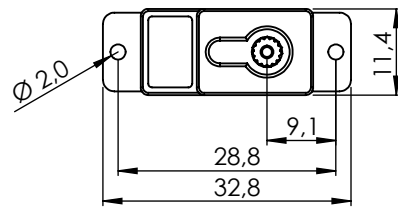
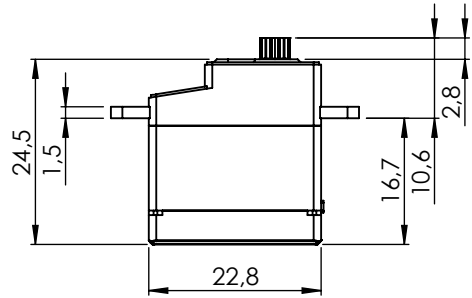
GENERAL SPECIFICATION

D980TW			
Control System	PWM / TTL (Half Duplex)		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life		
Motor Type	Coreless		
Amplifier / MCU	32bit programmable Digital with Mosfet Drive		
Operating Voltage Range	3.5V ~ 8.4V		
Operating Voltage	At 4.8V	At 6.0V	At 7.4V
Operating Speed at no Load	214°/s (36RPM)	286°/s (48RPM)	343°/s (59RPM)
Stall Torque	26.0kgcm (255.1Ncm)	36.0kgcm (353.2Ncm)	44.0kgcm (431.6Ncm)
Peak Efficiency Torque	5.5kgcm (54.0Ncm)	7.2kgcm (70.6Ncm)	8.8kgcm (86.3Ncm)
Rest Current	30mA	30mA	30mA
Running Current at no Load	300mA	390mA	500mA
Stall Current	4200mA	4800mA	6200mA
Deadband Width	1µs	1µs	1µs
Operating Travel	Default	±60°	
	Programmable	Max. 175°	
	Multi Turn/Continuous Rotation	n/a / n/a	
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	300mm		
Connector Wire Gauge	20AWG		
Connector Wire Strand Count	80/0.08		
External Dimensions	43.8 x 22.4 x 40.0mm		
Weight*	78.2g		
Ball Bearing	Dual Ball Bearing		
Case Material	Engineering Plastic & Aluminum Heatsink		
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	H25T Ø6.0		
Accessories	Mounting Hardware, Servo Horns (HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25, HD-IG25, HD-LG25)		
IP-Rating	IP54		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

HS-53

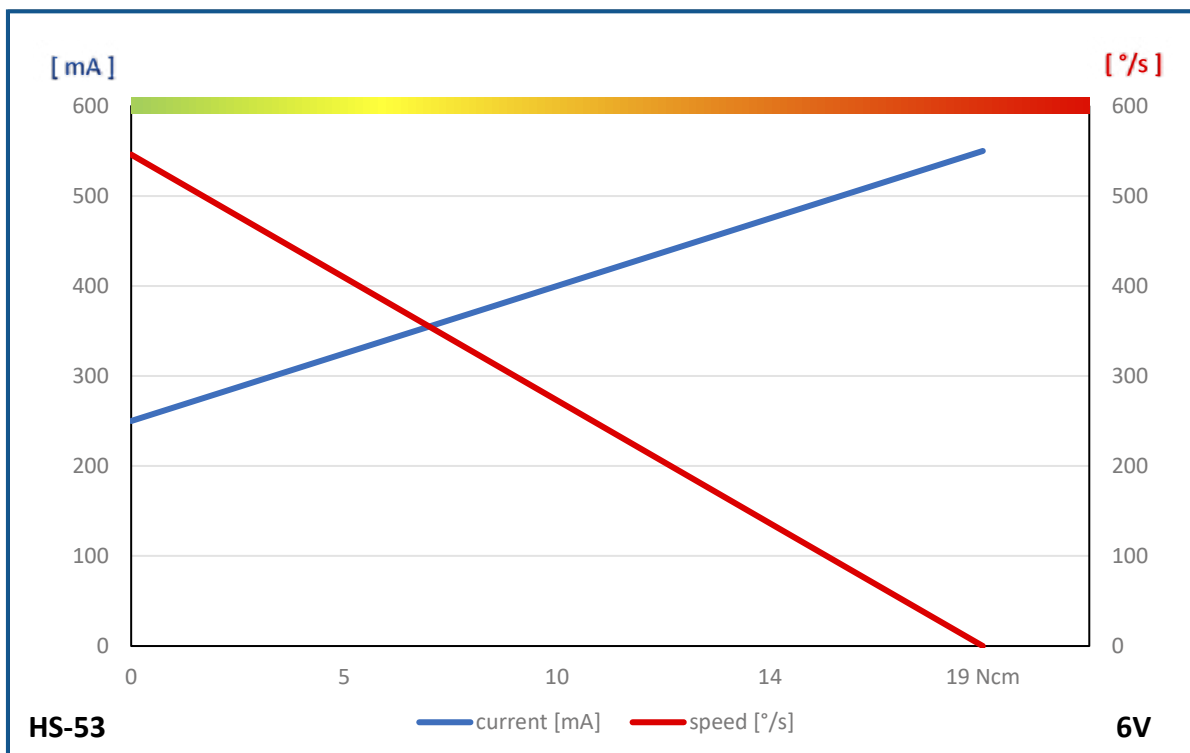
#112053

#112054 GP 20 Stück



1:1

PERFORMANCE CHART



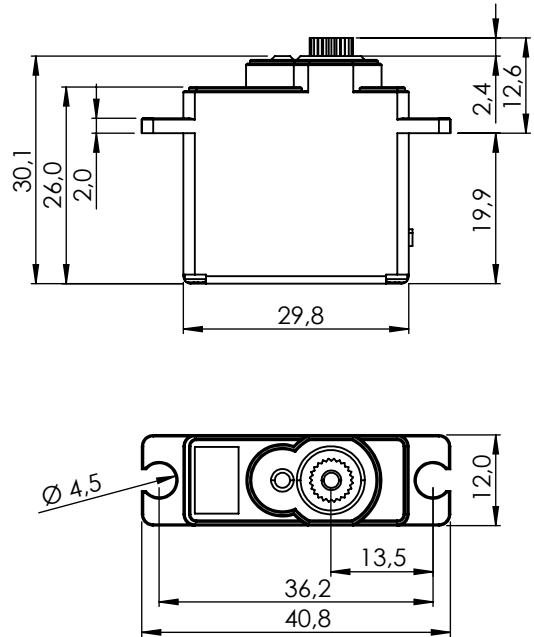
GENERAL SPECIFICATION

HS-53		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 2 Slider	
Motor Type	Cored Metal Brush	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	429°/s (71RPM)	546°/s (91RPM)
Stall Torque	1.5kgcm (14.7Ncm)	1.9kgcm (18.6Ncm)
Peak Efficiency Torque	0.3kgcm (2.9Ncm)	0.4kgcm (3.9Ncm)
Rest Current	8mA	10mA
Running Current at no Load	200mA	250mA
Stall Current	440mA	550mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20/0.08	
External Dimensions	22.8 x 11.4 x 24.5mm	
Weight*	8.0g	
Ball Bearing	n/a	
Case Material	Engineering Plastic	
Gear Material	5 Resin Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	15T Ø4.0	
Accessories	Tapping Screw, Servo Horns (FS-IL, FS-X)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-81

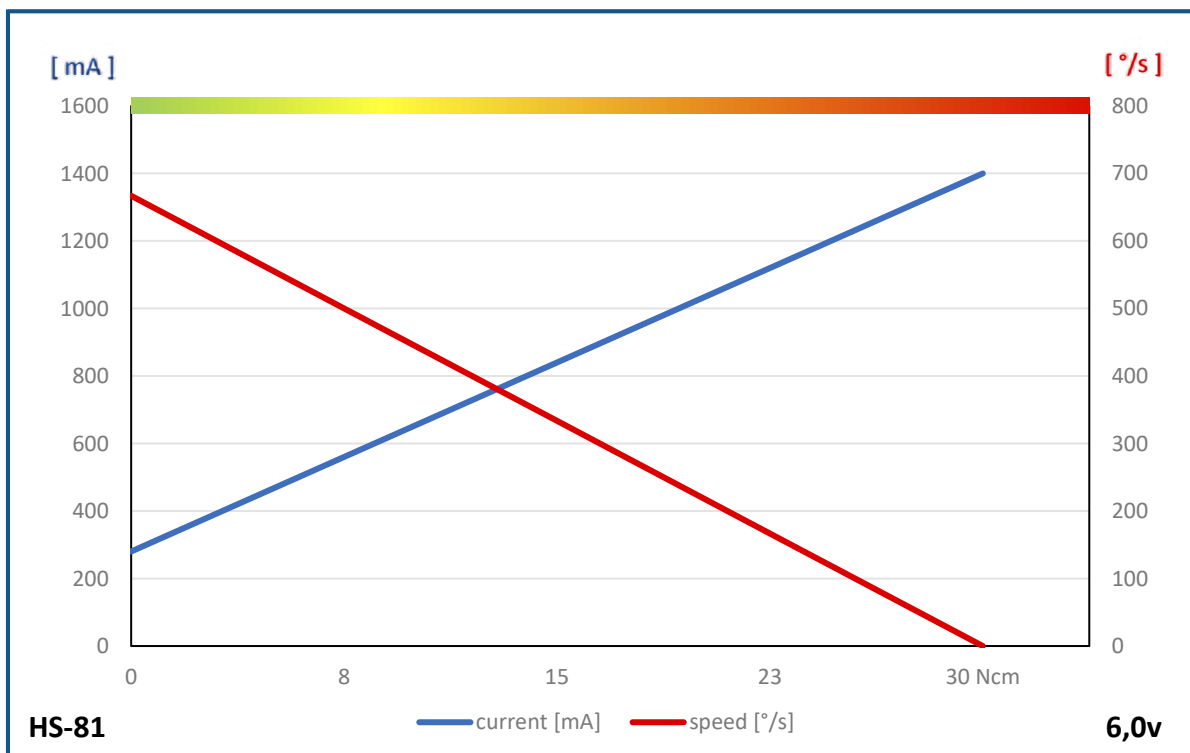
#112081

#112084 GP 20 Stück



1:2

PERFORMANCE CHART



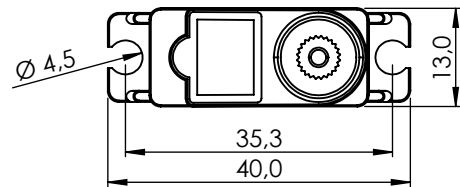
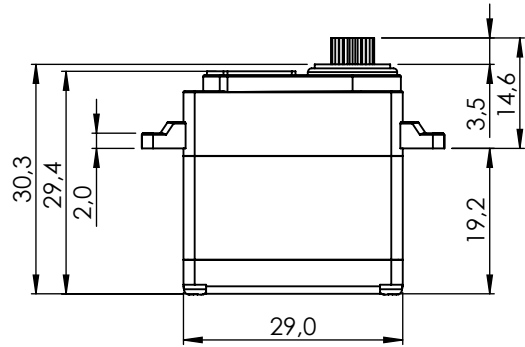
GENERAL SPECIFICATION

HS-81		
Control System	Pulse Width Modulation (PWM)	
	PWM Range 900µs 1500µs 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive	
Motor Type	Cored / 3 poles Ferrite Motor	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	546°/s (91RPM)	667°/s (111RPM)
Stall Torque	2.6kgcm (25.5Ncm)	3.0kgcm (29.4Ncm)
Peak Efficiency Torque	0.5kgcm (4.9Ncm)	0.6kgcm (5.9Ncm)
Rest Current	9mA	9mA
Running Current at no Load	220mA	280mA
Stall Current	-	-
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20/0.08	
External Dimensions	29.8 x 12.0 x 26.0mm	
Weight*	16.6g	
Ball Bearing	n/a	
Case Material	Engineering Plastic	
Gear Material	3 resin & 1 Heavy Duty Resin Gears	
Gear Train Backlash	n/a	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, Servo Horns (M-I, M-X, M-O)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-85MG

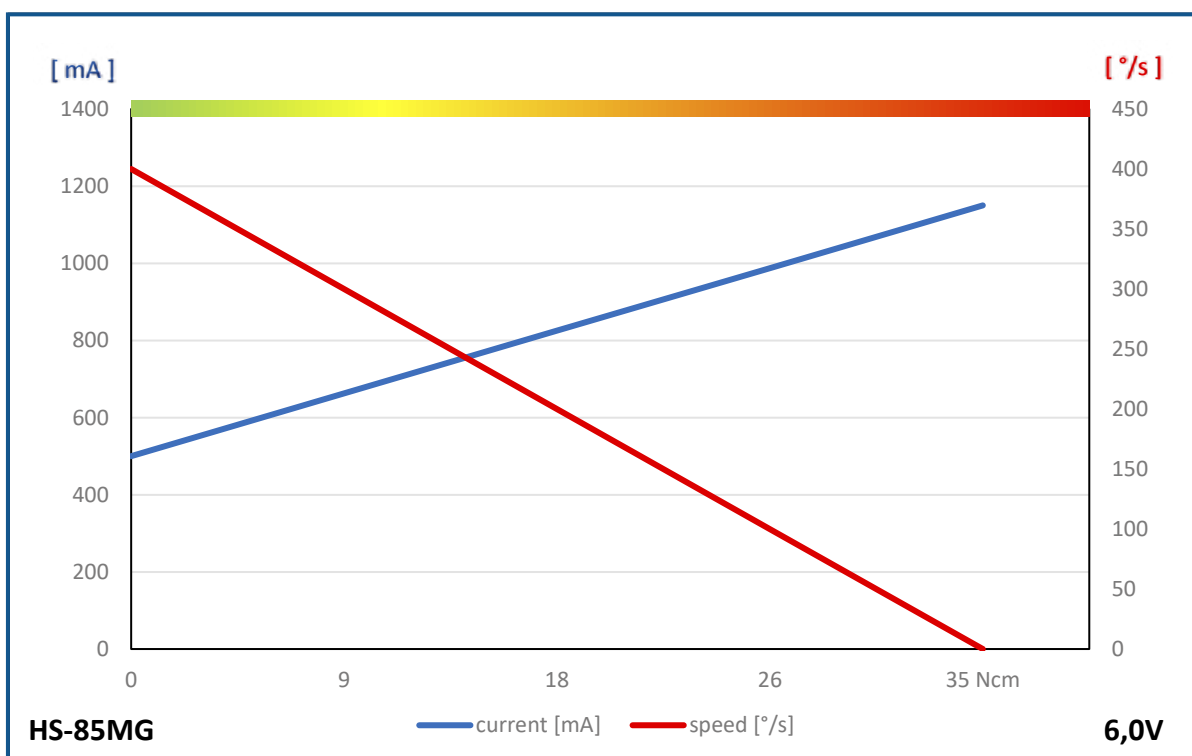
#112086

#112091 GP 20 Stück



1:1

PERFORMANCE CHART



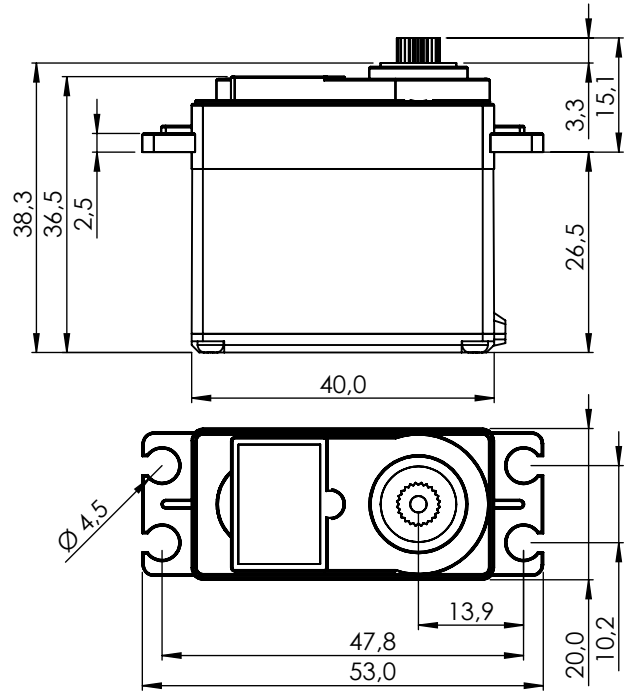
GENERAL SPECIFICATION

HS-85MG		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Cored / 3 Pole Ferrite Motor	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	375°/s (63RPM)	429°/s (71RPM)
Stall Torque	3.0kgcm (29.4Ncm)	3.5kgcm (34.3Ncm)
Peak Efficiency Torque	0.6kgcm (5.9Ncm)	0.7kgcm (6.9Ncm)
Rest Current	8mA	8mA
Running Current at no Load	240mA	240mA
Stall Current	-	-
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20/0.08	
External Dimensions	29.0 x 13.0 x 29.4mm	
Weight*	21.9g	
Ball Bearing	Single Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Resin & 4 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (M-I, M-X, M-O)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-311

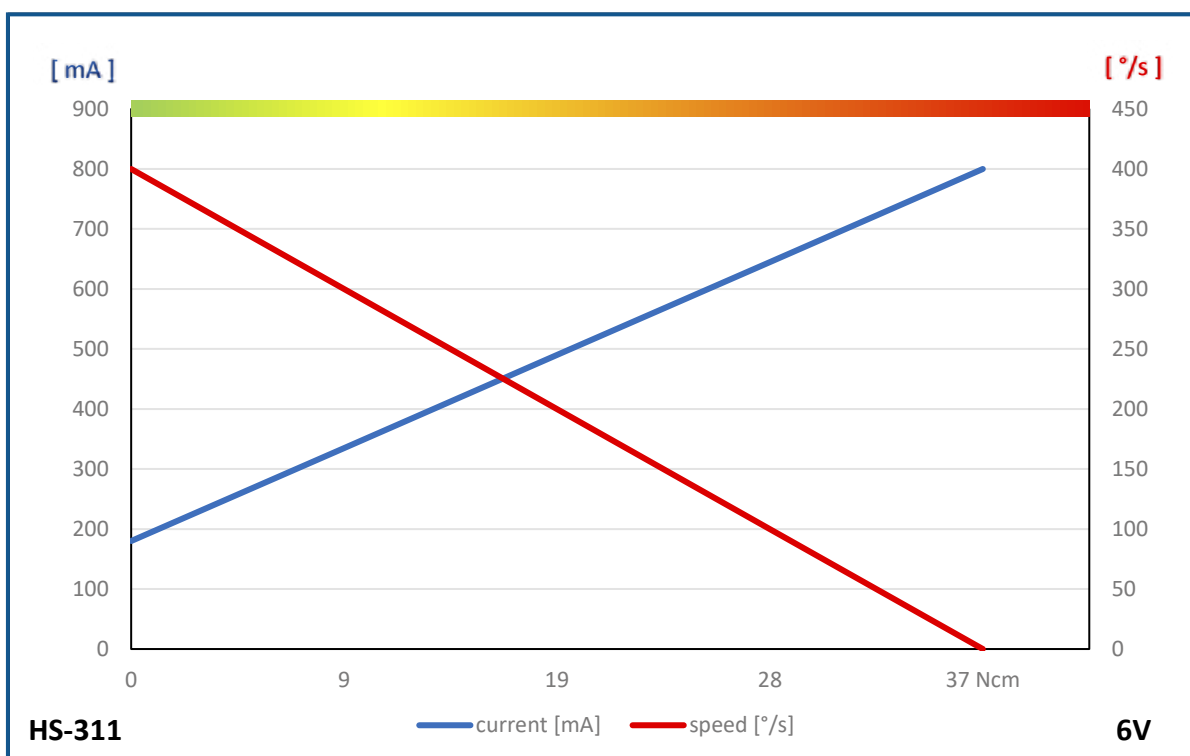
#112311

#IND-112314 GP 30 Stück



1:1

PERFORMANCE CHART



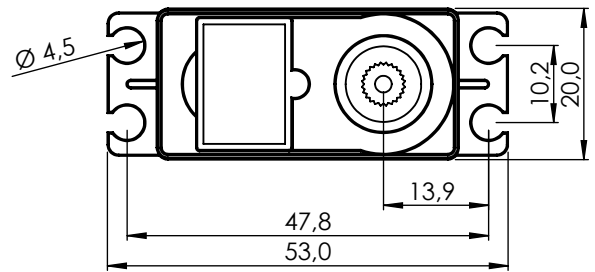
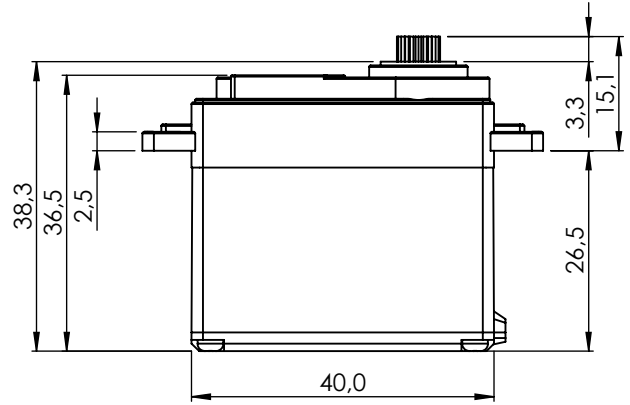
GENERAL SPECIFICATION

HS-311		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 4 Slider	
Motor Type	Cored Metal Brush	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	316°/s (53RPM)	400°/s (67RPM)
Stall Torque	3.0kgcm (29.4Ncm)	3.7kgcm (36.3Ncm)
Peak Efficiency Torque	0.6kgcm (5.9Ncm)	0.7kgcm (6.9Ncm)
Rest Current	7mA	8mA
Running Current at no Load	160mA	180mA
Stall Current	700mA	800mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	24AWG	
Connector Wire Strand Count	40/0.08	
External Dimensions	40.0 x 20.0 x 36.5mm	
Weight*	43.0g	
Ball Bearing	Single Resin Bushing	
Case Material	Engineering Plastic	
Gear Material	4 Resin Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (R-0, R-X, R-I, R-D, R-C, R-XA)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-322HD

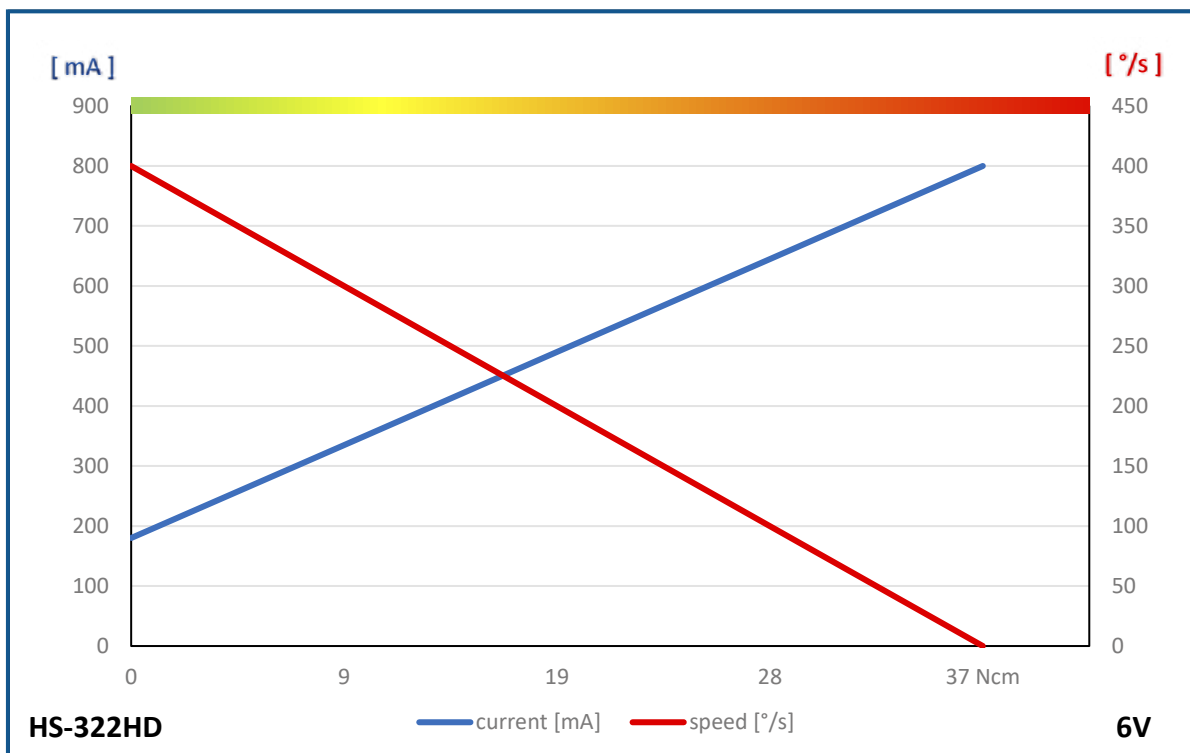
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#112326 GP 30 Stück



1:1

PERFORMANCE CHART



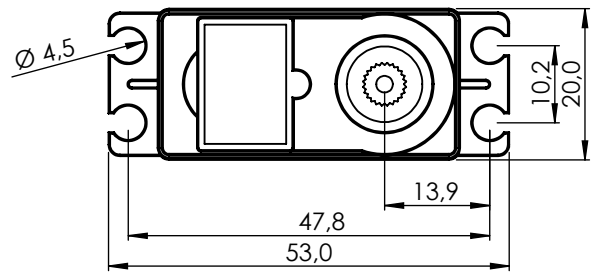
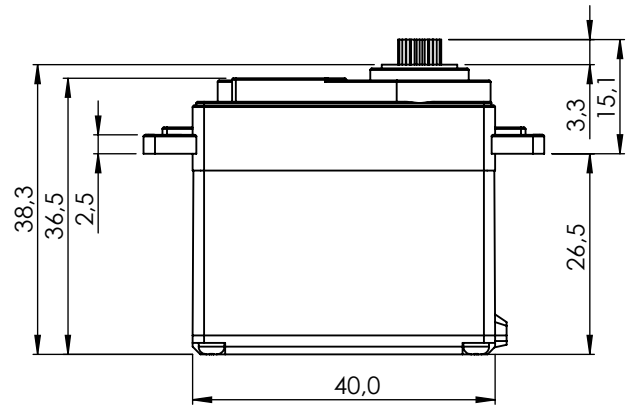
GENERAL SPECIFICATION

HS-322HD		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 4 Slider	
Motor Type	Cored Metal Brush	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	316°/s (53RPM)	400°/s (67RPM)
Stall Torque	3.0kgcm (29.4Ncm)	3.7kgcm (36.3Ncm)
Peak Efficiency Torque	0.6kgcm (5.9Ncm)	0.7kgcm (6.9Ncm)
Rest Current	7mA	8mA
Running Current at no Load	160mA	180mA
Stall Current	700mA	800mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	24AWG	
Connector Wire Strand Count	40/0.08	
External Dimensions	40.0 x 20.0 x 36.5mm	
Weight*	43.0g	
Ball Bearing	Dual Resin Bushing	
Case Material	Engineering Plastic	
Gear Material	2 Resin & 2 Heavy Duty Resin Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (R-O, R-X, R-I, R-D, R-C)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-325HB

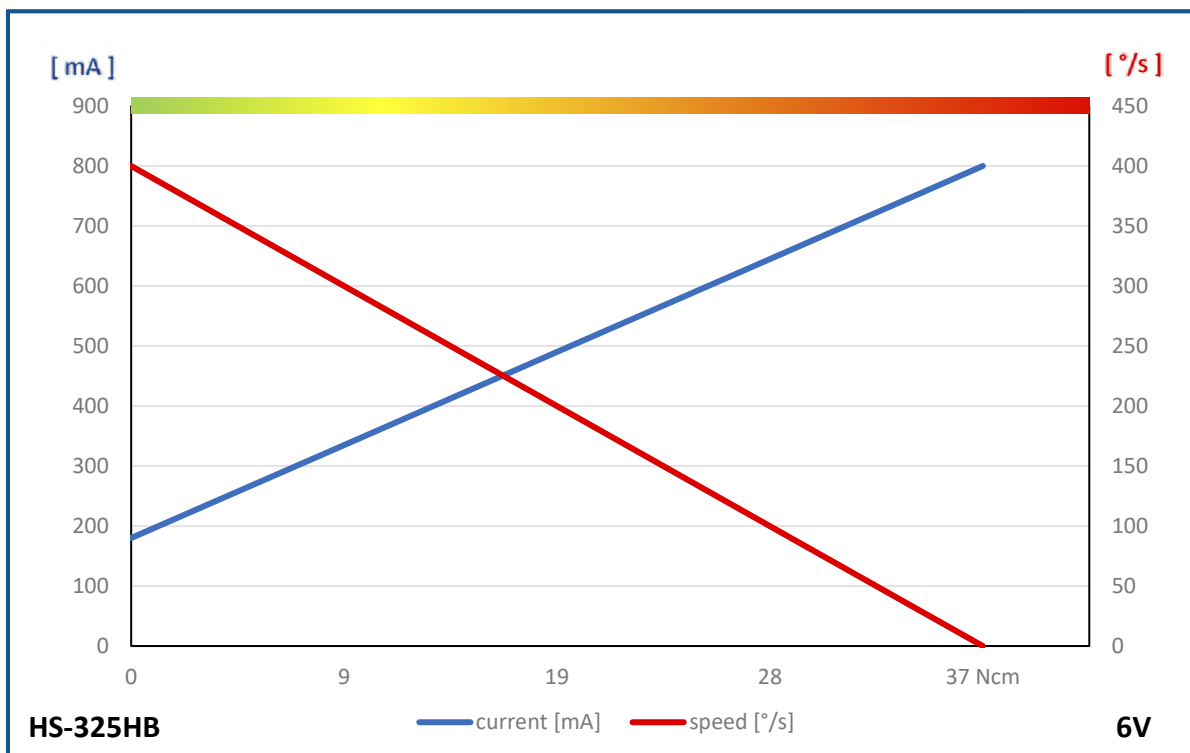
#112325

#1-02361 GP 30 Stück



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PERFORMANCE CHART



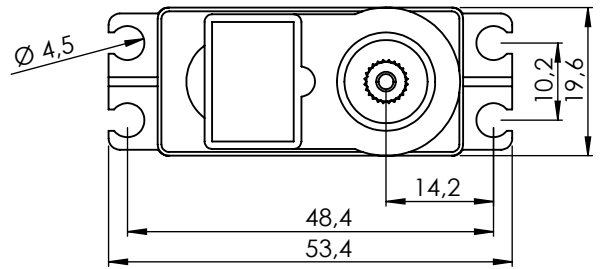
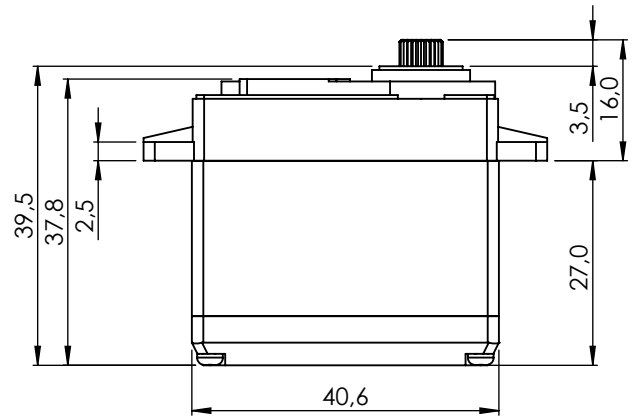
GENERAL SPECIFICATION

HS-325HB		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 4 Slider	
Motor Type	Cored Metal Brush	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	316°/s (53RPM)	400°/s (67RPM)
Stall Torque	3.0kgcm (29.4Ncm)	3.7kgcm (36.3Ncm)
Peak Efficiency Torque	0.6kgcm (5.9Ncm)	0.7kgcm (6.9Ncm)
Rest Current	7mA	8mA
Running Current at no Load	160mA	180mA
Stall Current	700mA	800mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	24AWG	
Connector Wire Strand Count	40/0.08	
External Dimensions	40.0 x 20.0 x 36.5mm	
Weight*	43.0g	
Ball Bearing	Dual Resin Bushing	
Case Material	Engineering Plastic	
Gear Material	2 Resin & 2 Heavy Duty Resin Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (R-O, R-X, R-I, R-D, R-C)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-645MG

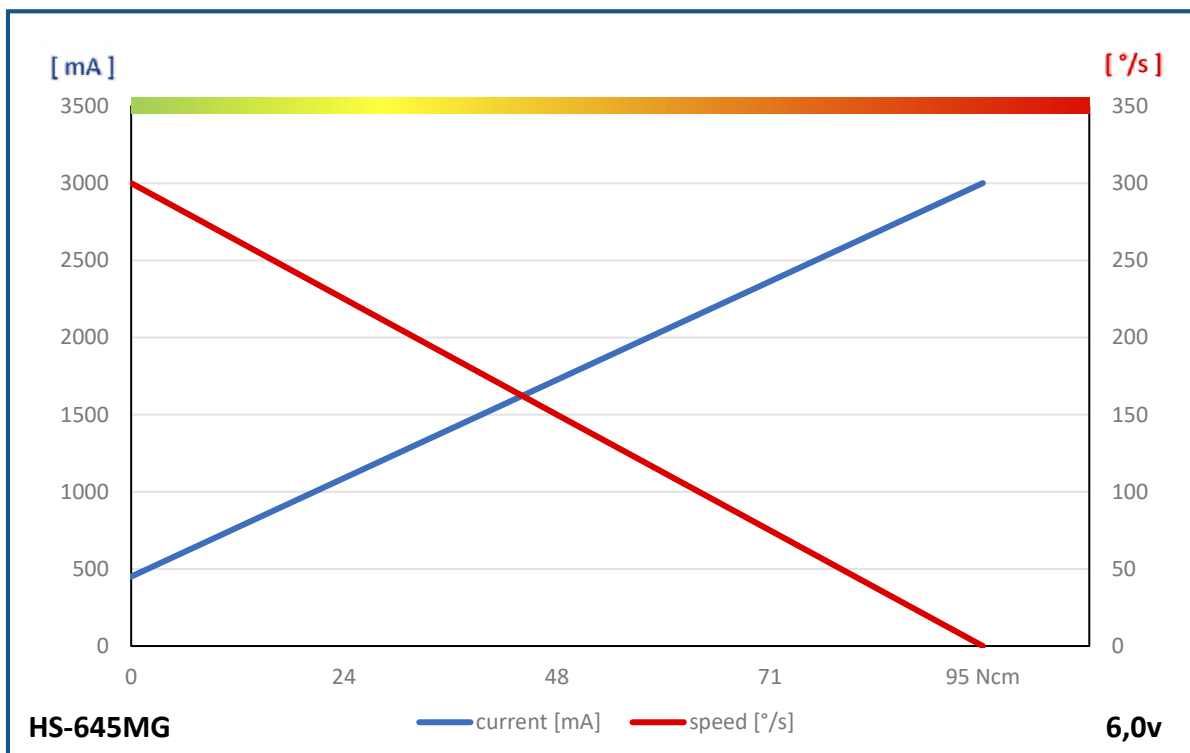
#112645

#112648 GP 30 Stück



1:1

PERFORMANCE CHART



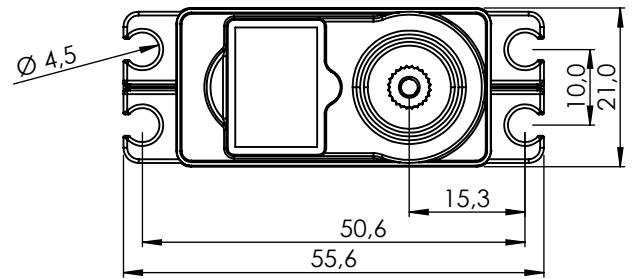
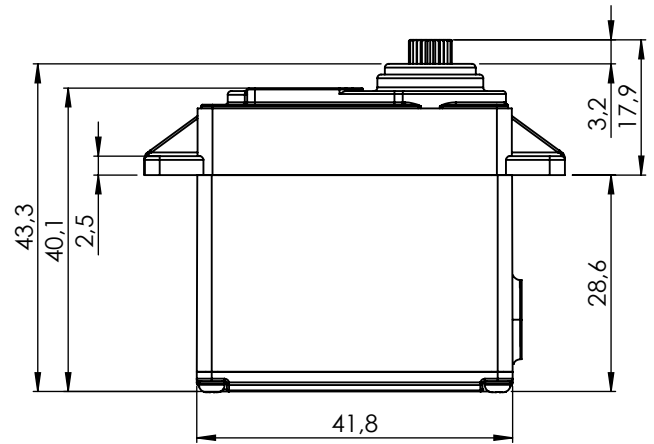
GENERAL SPECIFICATION

HS-645MG		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Cored Metal Brush	
Amplifier / MCU	Analog	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	250°/s (42RPM)	300°/s (50RPM)
Stall Torque	7.7kgcm (75.5Ncm)	9.6kgcm (94.2Ncm)
Peak Efficiency Torque	1.5kgcm (14.7Ncm)	1.9kgcm (18.6Ncm)
Rest Current	9mA	9mA
Running Current at no Load	350mA	450mA
Stall Current	-	-
Deadband Width	8µs	8µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-31°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count	60/0.08	
External Dimensions	40.6 x 19.6 x 37.8mm	
Weight*	55.2g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic Gear & 3 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T / Ø6.0	
Accessories	Mounting Hardware, Servo Horns (R-0, R-XA, HD-IS, HD-LS, HD-OS)	
IP-Rating	IP4X	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

HS-646WP

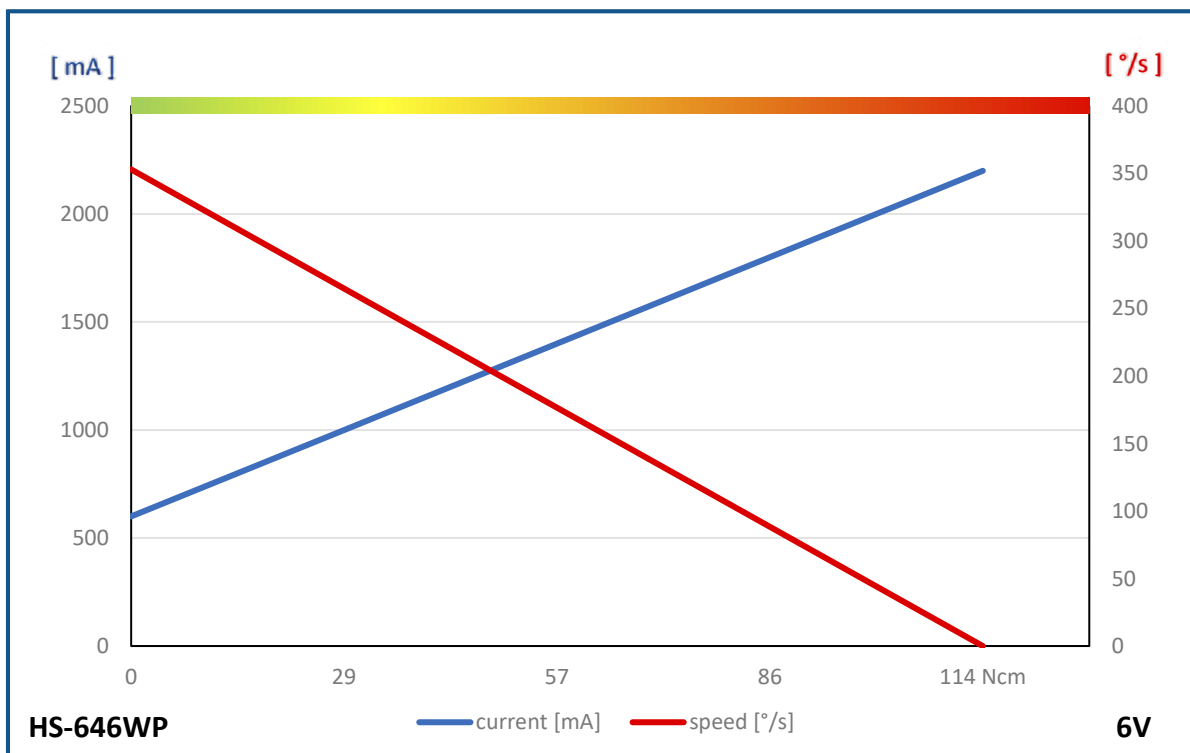
#115646

#1-02352 GP 24 Stück



1:1

PERFORMANCE CHART

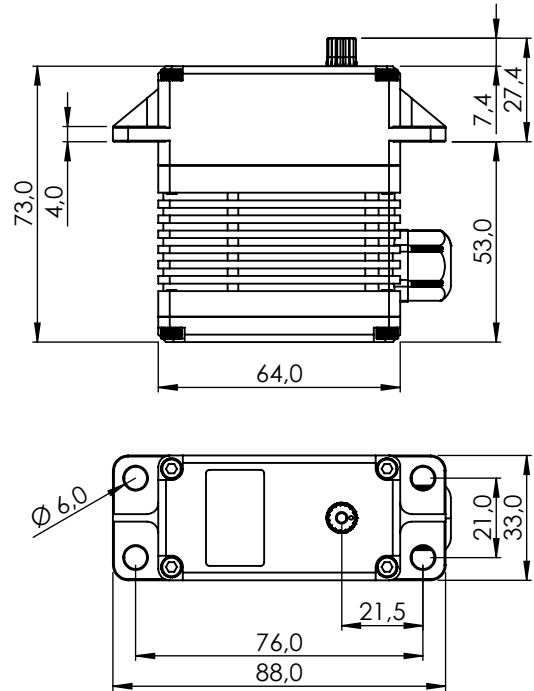


GENERAL SPECIFICATION

HS-646WP		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M cycle Long Life	
Motor Type	Cored Carbon Brush / 3 Pole Ferrite Motor	
Amplifier / MCU	Analog	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	300°/s (50RPM)	353°/s (59RPM)
Stall Torque	9.6kgcm (94.2Ncm)	11.6kgcm (113.8Ncm)
Peak Efficiency Torque	1.9kgcm (18.6Ncm)	2.3kgcm (22.6Ncm)
Rest Current	8mA	8mA
Running Current at no Load	400mA	600mA
Stall Current	2000mA	2200mA
Deadband Width	4µs	4µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count	60/0.08	
External Dimensions	41.8 x 21.0 x 40.0mm	
Weight*	61.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories	Mounting Hardware, Servo Horns (R-0, R-XA, HD-IS, HD-LS, HD-OS)	
IP-Rating	IP67	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

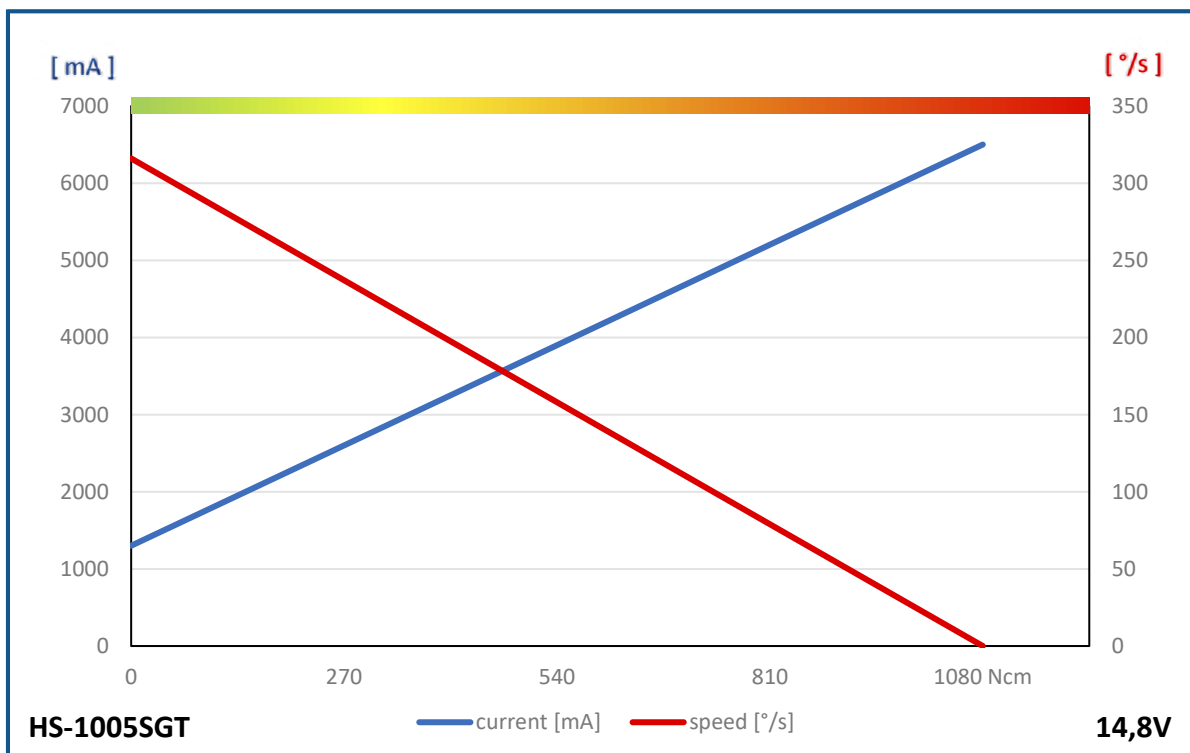
HS-1005SGT

#138105



1:2

PERFORMANCE CHART

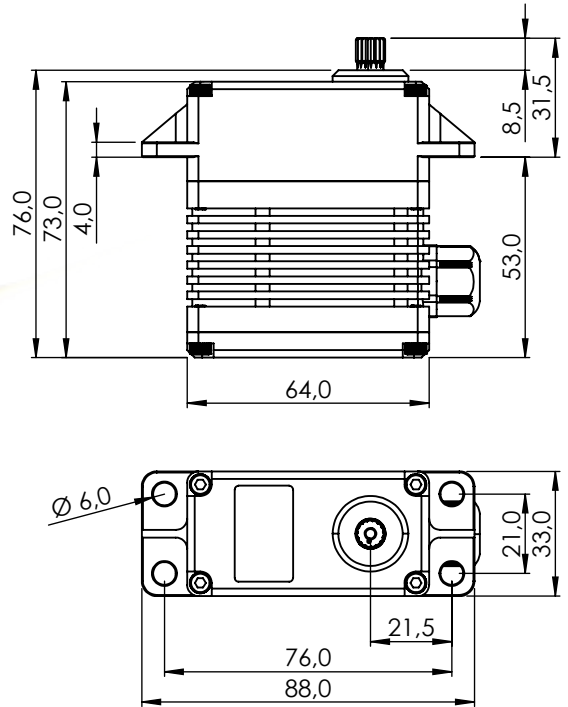


GENERAL SPECIFICATION

HS-1005SGT		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	Cored Carbon Brush	
Amplifier / MCU	Digital with Mosfet Drive	
Operating Voltage Range	9.0V ~ 16.8V (Signal: 3.5V ~ 8.4V)	
Operating Voltage	At 11.1V	At 14.8V
Operating Speed at no Load	231°/s (38RPM)	316°/s (53RPM)
Stall Torque	84.0kgcm (824.0Ncm)	110.0kgcm (1079.1Ncm)
Peak Efficiency Torque	16.8kgcm (164.8Ncm)	22.0kgcm (215.8Ncm)
Rest Current	90mA	130mA
Running Current at no Load	1100mA	1300mA
Stall Current	5500mA	6500mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	IEC-60068-2-64	
Connector Wire Length	250mm	
Connector Wire Gauge	18AWG (Signal: 20AWG)	
Connector Wire Strand Count	120/0.08 (80/0.08)	
External Dimensions	64.0 x 33.0 x 73.0mm	
Weight*	310.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Aluminum Alloy	
Gear Material	1 Metal-Plastic & 3 Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	15T Ø8.0	
Accessories	Mounting Hardware, Servo Horn (I-MO)	
IP-Rating	IP54	
Revision	Rev. 1.1 / 04.01.2024	
Changelog	-	
*of the servo only w/o horns and accessories		

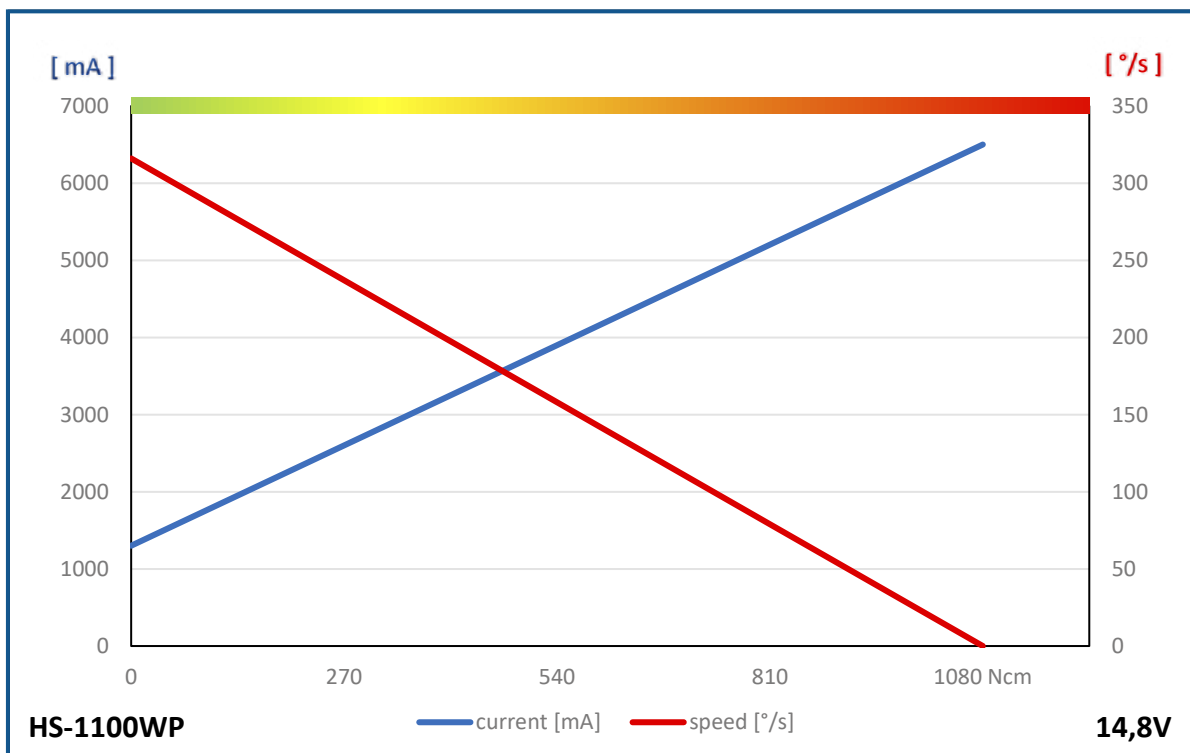
HS-1100WP

#138100



1:2

PERFORMANCE CHART



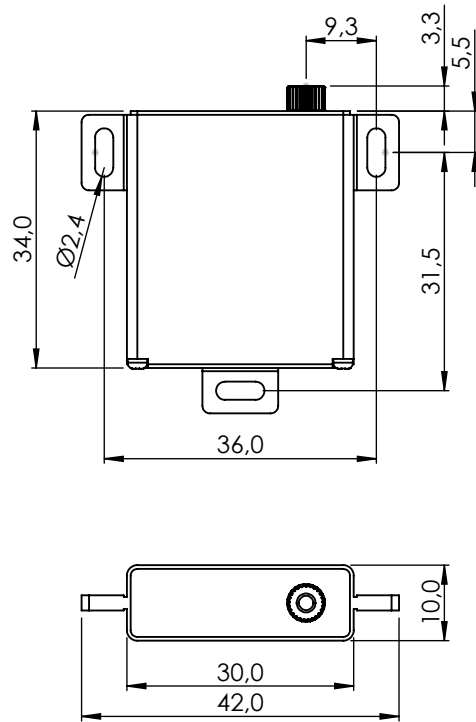
GENERAL SPECIFICATION

General Specification		HS-1100WP	
Control System	PWM		
	Pulse Width 900µs 1500µs (Center) 2100µs		
Connector Type	Hitec 3P (JR 3P compatible)		
Position Sensor Type	Indirect Drive / 1M Cycle Long Life		
Motor Type	5 Poles DC Cored Carbon Brush		
Amplifier / MCU	Digital with Mosfet Drive		
Operating Voltage Range	9.0V ~ 16.8V (Signal: 3.5V ~ 8.4V)		
Operating Voltage	At 11.1V		At 14.8V
Operating Speed at no Load	231°/s (38RPM)		316°/s (53RPM)
Stall Torque	84.0kgcm (824.0Ncm)		110.0kgcm (1079.1Ncm)
Peak Efficiency Torque	16.8kgcm (164.8Ncm)		22.0kgcm (215.8Ncm)
Rest Current	90mA		130mA
Running Current at no Load	1100mA		1300mA
Stall Current	5500mA		6500mA
Deadband Width	2µs		2µs
Operating Travel	Default		±60°
	Programmable		n/a
	Multi Turn/Continuous Rotation		n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)		
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)		
Vibrations at no Load	-		
Connector Wire Length	250mm		
Connector Wire Gauge	18AWG (Signal: 20AWG)		
Connector Wire Strand Count	120/0.08 (80/0.08)		
External Dimensions	64.0 x 33.0 x 73.0mm		
Weight*	320.0g		
Ball Bearing	Dual Ball Bearing & Dual Needle Bearing		
Case Material	Aluminum Alloy		
Gear Material	1 Metal-Plastic & 3 Steel Gears		
Gear Train Backlash	Max. 0.5°		
Horn Gear Spline	15T Ø8.0		
Accessories	Mounting Hardware, Servo Horn (I-MO)		
IP-Rating	IP67		
Revision	Rev. 1.1 / 04.01.2024		
Changelog	-		
*of the servo only w/o horns and accessories			

HS-5125MG

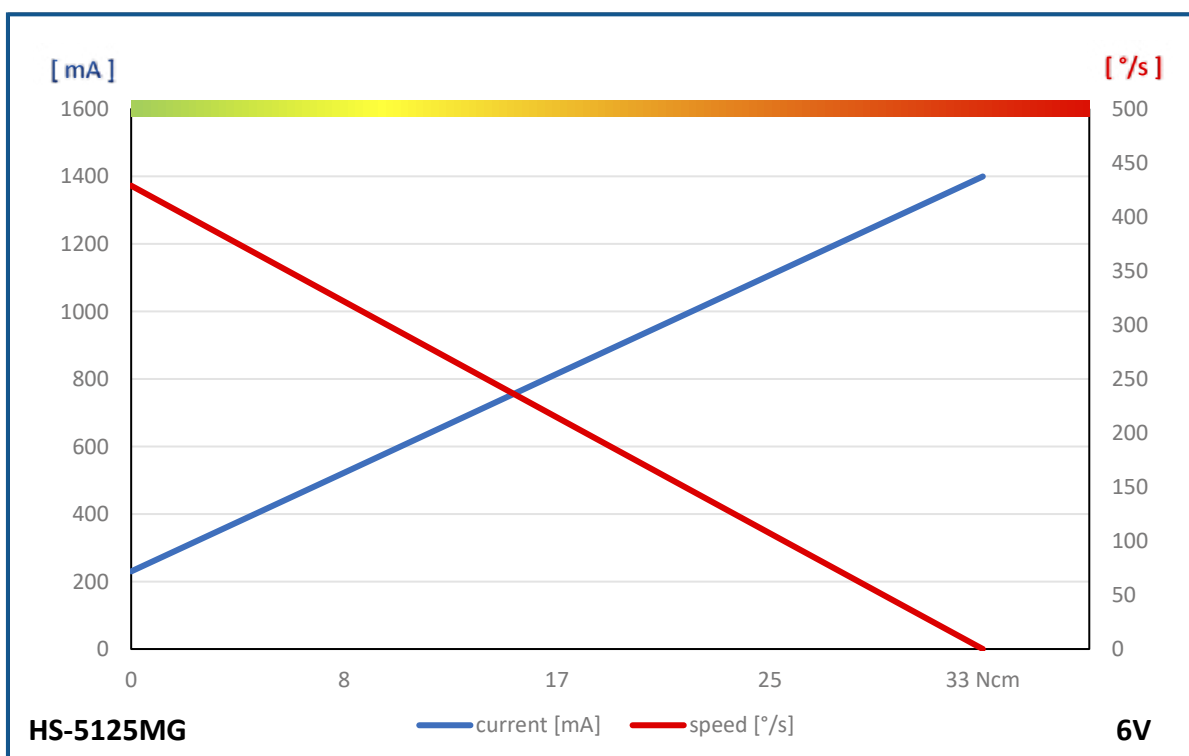
#113125

#1-03035 GP 15 Stück



1:1

PERFORMANCE CHART

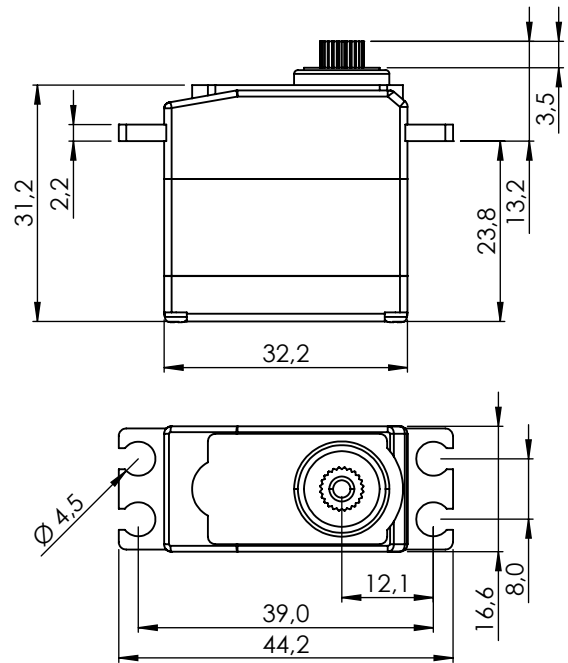


GENERAL SPECIFICATION

HS-5125MG	
Control System	PWM
	Pulse Width 900µs 1500µs (Center) 2100µs
Connector Type	Hitec 3P (JR 3P compatible)
Position Sensor Type	Contact Analog Potentiometer
Motor Type	Cored Metal Brush
Amplifier / MCU	8bit programmable Digital
Operating Voltage Range	3.5V ~ 8.4V
Operating Voltage	At 4.8V At 6.0V
Operating Speed at no Load	333°/s (56RPM) 429°/s (71RPM)
Stall Torque	2.8kgcm (27.5Ncm) 3.3kgcm (32.4Ncm)
Peak Efficiency Torque	0.6kgcm (5.9Ncm) 0.7kgcm (6.9Ncm)
Rest Current	3mA 3mA
Running Current at no Load	180mA 230mA
Stall Current	1100mA 1400mA
Deadband Width	2µs 2µs
Operating Travel	Default ±60°
	Programmable Max. 175°
	Multi Turn/Continuous Rotation n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)
Vibrations at no Load	-
Connector Wire Length	300mm
Connector Wire Gauge	22AWG
Connector Wire Strand Count	60/0.08
External Dimensions	30.0 x 10.0 x 34.0mm
Weight*	24.0g
Ball Bearing	Dual Ball Bearing
Case Material	Engineering Plastic
Gear Material	1 Metal-Plastic & 4 Metal Gears
Gear Train Backlash	Max. 0.5°
Horn Gear Spline	25T Ø5.0
Accessories	Mounting Hardware, Servo Horns (MS-L25, MS-ML25)
IP-Rating	IP4X
Revision	Rev. 1.0 / 08.01.2024
Changelog	-
*of the servo only w/o horns and accessories	

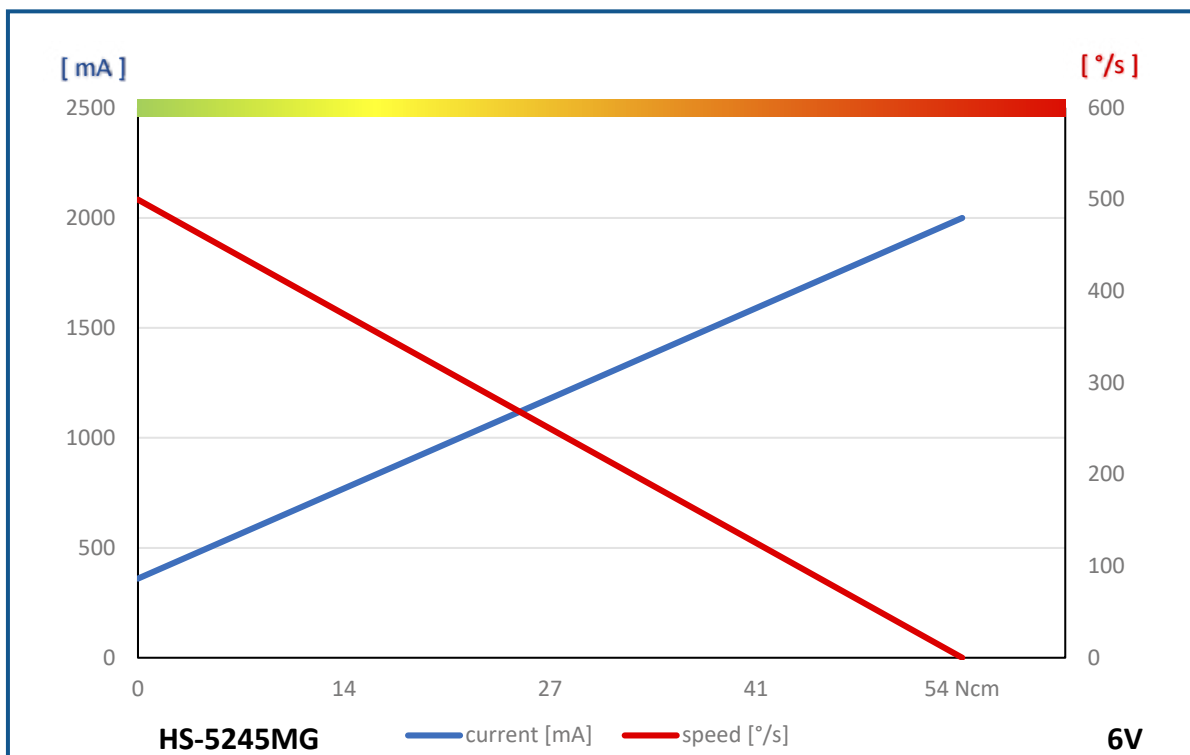
HS-5245MG

#113245



1:1

PERFORMANCE CHART

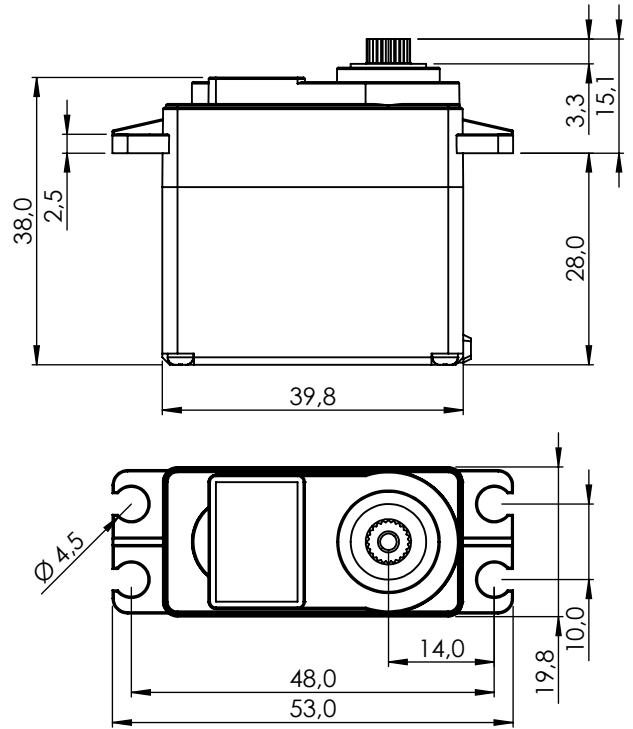


GENERAL SPECIFICATION

HS-5245MG		
Control System	PWM	
	Pulse Width: 900~2100µs(Center:1500µs)	
Connector Type		
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Cored Metal Brush	
Amplifier / MCU	8bit programmable Digital	
Operating Voltage Range**	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	0.15sec/60°	0.12sec/60°
Stall Torque	4.4kgf-cm (61.1 oz-in)	5.5kgf-cm (76.4 oz-in)
Peak Efficiency Torque	0.9kgf-cm (12.5 oz-in)	1.1kgf-cm (15.3 oz-in)
Rest Current	3mA	3mA
Running Current at no Load	260mA	360mA
Stall Current	1,600mA	2,000mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	Max. 175°
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count		
External Dimensions	32.2mm x 16.8mm x 31.0mm	
Weight*	32.0g	
Ball Bearing	2 Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories		
IP-Rating	IP4X	
Revision		
Changelog	-	
*of the servo only w/o horns and accessories		
**At the Max voltage, it is recommended to be used only for a short time duration.		

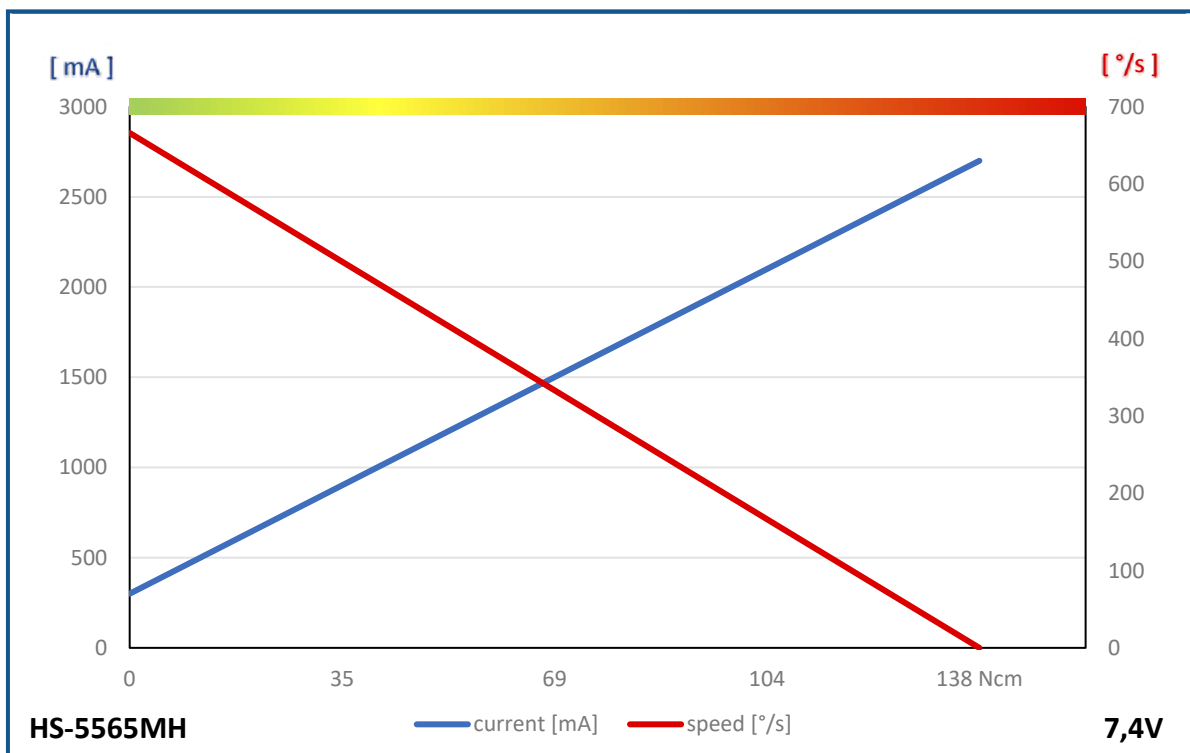
HS-5565MG

#114565



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PERFORMANCE CHART

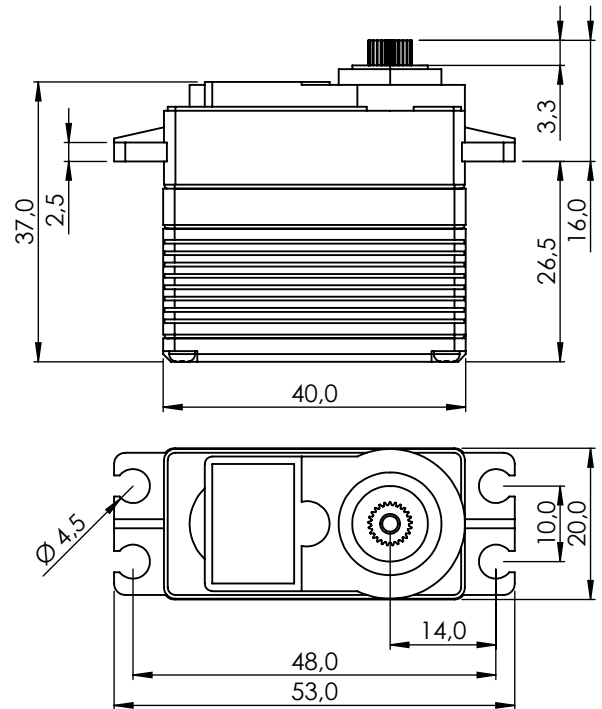


GENERAL SPECIFICATION

HS-5565MG		
Control System	PWM	
	Pulse Width: 900~2100µs(Center:1500µs)	
Connector Type		
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Cored Metal Brush	
Amplifier / MCU	8bit programmable Digital	
Operating Voltage Range**	3.5V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	0.11sec/60°	0.09sec/60°
Stall Torque	11.0kgf-cm (152.8 oz-in)	14.0kgf-cm (194.4 oz-in)
Peak Efficiency Torque	2.2kgf-cm (30.6 oz-in)	2.8kgf-cm (38.9 oz-in)
Rest Current	4mA	4mA
Running Current at no Load	260mA	300mA
Stall Current	2,100mA	2,700mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	Max. 175°
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~+140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~+176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm (11.811inch)	
Connector Wire Gauge	24AWG	
Connector Wire Strand Count		
External Dimensions	40.0mm x 20.0mm x 38.0mm	
Weight*	59.0g	
Ball Bearing	2 Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories		
IP-Rating	IP54	
Revision		
Changelog	-	
*of the servo only w/o horns and accessories		
**At the Max voltage, it is recommended to be used only for a short time duration.		

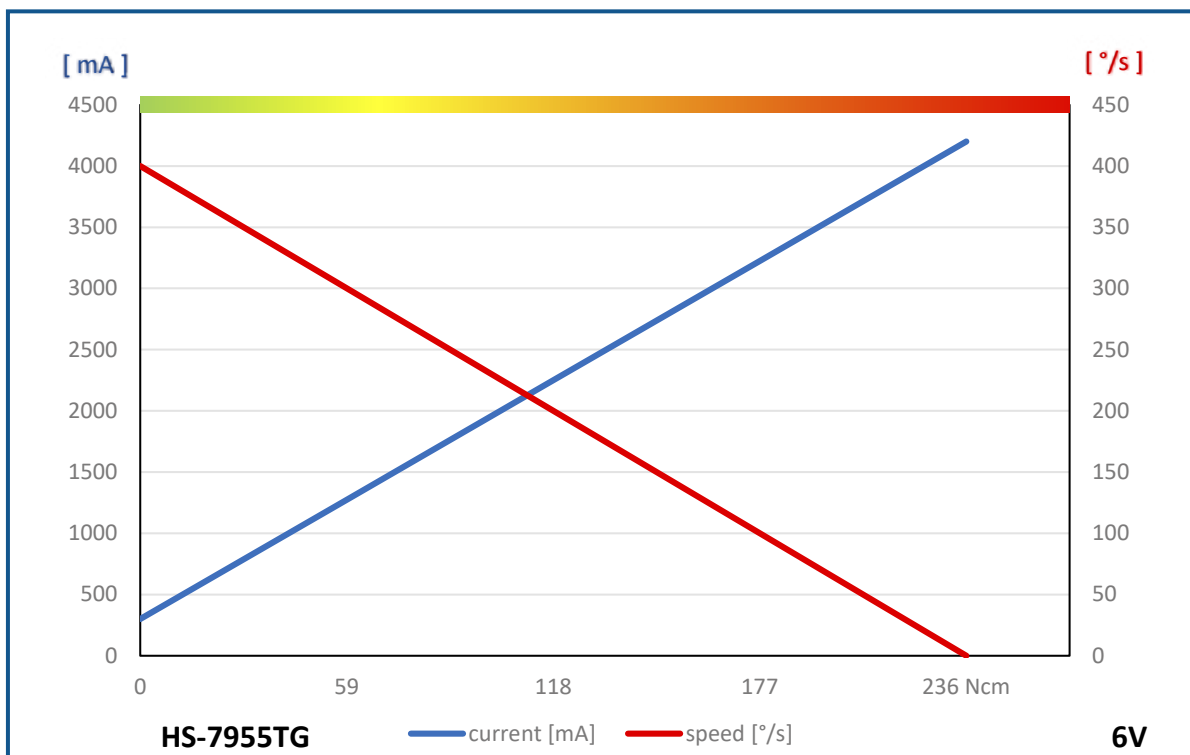
HS-7955TG

#113957



1:1

PERFORMANCE CHART

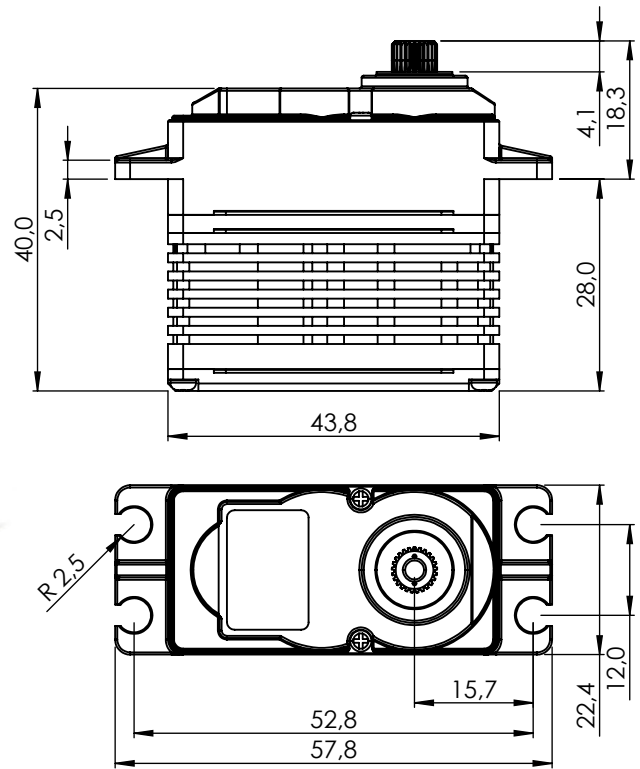


GENERAL SPECIFICATION

HS-7955TG		
Control System	PWM	
	Pulse Width: 900~2100µs(Center:1500µs)	
Connector Type		
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Coreless	
Amplifier / MCU	8bit programmable Digital	
Operating Voltage Range**	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 6.0V
Operating Speed at no Load	0.19sec/60°	0.15sec/60°
Stall Torque	18.0kgf-cm (250.0 oz-in)	24.0kgf-cm (333.3 oz-in)
Peak Efficiency Torque	3.6kgf-cm (50.0 oz-in)	4.8kgf-cm (66.7 oz-in)
Rest Current	9mA	9mA
Running Current at no Load	220mA	300mA
Stall Current	3,400mA	4,200mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 175°
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count		
External Dimensions	40.0mm x 20.0mm x 37.0mm	
Weight*	65.0g	
Ball Bearing	2 Ball Bearing	
Case Material	Engineering Plastic & Aluminum Heat Sink	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	24T Ø6.0	
Accessories		
IP-Rating		
Revision		
Changelog	-	
*of the servo only w/o horns and accessories		
**At the Max voltage, it is recommended to be used only for a short time duration.		

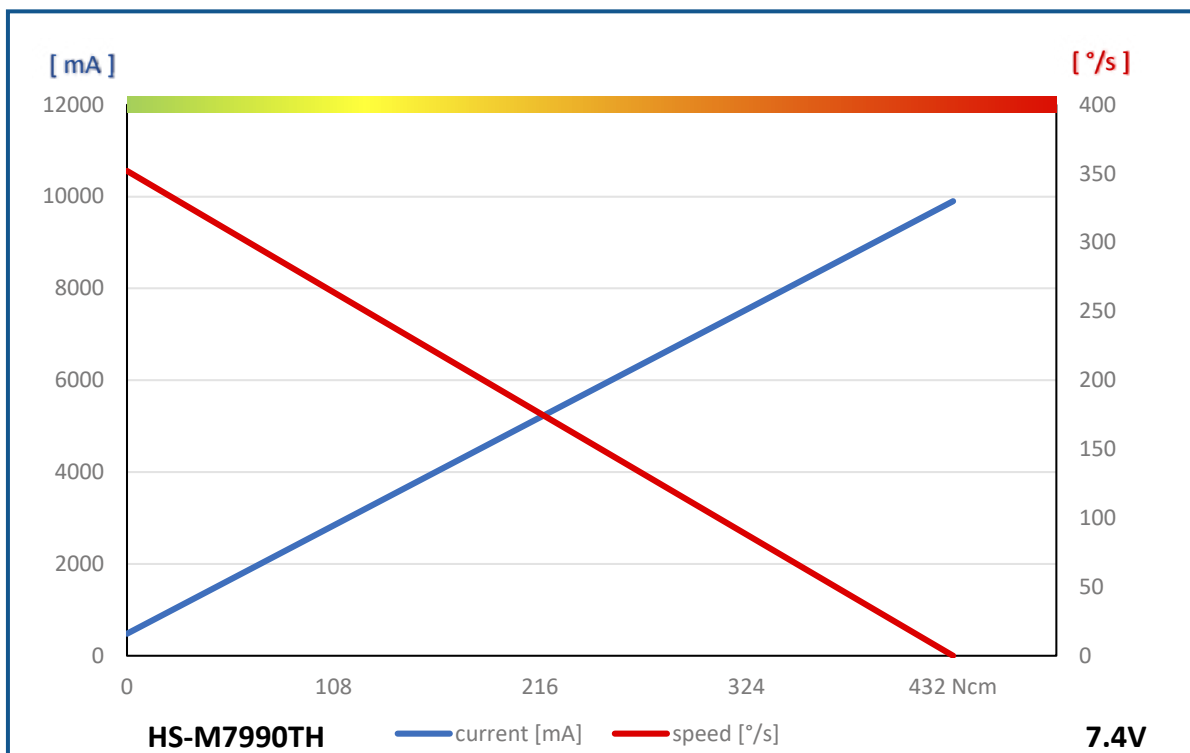
HS-M7990TH

#114990



1:1

PERFORMANCE CHART

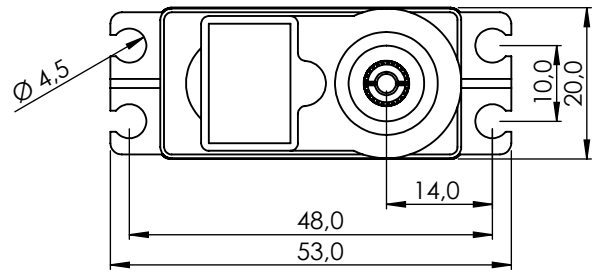
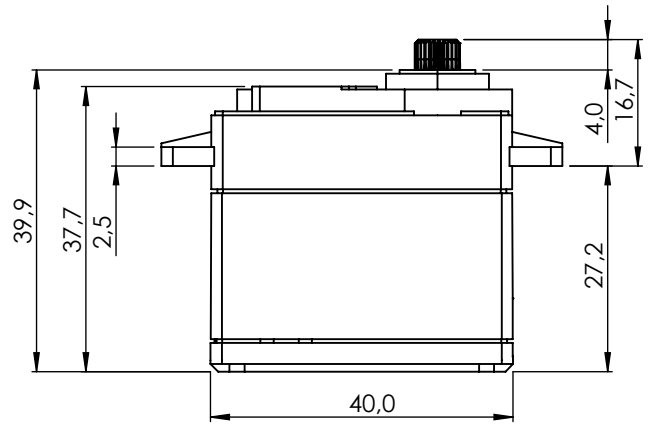


GENERAL SPECIFICATION

HS-M7990TH		
Control System	PWM	
	Pulse Width: 900~2100µs(Center:1500µs)	
Connector Type		
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	Coreless	
Amplifier / MCU	8bit programmable Digital	
Operating Voltage Range**	3.5V ~ 8.4V	
Operating Voltage	At 6.V	At 7.4V
Operating Speed at no Load	0.21sec/60°	0.17sec/60°
Stall Torque	36.0kgf-cm (499.9 oz-in)	44.0kgf-cm (611.0 oz-in)
Peak Efficiency Torque	7.2kgf-cm (100.0 oz-in)	8.8kgf-cm (122.2 oz-in)
Rest Current	22mA	23mA
Running Current at no Load	400mA	480mA
Stall Current	8,100mA	9,900mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	Max 300°
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Vibrations at no Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count		
External Dimensions	43.8mm x 22.4mm x 40.0mm	
Weight*	79.0g	
Ball Bearing	2 Ball Bearing	
Case Material	Engineering Plastic & Aluminum Heat Sink	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	25T Ø6.0	
Accessories		
IP-Rating	IP54	
Revision		
Changelog	-	
*of the servo only w/o horns and accessories		
**At the Max voltage, it is recommended to be used only for a short time duration.		

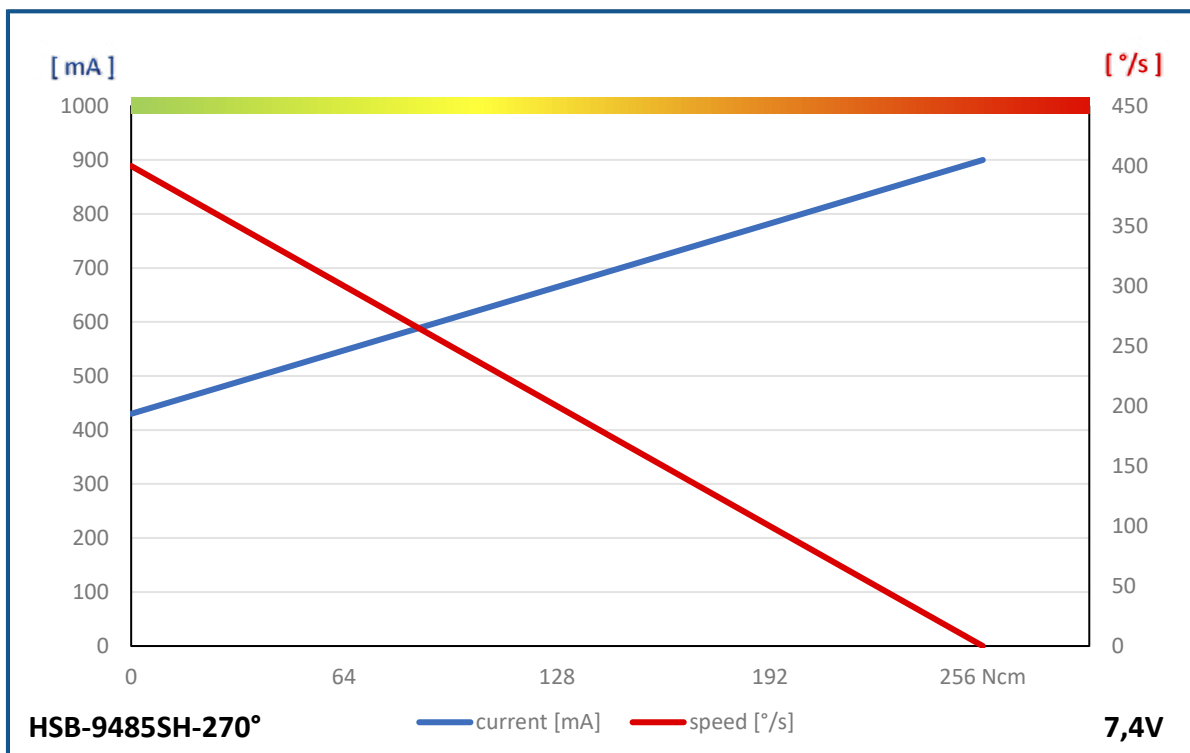
HSB-9485SH-270°

#1-00409



1:1

PERFORMANCE CHART



GENERAL SPECIFICATION

HSB-9485SH-270°		
Control System	PWM	
	Pulse Width 900µs 1500µs (Center) 2100µs	
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life	
Motor Type	BLDC	
Amplifier / MCU	16bit programmable Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.0V ~ 8.4V	
Operating Voltage	At 6.0V	At 7.4V
Operating Speed at no Load	333°/s (56RPM)	400°/s (67RPM)
Stall Torque	26.0kgcm (255.1Ncm)	26.0kgcm (255.1Ncm)
Peak Efficiency Torque	5.2kgcm (51.0Ncm)	5.2kgcm (51.0Ncm)
Rest Current	30mA	30mA
Running Current at no Load	360mA	430mA
Stall Current	1100mA	900mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	Max. 270°
	Multi Turn/Continuous Rotation	n/a / n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-30°C ~ +80°C (-22°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80/0.08	
External Dimensions	40.0 x 20.0 x 37.7mm	
Weight*	62.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Steel Gears	
Gear Train Backlash	Max. 0.5°	
Horn Gear Spline	H25T Ø6.0	
Accessories	Servo Horn (HD-LS25)	
IP-Rating	IP54	
Revision	Rev. 1.0 / 09.01.2024	
Changelog	-	
*of the servo w/o horns and accessories		



Anwendungsbeispiel für HiTEC-Servos

Hier im Roboter-Arm

Typical application for HiTEC servos –

here in a robot arm



Foto: Robotzone, LLC



Anwendungsbeispiel für HiTEC-Servos

Hier in einem Robotergetriebe

Typical application for HiTEC servos –

In this case in a robot gearbox

KUNDENINDIVIDUELLE ANPASSUNG

Als Schwesterunternehmen der Firma Hitec RCD Korea Inc. Sind wir in der Lage individuelle Kundenwünsche zu realisieren. Folgende Anpassungen/Modifikationen sind dabei möglich:

- Änderung von Kabeltyp und Kabellänge
- Änderung der Steckverbindung
- Anpassung des Zubehörs
- Anpassung der Verpackung (Umverpackung und Gebindegröße)
- Programmierservice
- Montageservice
- Erweiterte Wareenausgangsprüfung (Teststand und Protokollierung)
- Änderung der Beschriftung (Name Plate, Serien-Nr., etc.)
- Anpassung des Produkts (z.B. Getriebeübersetzung)
- Erfüllung von besonderen Zertifizierungswünschen
- Tracing von Komponenten
- Spezielle Liefervereinbarung (Rahmenaufträge, garantierte Lieferfähigkeiten)

PROGRAMMIERGERÄTE

Digitale Hitec Aktuatoren verfügen über die Möglichkeit unterschiedliche Einstellungen anzupassen beziehungsweise Sicherheitsfeatures zu aktivieren. Das Ändern dieser Parameter kann mit Hilfe von unterschiedlichen Programmiergeräten erfolgen.

HFP-30

Das Hitec HFP-30 bietet umfangreiche Einstellungsmöglichkeiten und Testfunktionen. Aufgrund der kompakten Abmessungen eignet sich das HFP-30 ideal für den mobilen Einsatz, da kein Computer benötigt wird. Mit dem HFP-30 lassen sich alle digitalen Hitec PWM-Aktuatoren programmieren.



DPC-11

Das Hitec DPC-11 ist eine kostengünstige Programmierschnittstelle, welche in Verbindung mit einem Computer mit Windows-Betriebssystem verwendet wird. Hierbei lassen sich alle Einstellungen bequem modifizieren und optional auch abspeichern. So können beispielsweise die gewählten Einstellungen mit geringem Aufwand archiviert, oder auf weitere Servos übertragen werden. Die Anbindung erfolgt über USB.



DPC-CAN

Mit der Hitec DPC-CAN Schnittstelle lassen sich Hitec CAN- und UAVCAN-Servos konfigurieren, aktualisieren, oder testen. Hierfür stehen unterschiedliche Software-Applikationen bereit. Hierfür ist ein Computer mit Windows-Betriebssystem notwendig. Die Anbindung erfolgt über USB.



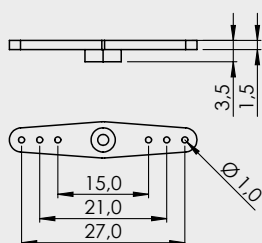
SERVO ABTRIEBSARME

Für das gesamte Hitec Servo-Portfolio steht eine Vielzahl von Abtriebsarmen zur Verfügung. Im Lieferumfang der Servos ist zumeist eine Auswahl geeigneter Abtriebsarme enthalten.

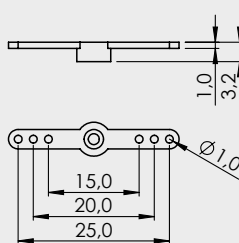
Bei Sonderwünschen können Sie aus dem breiten Sortiment wählen, bitte nehmen Sie hierzu Kontakt zu uns auf.

15T (Ø4,0)

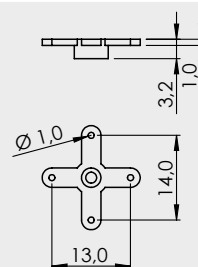
FS-IL15



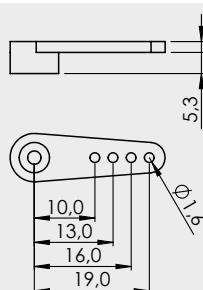
FS-IS15



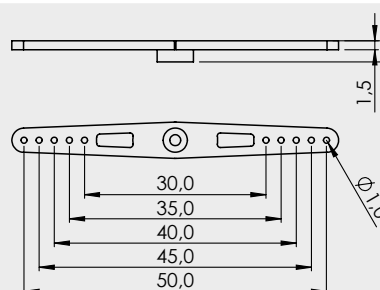
FS-X15



HD-M15-L

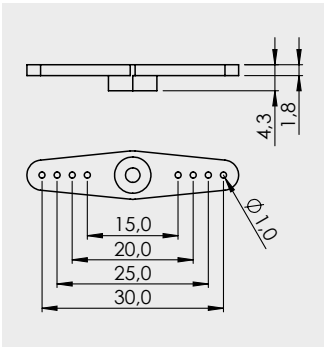


FS-IXL15

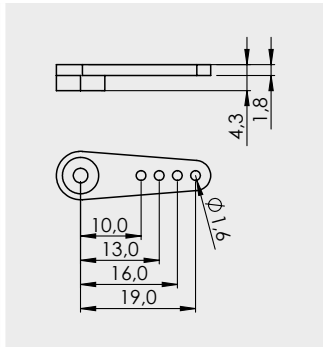


25T (Ø5,0)

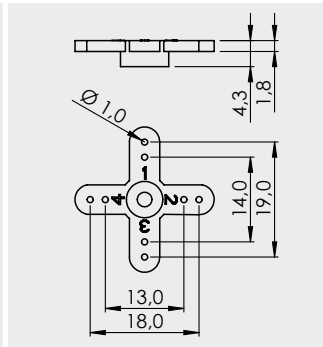
MS-I25



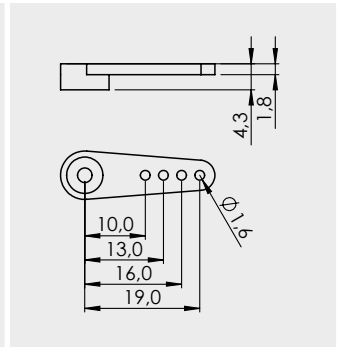
MS-L25



MS-X25

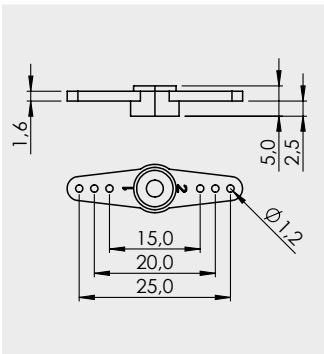


MS-ML25

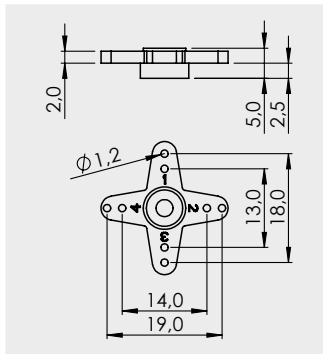


24T (Ø6,0)

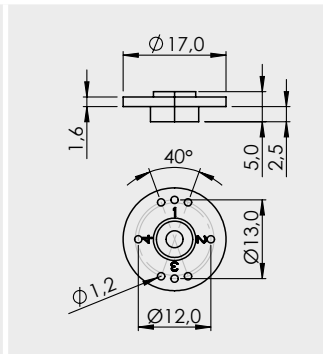
M-I24



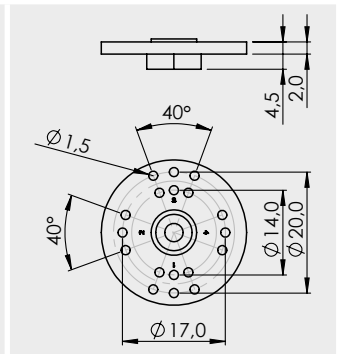
M-X24



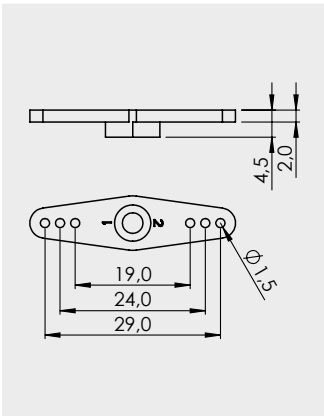
M-024



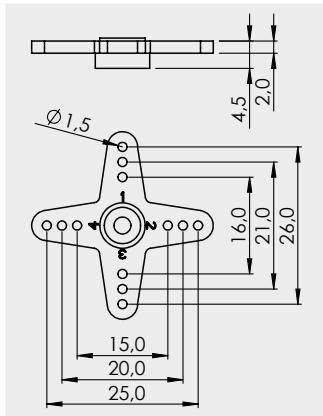
R-024



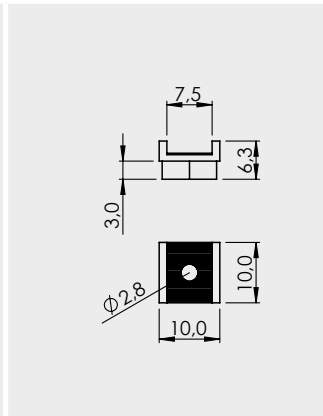
R-I24



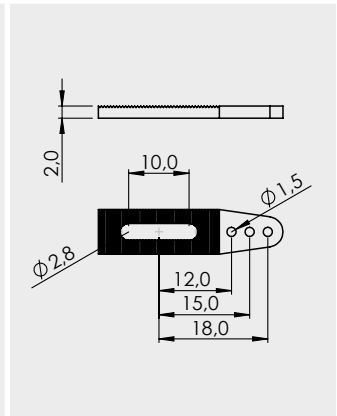
R-X24



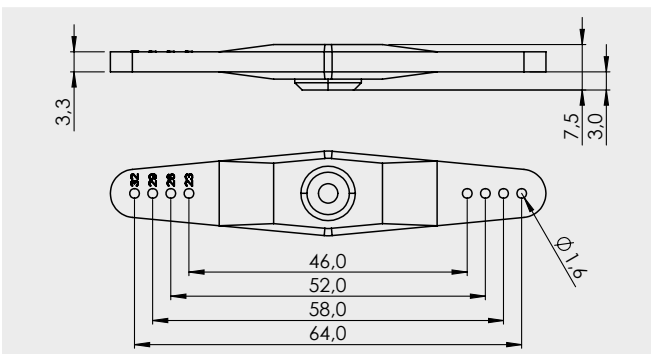
R-C



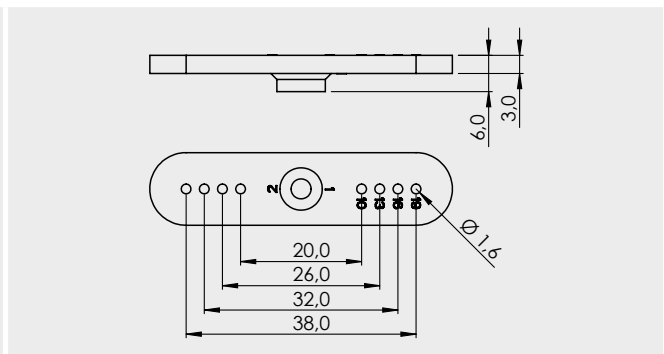
R-D



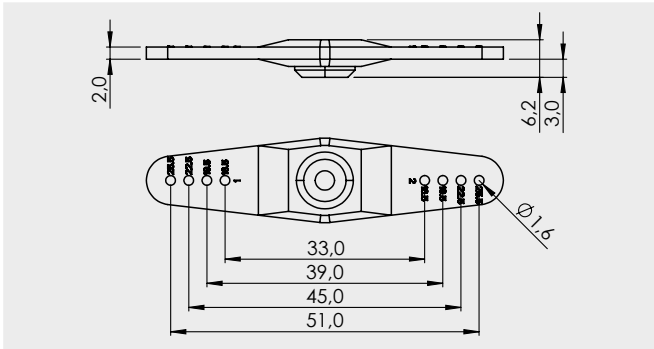
HD-IL24



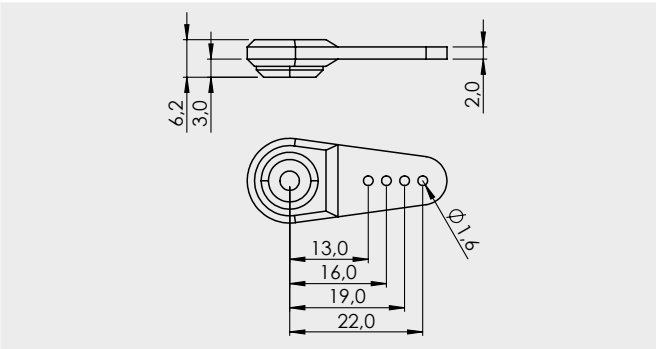
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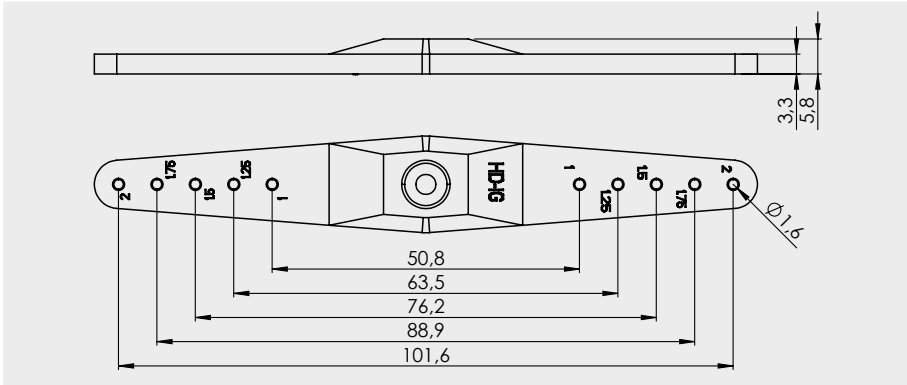
HD-IS24



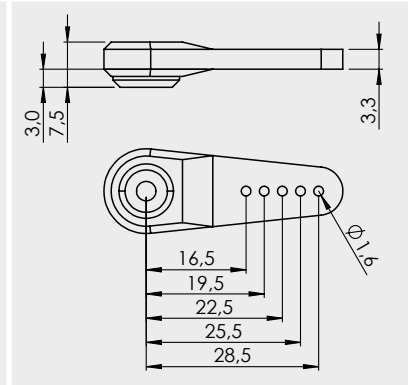
HD-LS24



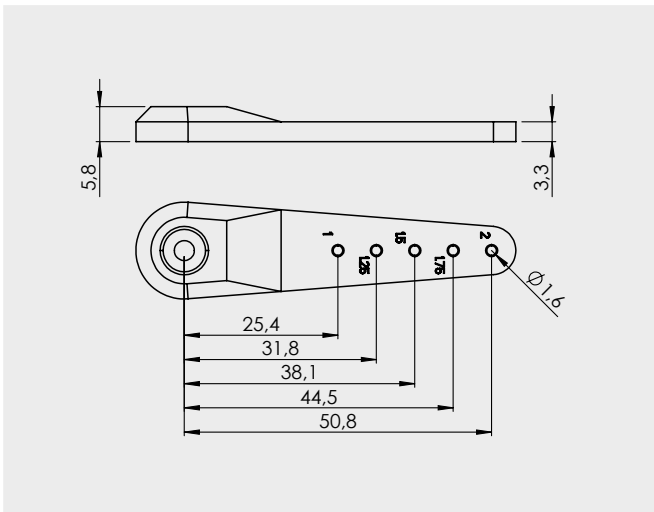
HD-IG24



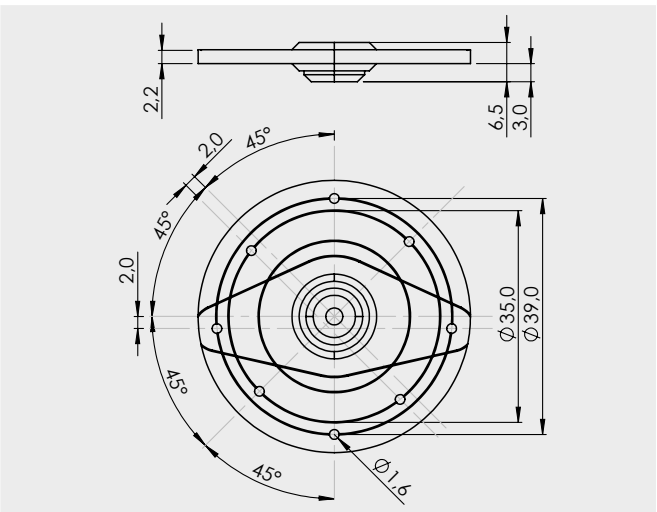
HD-LL24



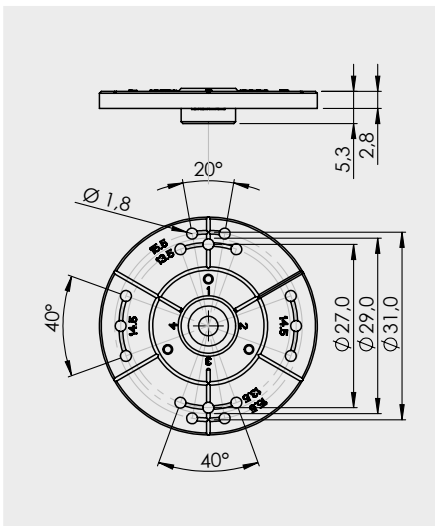
HD-LG24



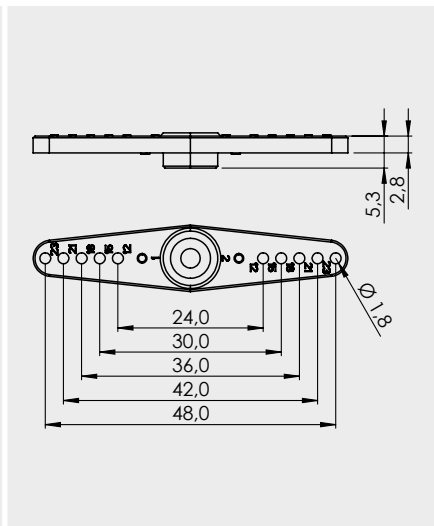
HD-OS24



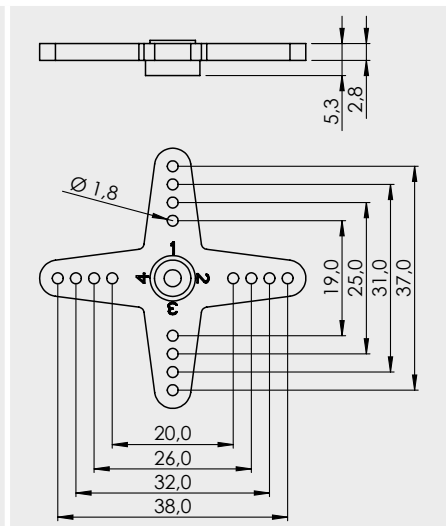
Q-024



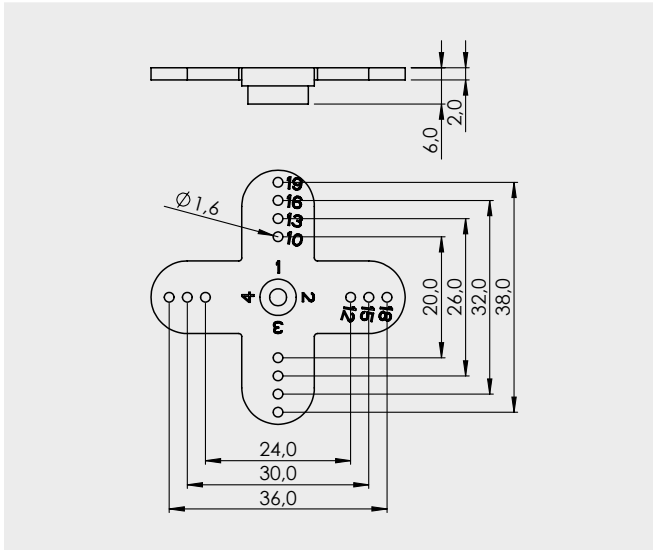
Q-I24



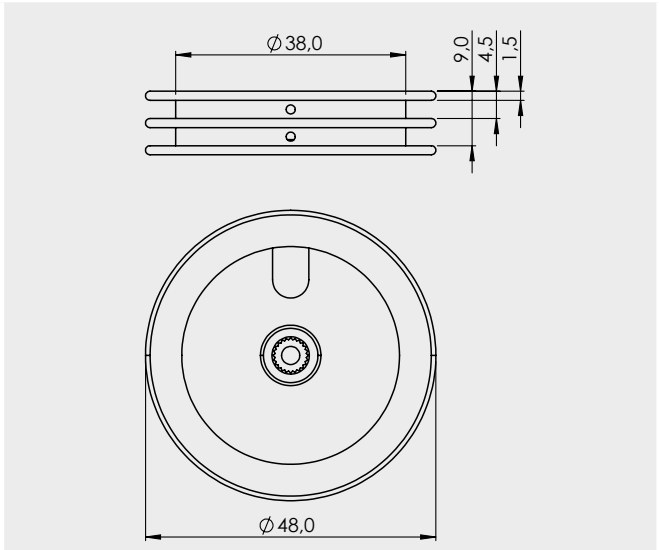
Q-X24



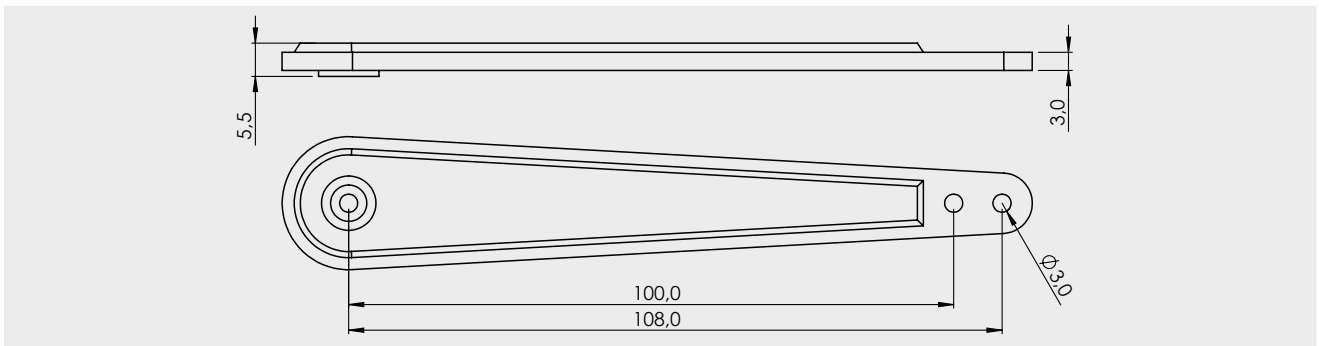
R-XA24



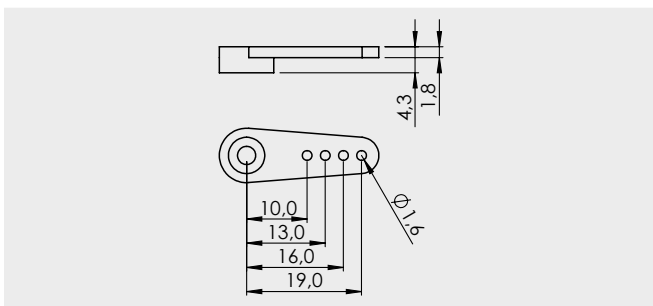
SP-24



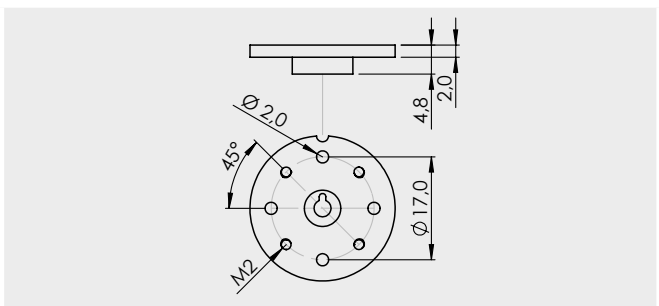
715SA-24



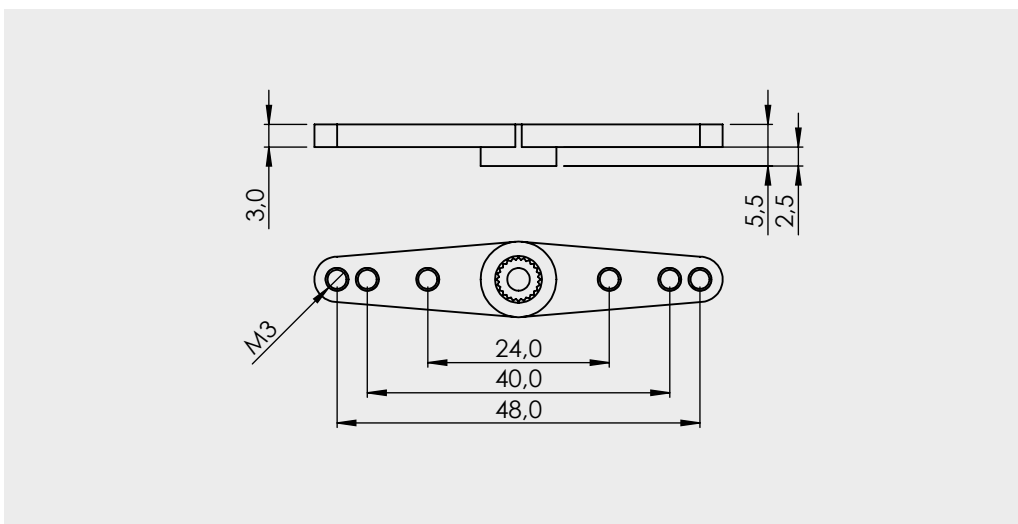
R-ML24



R-M024

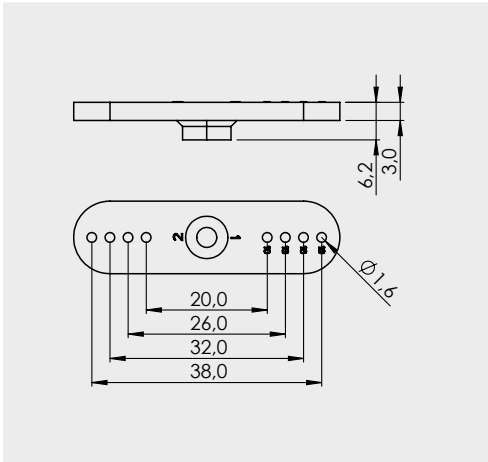


Q-MI24

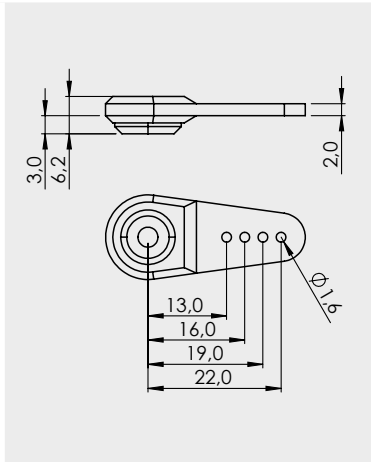


H25T (Ø6,0)

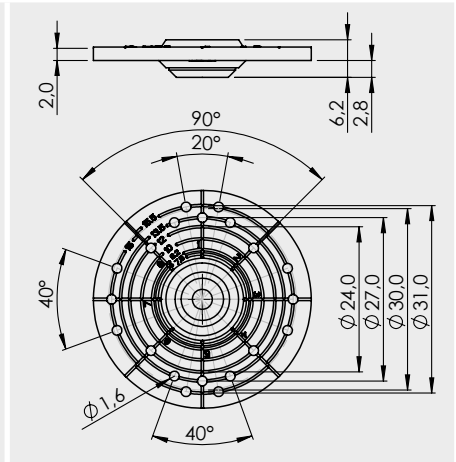
HD-IM25



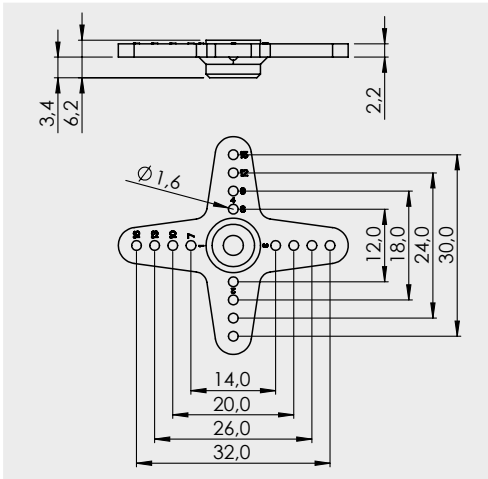
HD-LS25



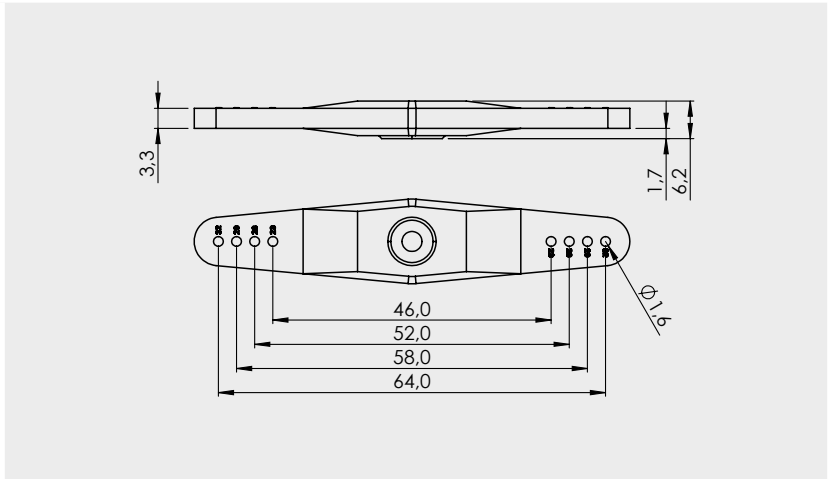
HD-OS25



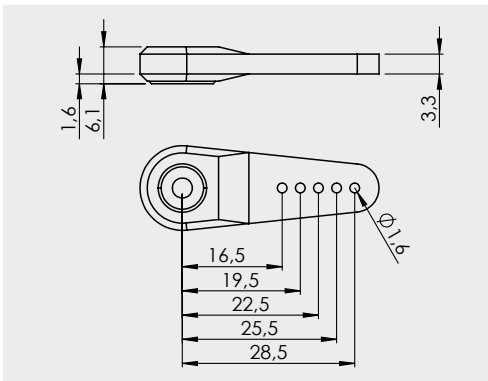
HD-XS25



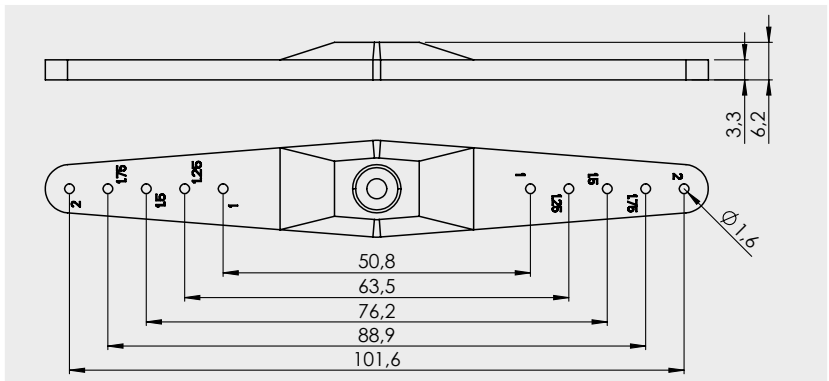
HD-IL25



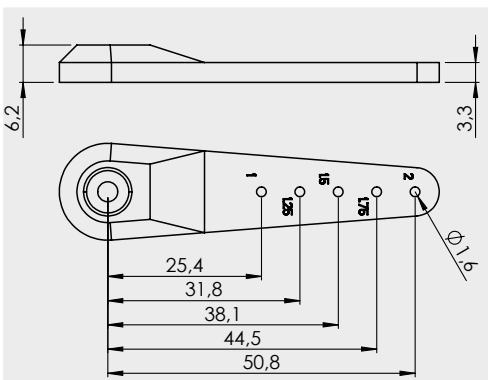
HD-LL25



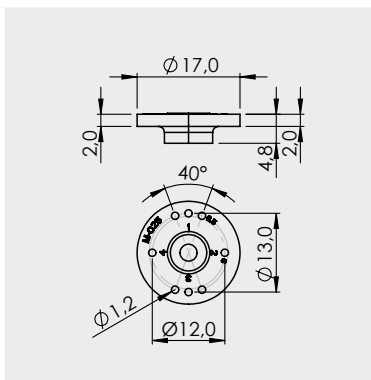
HD-IG25



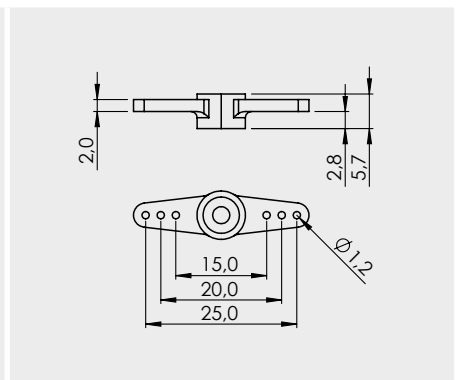
HD-LG25



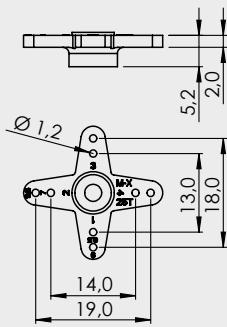
M-025



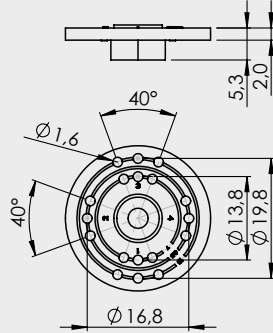
M-I25



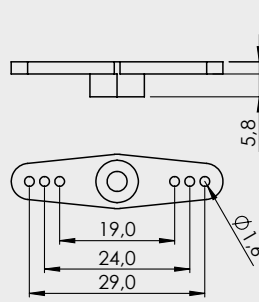
M-X25



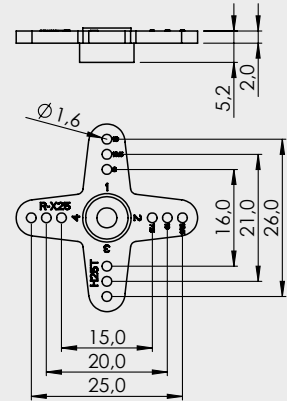
R-025



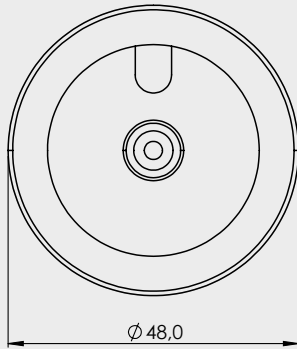
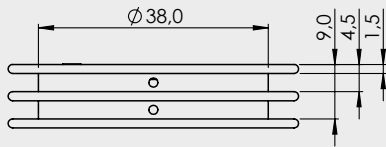
R-I25



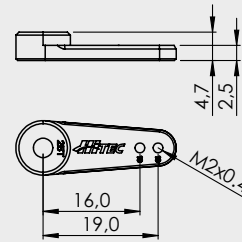
R-X25



SP-25

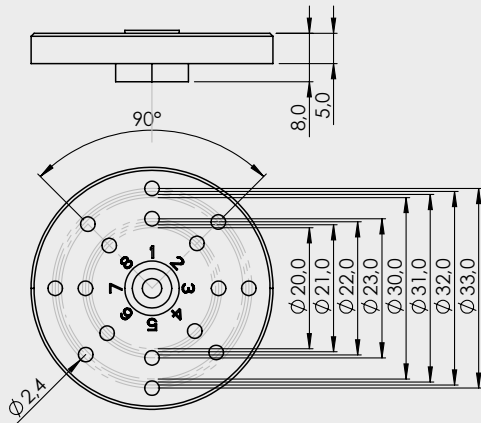


R-ML25

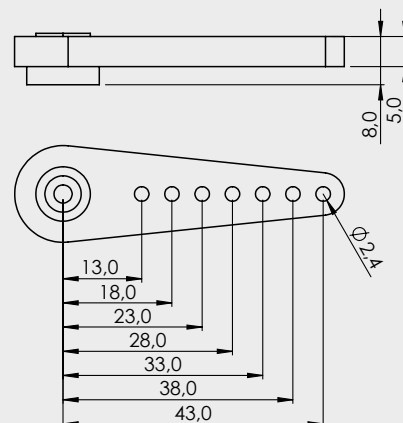


15T (Ø8,0)

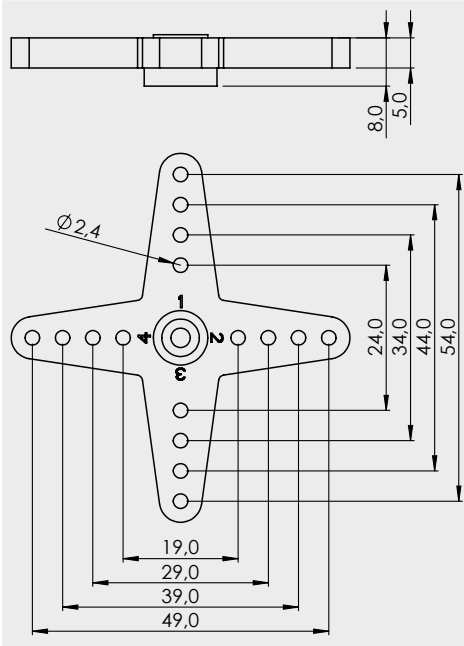
Q-0A15



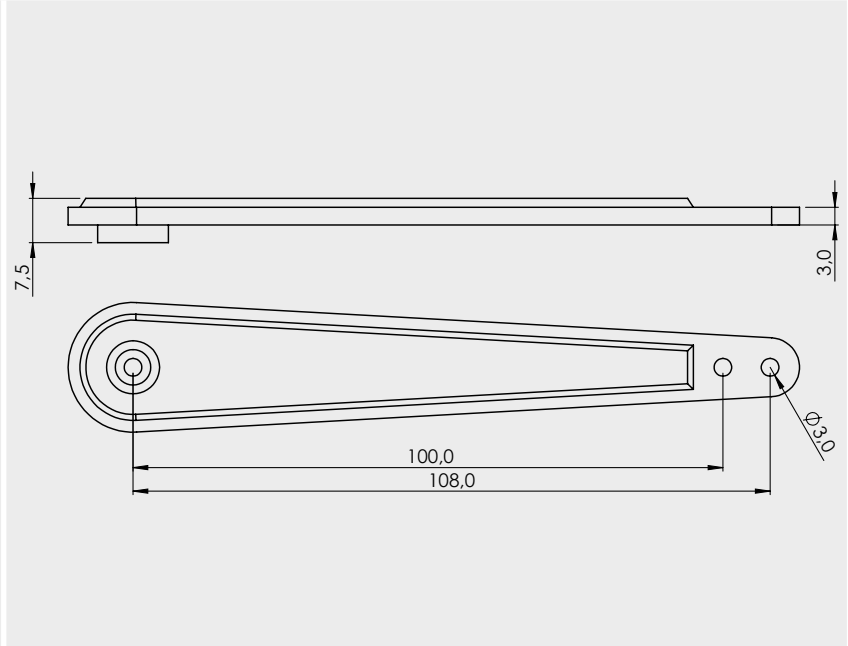
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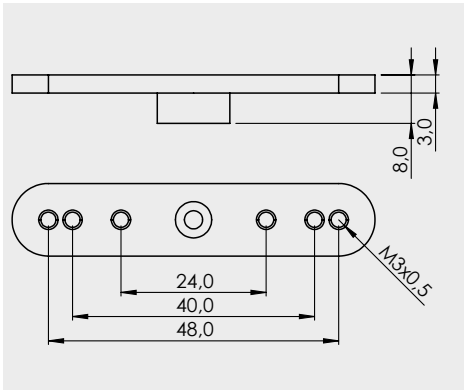
Q-XA15



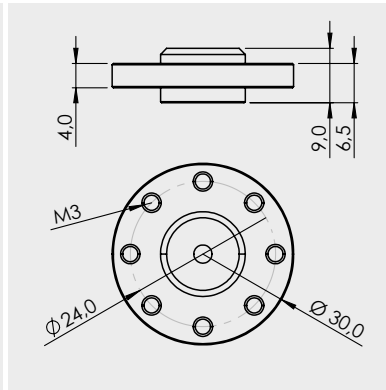
825SA-15



Q-MIA15



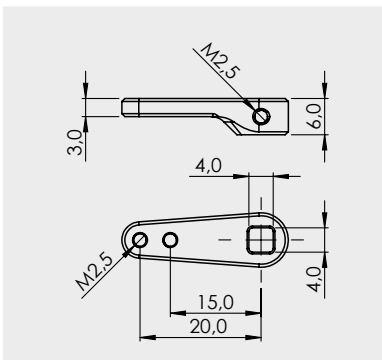
I-M015



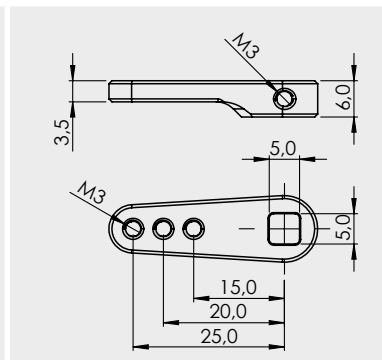
SQUARE 4

SQUARE 5

MIS4-A

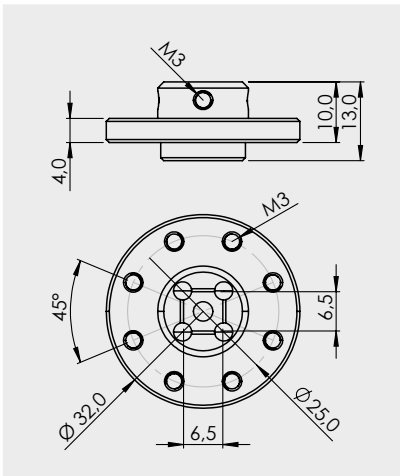


MIS5-A

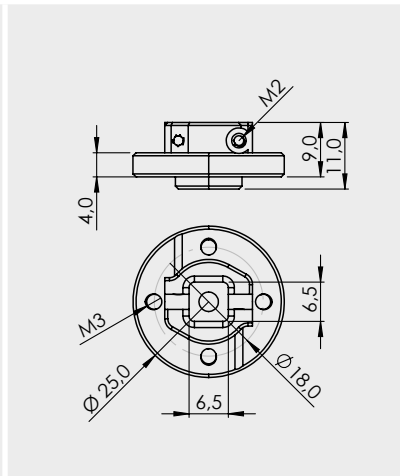


SQUARE 6.5

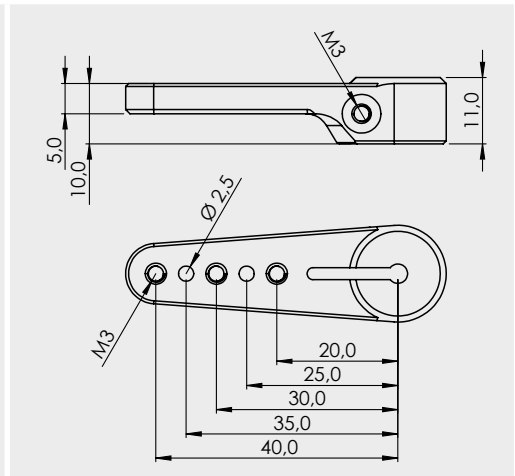
MOS6.5-S



MOS6.5-A



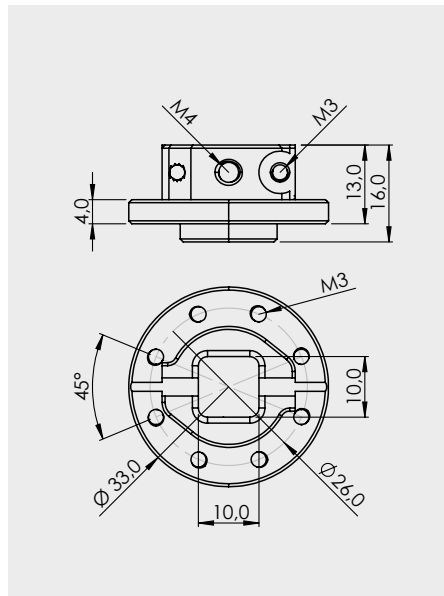
MIS6.5-A



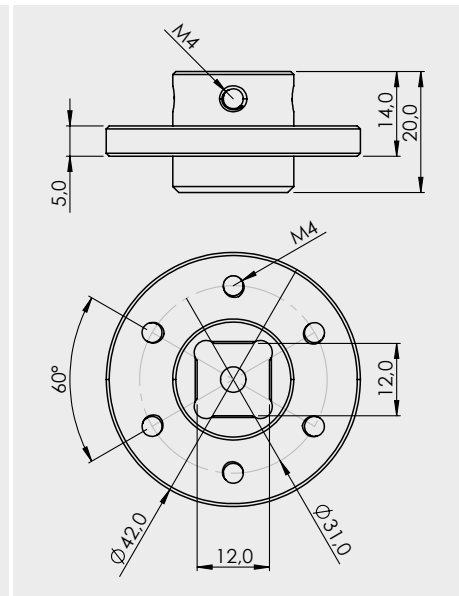
SQUARE 10

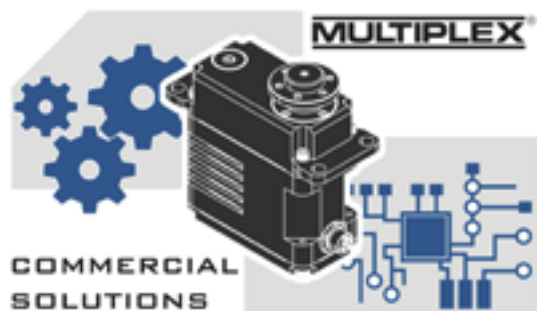
SQUARE 12

MOS10-A



MOS12-S





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