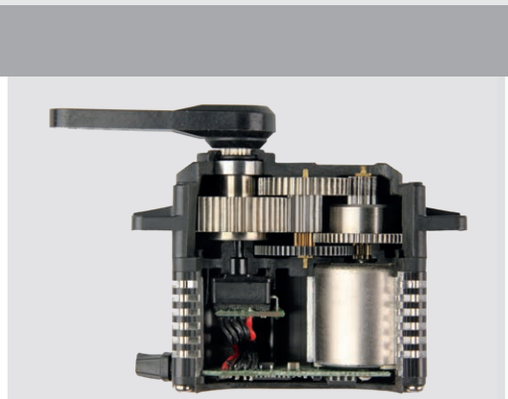
MULTIPLEX®

COMMERCIAL
SOLUTIONS

Innovative Lösungen für industrielle Anwendungen
Innovative Commercial Solutions



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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MULTIPLEX Modellsport GmbH & Co.KG

Hitec RCD Korea, Inc.

Hitec Group USA, Inc.

Hitec-MULTIPLEX Japan, Inc.

Hitec RCD Philippines, Inc.

PRODUKTÜBERSICHT

Servos und Linear Aktuatoren

Servo Zubehör

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 Geräuschentwicklung 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, UAVCAN, 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 2ms. 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 Geräuschentwicklung durch hohe Motor-Ansteuerfrequenz
- Höhere Leistungsaufnahme

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 UAVCAN-Kommunikation

Der Industrie- und UAV-Bereich gewinnt zunehmend an Bedeutung. Dieser zukunftsträchtige, 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, DRONECAN, UAVCAN

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.

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.


HiTEC
SG33BL
1WF1601001B019
SG33BL
1WF1601001B019
SG33BL
1WF1601001B019

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.

Since 2002, MULTIPLEX Modellsport GmbH & Co.KG, based in Bretten, Germany, is part of the South Korean HITEC Group.

The products of Hitec RCD Korea, Inc. are used worldwide and, due to their diversity, are suitable for a wide variety of applications. For example, they are used as servos in the UAV sector, as actuators for automation and handling tasks in industry, or as actuators for the active aerodynamics of a racecar.

We will be happy to send you detailed specifications and additional information on request.

Contact us under:
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Hitec RCD Philippines, Inc.

PRODUCT OVERVIEW

ANALOGUE ACTUATORS

Analogue actuators are generally low-priced to mid-priced items, and most of them are equipped with inexpensive components. The motor is always a D.C. brushed unit. Actuators offer no user-programmable options. Communication is always based on a PWM signal with a frequency of 50Hz. The motor PWM is the same as the control frequency, i.e. it is also 50Hz. This means that the possibility to control activity (motor on or motor off) only occurs every 20ms. Slow movements or small corrections result in long motor-off periods in relation to motor-on periods. The motor voltage is always the same as the power supply voltage.

Advantages:

- Reasonable price
- Pleasant running sound thanks to low motor frequency
- Low power consumption

Disadvantages:

- Low holding moment
- Slow response characteristics
- Low resolution due to low control frequency
- Wide deadband (20ms)
- Slow movements may not be smooth

DIGITAL ACTUATORS

Digital actuators generally fall in the high mid-range to high-price category. Very high-quality components may be used, such as Hall sensors for position sensing, as well as brushless D.C. motors. Communication is based on a PWM signal with frequencies up to 330Hz (according to actuator type) or other interfaces such as CAN, UAVCAN, RS-485 or TTL. The motor frequency is independent of the control system and is usually in the range 300 - 500Hz. This results in a very small possible deadband of up to 2ms. Digital actuators also offer wide-ranging programming and protective functions, as well as allowing two-way communication (feedback) depending on type.

Advantages:

- Fast response characteristics
- Fast corrective activity
- High holding power
- User-variable deadband
- Good accuracy
- Two-way communication
- Programmability
- Safety functions
- High resolution

Disadvantages:

- In most cases more expensive
- In some cases unpleasant running sound due to high motor frequency
- Higher power consumption

INTERFACES

PWM communication

The conventional method of controlling Hitec actuators, with many advantages for simple tasks. Hitec PWM actuators can be controlled using a pulse width of 900 to 2100µs. The usual control frequency is 50Hz (20ms), but frequencies up to 330Hz are possible with particular actuator types for special applications.

Actuators with PWM communication can easily be controlled at low cost, and they are adequate for many applications where feedback is not required.

The interface is in widespread use, and many controllers offer suitable presets and libraries.

Pin layout of Hitec PWM actuators*

RS485 and TTL communication

There are a number of applications in several fields of operation for which feedback of the actual servo position is required, or at least desirable. Certain Hitec actuators are also available with RS485 and TTL interfaces, which enable them to work with two-way communication (feedback).

Hitec RS485 and TTL actuators communicate with external devices using the half-duplex process. TTL actuators of this type feature just one signal wire in addition to the voltage and earth conductors, whereas RS485 actuators feature two signal wires.

Pin layout of Hitec TTL actuators*

Pin layout of Hitec RS485 actuators*

CAN and UAVCAN communication

The industrial and UAV field is becoming increasingly significant. This progressive, fast and technically highly complex market demands innovation and reliability. Many applications require intelligent solutions and genuine feedback of position, torque and other parameters in order to assess the application or to gain information about the condition of the components.

The following protocols are available: CAN 2.0A, CAN 2.0B, DRONECAN, UAVCAN

Pin layout of Hitec CAN actuators (not applicable to the SG-series)

* Can be supplied fitted with the client's choice of connectors upon request.

FEATURE SUMMARY

Mid-point and end-point adjustment (EPA / Neutral Settings)

Provides programmable mid-point and end-point servo positions.

Direction of rotation

Clockwise (CW) = when viewed from above, the servo output rotates clockwise when the signal width is increased.

Counter-Clockwise (CCW) = when viewed from above, the servo output rotates counter-clockwise when the signal width is increased.

Deadband (DB width)

The smaller the deadband, the sooner any corrective activity takes place when an angular change occurs. If the deadband is too low for the application, the result will be increased wear. Increasing the deadband results in loss of precision.

Travel speed

The servo's transit speed: 100% equates to maximum possible travel speed.

ID-read / Node-ID

Assignment of an actuator ID in TTL and CAN networks.

Fail Safe

If the signal is lost, the servo rotates to a pre-selected position.

Fail Safe limp mode

The servo goes into sleep mode: the motor is disabled and the servo position is not maintained. The servo can be moved by hand.

Soft Start setting

When switched on, the servo runs to the nominal position at low speed in order to minimise stress on the gearbox and peripherals. At the 100% setting the servo runs to the nominal position with maximum transit speed when switched on.

Overload protection

Protection mechanism designed to avoid damage to the servo if it is overloaded or stalled. A setting of 20% corresponds to a reduction in maximum torque by 80%.

Smart sense

An intelligent regulatory circuit adjusts the control parameters while the servo is in use, in order to reduce oscillation. Oscillation can be provoked by fluctuating inertia levels in the various applications.

It is also possible to influence the regulatory circuit manually (sensitivity ratio settings). A high value may result in high-speed oscillation at the servo. A low value may generate severely damped response characteristics.

SERIES SUMMARY

HLS-series (Linear Actuators)

Electrical linear actuators generating straight-line travel movements, making them suitable as replacements for pneumatic and hydraulic cylinders in many applications.

SG-series (Industrial Servos)

The premium industrial servo line, consistently developed for requirements in the fields of automation, unmanned aviation and robotics. Basic equipment includes a powerful BLDC motor, a Hall sensor for zero-contact, zero-wear position sensing, and watertight construction. All SG-series servos also feature a Multi-Turn* and Continuous-Rotation** function.

HSB-series (Brushless Servos)

Mid-priced servo motors with powerful BLDC motors.

HSR-series (Servos with Multi-Turn)

Mid-priced servo motors with Multi-Turn* and in some cases Continuous-Rotation** function. Most are equipped with a BLDC motor.

D-series (Digital Servos)

Mid-priced digital servo motors with a coreless or brushed motor. Fitted with a high-quality potentiometer for position sensing.

MD-series (Digital Servos with Magnetic Encoder)

Mid-priced digital servo motors with a coreless or brushed motor. Fitted with a Hall sensor for position sensing.

DB-series (Brushless Servos)

Mid-priced digital servo motors with powerful BLDC motors. Fitted with a high-quality potentiometer for position sensing.

MDB-series (Brushless Servos with Magnetic Encoder)

Mid-priced digital servo motors with powerful BLDC motors. Fitted with a Hall sensor for position sensing.

MDR-series (Digital Servos with Magnetic Encoder and Multi-Turn)

Mid-priced digital servo motors with Multi-Turn* and in some cases Continuous-Rotation** function. Fitted with a coreless or brushed motor. Fitted with a Hall sensor for position sensing.

HS-series (Hitec Servo)

Low-priced analogue servo motors, fitted with a brushed motor and a potentiometer for position sensing.

HS-1XXX, HS-5XXX, HS-7XXX series (Hitec Servo)

Mid-priced digital servo motors fitted with a coreless or brushed motor and a potentiometer for position sensing.

*: Several rotations are possible for maximum angular travel.
**: The servo is capable of continuous rotation.


HiTEC
SG50BL
105CCN24V5520-MMTH
SG50BL
105CCN24V5520-MMTH
SG50BL
105CCN24V5520-MMTH

TWO-WAY COMMUNICATION (FEEDBACK)

Absolute position

The control system no longer has to rely on an actuator actually taking up the desired position; instead its current position can be read off with a resolution of 4096 steps.

Torque

Torque is a particularly important feature, as it allows the user to make assessments of the actual loads when the actuator is in use, as well as the condition of the components. Stiff mechanical systems can be detected and corrected in good time before they result in actuator overload. The torque value is derived from the motor PWM, and is therefore not an actual measurement, but it is adequately precise for the majority of applications.

Speed

How fast is the actuator when actually in use by the application? The actuator itself supplies the answer, thereby permitting important inferences to be drawn for many a control task.

Power supply voltage

The actuator constantly provides information on the momentary power supply voltage. The development or maintenance team can use this to detect potential weak points in the cable loom, for example: enabling high-resistance connectors to be replaced in good time.

Current drain

Current is the most important feedback element in preventing potential damage. Rising current over a given period of operation under a constant load is a reliable indication of an imminent fault. This may relate to the motor, the gearbox or the mechanical system being moved. Monitoring current drain opens up new possibilities in programming: effective system life can be extended by targeted optimisation of the internal control system (PID) and other parameters such as Soft Start (ramp) or deadband.

Micro-controller temperature

The temperature of the micro-controller is more than just a useful piece of information. Environmental conditions which include wide thermal variation can be very demanding on an actuator. Monitoring temperature in this way allows the development team to learn the thermal limits of the product, and to introduce appropriate measures to prevent premature failure.

Motor temperature

Are you asking too much of the actuator you are using? The motor temperature provides reliable information on whether an actuator is being operated close to its limit. This feedback is very important, especially if thermal conditions are widely variable.

Cycle counter

How many cycles does the actuator complete during use? How many parts were positioned? When must the actuator be replaced because the maximum cycle count has been reached? Some of our actuators supply this feedback in a convenient manner as part of the protocol.

PROTOCOL-FEEDBACK-LIST

Series	Item Name	Available Protocol				
		PWM	TTL	RS485	CAN	UAVCAN
D Series	D485HW	x	x			
	D646WP	x	x			
	D951TW	x	x			
	D954SW	x	x			
	D980TW	x	x			
DB Series	DB961WP	x	x			
HSB Series	HSB-M9381TH	x	x			
MD Series	MD1100WP	x	x			
	MD250MW	x	x			
	MD485HW	x	x			
	MD85MG	x	x			
MD-CAN Series	MD145SW-CAN				x	x
	MD245MW-CAN				x	x
	MD250MW-CAN				x	x
	MD65MG-CAN				x	x
	MD70MH-CAN				x	x
	MD85MG-CAN				x	x
	MD950TW-CAN				x	x
	MD89MW-CAN				x	x
MDR Series	MDR845WP	x	x			
MD-RS485 Series	MD245MW-RS485			x		
	MD250MW-RS485			x		
	MD950TW-RS485			x		
SG Series	SG33BL-T-12V	x	x	x		
	SG33BL-T-24V	x	x	x		
SG-CAN Series	SG33BL-T-CAN-12V				x	x
	SG33BL-T-CAN-24V				x	x
	SG50BL-T-CAN 24V				x	x

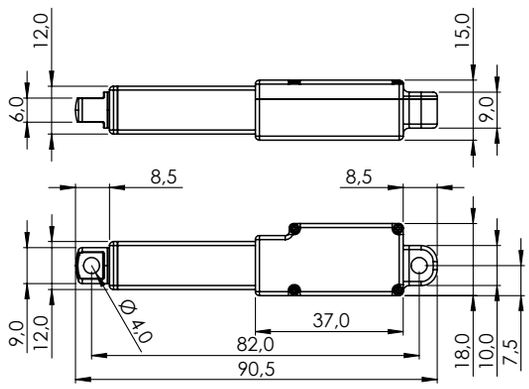
		Available Feedback							
Series	Item Name	POSITION	SPEED	TORQUE *	VOLTAGE	CURRENT	TURN COUNT	TEMP (MCU)	TEMP (MOTOR)
D Series	D485HW	x							
	D646WP	x							
	D951TW	x							
	D954SW	x							
	D980TW	x							
DB Series	DB961WP	x							
HSB Series	HSB-M9381TH	x		x	x				
MD Series	MD1100WP	x							
	MD250MW	x							
	MD485HW	x							
	MD85MG	x							
MD-CAN Series	MD145SW-CAN	x	x	x	x		x	x	
	MD245MW-CAN	x	x	x	x		x	x	
	MD250MW-CAN	x	x	x	x		x	x	
	MD65MG-CAN	x	x	x	x		x	x	
	MD70MH-CAN	x	x	x	x		x	x	
	MD85MG-CAN	x	x	x	x		x	x	
	MD950TW-CAN	x	x	x	x		x	x	
	MD89MW-CAN	x	x	x	x	x	x	x	x
MDR Series	MDR845WP	x	x	x	x		x **	x	
MD-RS485 Series	MD245MW-RS485	x							
	MD250MW-RS485	x							
	MD950TW-RS485	x							
SG Series	SG33BL-T-12V	x	x	x	x		x **	x	x
	SG33BL-T-24V	x	x	x	x		x **	x	x
SG-CAN Series	SG33BL-T-CAN-12V	x	x	x	x	x	x	x	x
	SG33BL-T-CAN-24V	x	x	x	x	x	x	x	x
	SG50BL-T-CAN 24V	x	x	x	x	x	x	x	x

Due to possible software changes, there may be differences in features and feedback. All information in this overview is provided without guarantee.

*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 sparate counter.

HLS12-3050, HLS12-30210, HLS12-30380

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

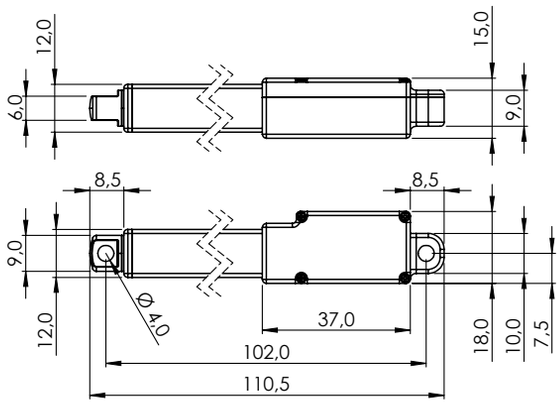


General Specification	HLS12-30XXX								
Control System	Pulse Width Modulation (PWM) 1000usec ~ 2000usec								
Position Sensor Type	-								
Operating Voltage Range	4.8 ~ 7.4V								
Motor Type	Cored Metal Brush								
Controller (MCU)	32Bits Programmable Digital								
Lead Screw	Lead 5mm								
Stroke Option	30mm								
Repeatability	±0.2mm								
Gear Ratio	50:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V		
No Load Speed	30.9mm/s			7.5mm/s			4.1mm/s		
No Load Running Current	130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (12.1N)	23.5mm/s	250mA	4.4kg (43.6N)	5.6mm/s	250mA	8.0kg (78.7N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	7.7kg (75.1N)	4.0mm/s	370mA	12.4kg (121.1N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.6N)	8.2mm/s	490mA	9.9kg (96.9N)	2.8mm/s	490mA	14.8kg (145.3N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.3N)			12.4kg (121.1N)			22.2kg (218.0N)		
Stall Current	620mA								
Max Static Force	247N (above)								
Max Side Load (Extended)	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	-								
Outline 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								
Dust & Water Protection class	IP4X								
Revision	Rev. 1.0 / 16.03.2022								
Changelog	-								

*of the servo only w/o horns and accessories

HLS12-5050, HLS12-50210, HLS12-50380

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

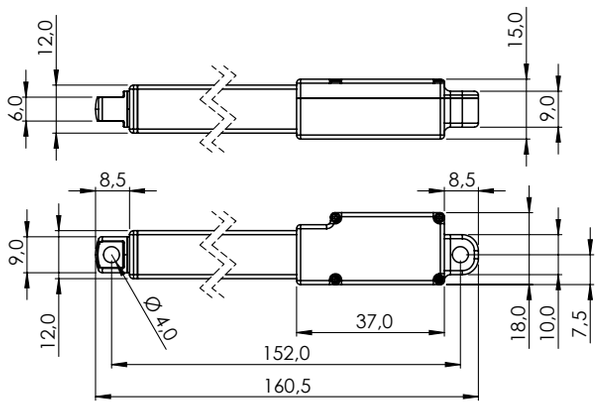


General Specification	HLS12-50XXX								
Control System	Pulse Width Modulation (PWM) 1000usec ~ 2000usec								
Position Sensor Type	-								
Operating Voltage Range	4.8 ~ 7.4V								
Motor Type	Cored Metal Brush								
Controller (MCU)	32Bits Programmable Digital								
Lead Screw	Lead 5mm								
Stroke Option	50mm								
Repeatability	±0.3mm								
Gear Ratio	50:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V		
No Load Speed	30.9mm/s			7.5mm/s			4.1mm/s		
No Load Running Current	130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (12.1N)	23.5mm/s	250mA	4.4kg (43.6N)	5.6mm/s	250mA	8.0kg (78.7N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	7.7kg (75.1N)	4.0mm/s	370mA	12.4kg (121.1N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.6N)	8.2mm/s	490mA	9.9kg (96.9N)	2.8mm/s	490mA	14.8kg (145.3N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.3N)			12.4kg (121.1N)			22.2kg (218.0N)		
Stall Current	620mA								
Max Static Force	247N (above)								
Max Side Load (Extended)	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	-								
Outline 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								
Dust & Water Protection class	IP4X								
Revision	Rev. 1.0 / 16.03.2022								
Changelog	-								

*of the servo only w/o horns and accessories

HLS-10050, HLS-100210, HLS-100380

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

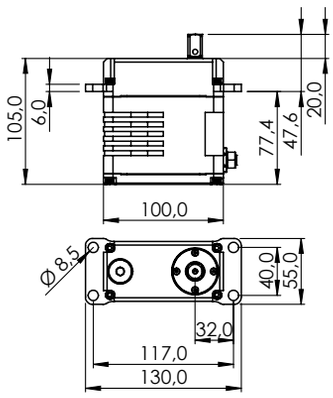


General Specification	HLS12-100XXX								
Control System	Pulse Width Modulation (PWM) 1000usec ~ 2000usec								
Position Sensor Type	-								
Operating Voltage Range	4.8 ~ 7.4V								
Motor Type	Cored Metal Brush								
Controller (MCU)	32Bits Programmable Digital								
Lead Screw	Lead 5mm								
Stroke Option	100mm								
Repeatability	±0.5mm								
Gear Ratio	50:1			210:1			380:1		
Voltage	At 7.4V			At 7.4V			At 7.4V		
No Load Speed	30.9mm/s			7.5mm/s			4.1mm/s		
No Load Running Current	130mA			130mA			130mA		
Load Spec	Load	Speed	Current	Load	Speed	Current	Load	Speed	Current
Maximum Efficiency Point	1.2kg (12.1N)	23.5mm/s	250mA	4.4kg (43.6N)	5.6mm/s	250mA	8.0kg (78.7N)	3.1mm/s	250mA
Peak Power Point	2.1kg (20.6N)	17.3mm/s	370mA	7.7kg (75.1N)	4.0mm/s	370mA	12.4kg (121.1N)	2.3mm/s	370mA
Max Force (Lifted)	2.7kg (26.6N)	8.2mm/s	490mA	9.9kg (96.9N)	2.8mm/s	490mA	14.8kg (145.3N)	1.5mm/s	490mA
Stall Torque	3.1kg (30.3N)			12.4kg (121.1N)			22.2kg (218.0N)		
Stall Current	620mA								
Max Static Force	247N (above)								
Max Side Load (Extended)	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	-								
Outline 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								
Dust & Water Protection class	IP4X								
Revision	Rev. 1.0 / 16.03.2022								
Changelog	-								

*of the servo only w/o horns and accessories

SG50BL-CAN-24V (CIRCULAR)

#1-02412

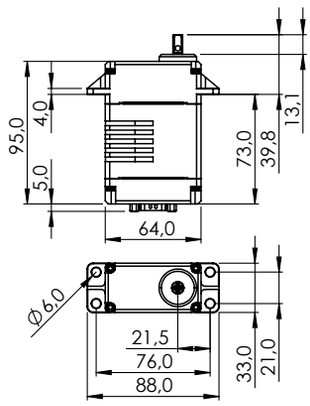


General Specification	SG50BL-CAN-24V (Circular)			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
No Load Speed	120°/s (20RPM)			
Stall Torque	520.0kgcm (5099,46Ncm)			
Idle Current	45mA			
No Load Running Current	300mA			
Stall Current	10,000mA			
Deadband Width	-			
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	-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 516.6			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	-			
Outline Dimensions	100.0 x 50.0 x 105.0mm			
Weight*	1450g			
Ball Bearing	4 Angular Ball Bearings & 9 Needle Bearings			
Case Material	Rugged Aluminium Alloy			
Gear Material	Hardened Steel Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Square 12.0 x 12.0			
Accessories	I-MOS12			
Dust & Water Protection class	IP68			
Revision & Stand	Rev. 1.0 / 17.03.2022			
Changelog	-			

*of the servo only w/o horns and accessories

SG33BL-T-12V/24V (DSUB)

#1-00932, #1-02462



General Specification	SG33BL-T-12V (DSUB)	
Control System	Pulse Width Modulation (PWM) / TTL (Half Duplex)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	DB-9 SUB	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Controller (MCU)	32 Bit Programmable Digital	
Operating Voltage Range	9.0V ~ 15.0V	
Operating Voltage	At 12.0V	
No Load Speed	324°/s (54RPM)	
Stall Torque	147.0kgcm (1441.58Ncm)	
Idle Current	45mA	
No Load Running Current	500mA	
Stall Current	10,000mA	
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	-	
Outline Dimensions	64.0 x 33.0 x 95.0mm	
Weight*	480.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminium Alloy	
Gear Material	1 Metal-Plastic & 3 Harden Steel Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	I-MOS	
Dust & Water Protection class	IP68	
Revision & Stand	Rev. 1.0 / 17.03.2022	
Changelog	-	

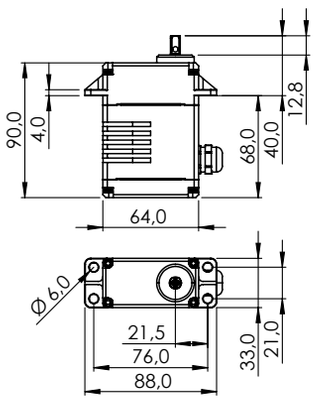
*of the servo only w/o horns and accessories

General Specification	SG33BL-T-24V (DSUB)	
Control System	Pulse Width Modulation (PWM) / TTL (Half Duplex)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	D-SUB9	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Controller (MCU)	32 Bit Programmable Digital	
Operating Voltage Range	18.0V ~ 32.0V	
Operating Voltage	At 24.0V	
No Load Speed	324°/s (54RPM)	
Stall Torque	147.00kgcm (1441.58Ncm)	
Idle Current	20mA	
No Load Running Current	230mA	
Stall Current	6,400mA	
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	
Connector Wire Length	-	
Connector Wire Gauge	-	
Connector Wire Strand Count	-	
Outline Dimensions	64.0 x 33.0 x 95.0mm	
Weight*	480.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminium Alloy	
Gear Material	1 Metal-Plastic & 3 Hardened Steel Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	I-MOS	
Dust & Water Protection class	IP68	
Revision & Stand	Rev. 1.0 / 17.03.2022	
Changelog	-	

*of the servo only w/o horns and accessories

SG33BL-T-24V (GLAND CABLE)

#1-02463

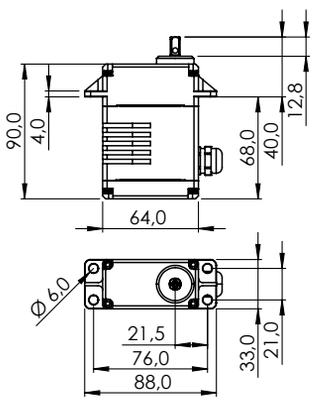


General Specification	SG33BL-T-24V (Gland Cable)	
Control System	Pulse Width Modulation (PWM) / TTL (Half Duplex)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	-	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	BLDC	
Controller (MCU)	32 Bit Programmable Digital	
Operating Voltage Range	18.0V ~ 32.0V	
Operating Voltage	At 24.0V	
No Load Speed	324°/s (54RPM)	
Stall Torque	147.00kgcm (1441.58Ncm)	
Idle Current	20mA	
No Load Running Current	230mA	
Stall Current	6,400mA	
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	
Connector Wire Length	400mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	64.0 x 33.0 x 95.0mm	
Weight*	480.0g	
Ball Bearing	6 Ball Bearings & 2 Needle Bearings	
Case Material	Rugged Aluminium Alloy	
Gear Material	1 Metal-Plastic & 3 Hardened Steel Gears	
Gear Train Backlash	Max 0.5°	
Horn Gear Spline	Square 6.5 x 6.5	
Accessories	I-MOS	
Dust & Water Protection class	IP68	
Revision & Stand	Rev. 1.0 / 17.03.2022	
Changelog	-	

*of the servo only w/o horns and accessories

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

#1-02345

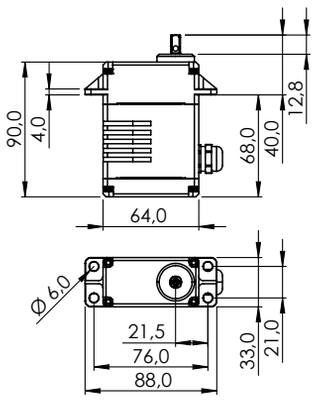


General Specification	SG33BL-T-CAN-12V (Gland Cable)			
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	-			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	9.0 ~ 15.0V			
Operating Voltage	At 12.0V			
No Load Speed	324°/s (54RPM)			
Stall Torque	147.0kgcm (1441.58Ncm)			
Idle Current	45mA			
No Load Running Current	500mA			
Stall Current	10,000mA			
Deadband Width	4 step			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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 ~ +70°C (-4°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at No Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	400mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80EA			
Outline Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	475.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminium Alloy			
Gear Material	1 Metal-Plastic-Metal & 3 Hardened Steel Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	I-MOS			
Dust & Water Protection class	IP68			
Revision & Stand	Rev. 1.0 / 17.03.2022			
Changelog	-			

*of the servo only w/o horns and accessories

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

#1-02464

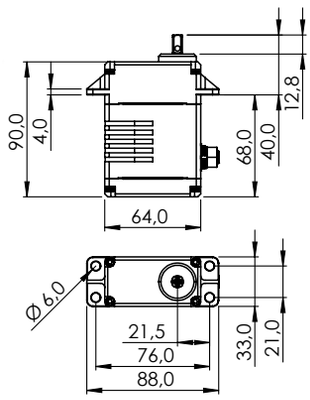


General Specification	SG33BL-T-CAN-24V (Gland Cable)			
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	-			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
No Load Speed	324°/s (54RPM)			
Stall Torque	147.0kgcm (1441.58Ncm)			
Idle Current	20mA			
No Load Running Current	230mA			
Stall Current	6,400mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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 ~ +70°C (-4°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at No Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	400mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80EA			
Outline Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	500.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminium Alloy			
Gear Material	1 Metal-Plastic-Metal & 3 Hardened Steel Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, I-MOS			
Dust & Water Protection class	IP68			
Revision & Stand	Rev. 1.0 / 17.03.2022			
Changelog	-			

*of the servo only w/o horns and accessories

SG33BL-T-CAN-12V (CIRCULAR)

#1-02346

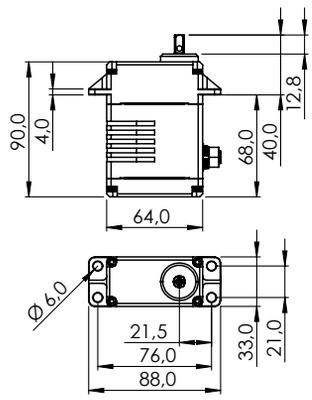


General Specification	SG33BL-T-CAN-12V (Circular)			
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	9.0 ~ 15.0V			
Operating Voltage	At 12.0V			
No Load Speed	324°/s (54RPM)			
Stall Torque	147.0kgcm (1441.58Ncm)			
Idle Current	45mA			
No Load Running Current	500mA			
Stall Current	10,000mA			
Deadband Width	4 step			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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 ~ +70°C (-4°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at No Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	-			
Outline Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	475.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminium Alloy			
Gear Material	1 Metal-Plastic-Metal & 3 Hardened Steel Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, I-MOS			
Dust & Water Protection class	IP68			
Revision & Stand	Rev. 1.0 / 17.03.2022			
Changelog	-			

*of the servo only w/o horns and accessories

SG33BL-T-CAN-24V (CIRCULAR)

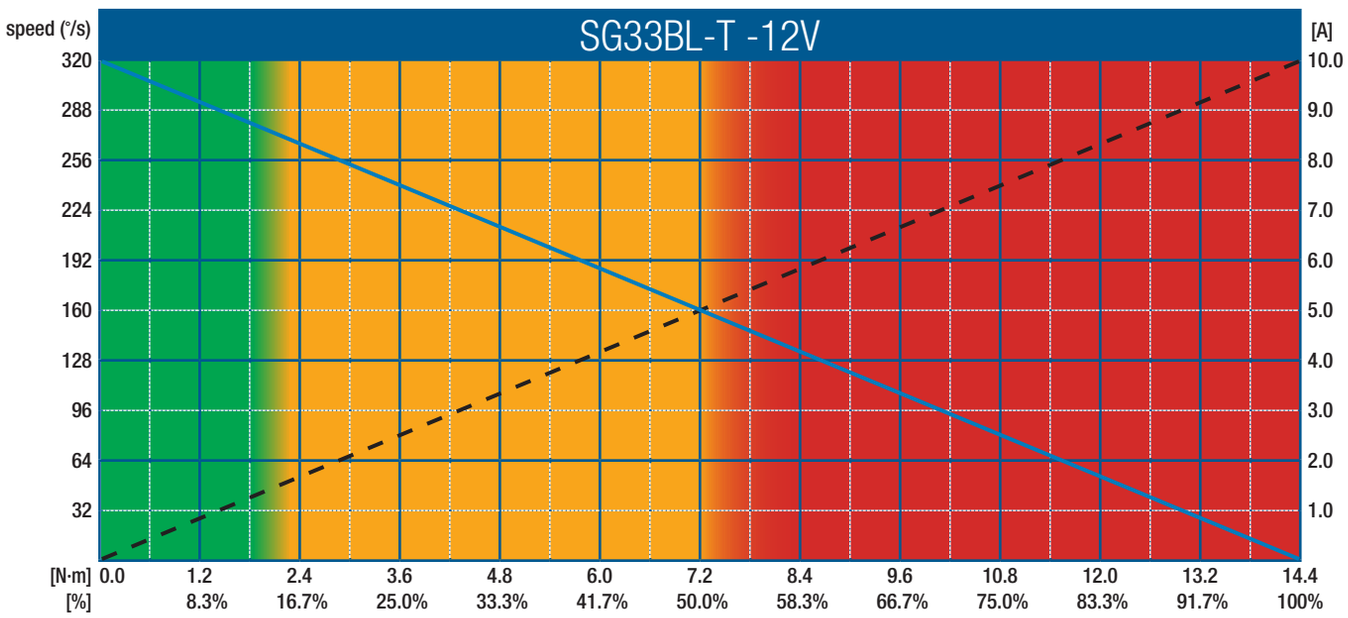
#1-02465

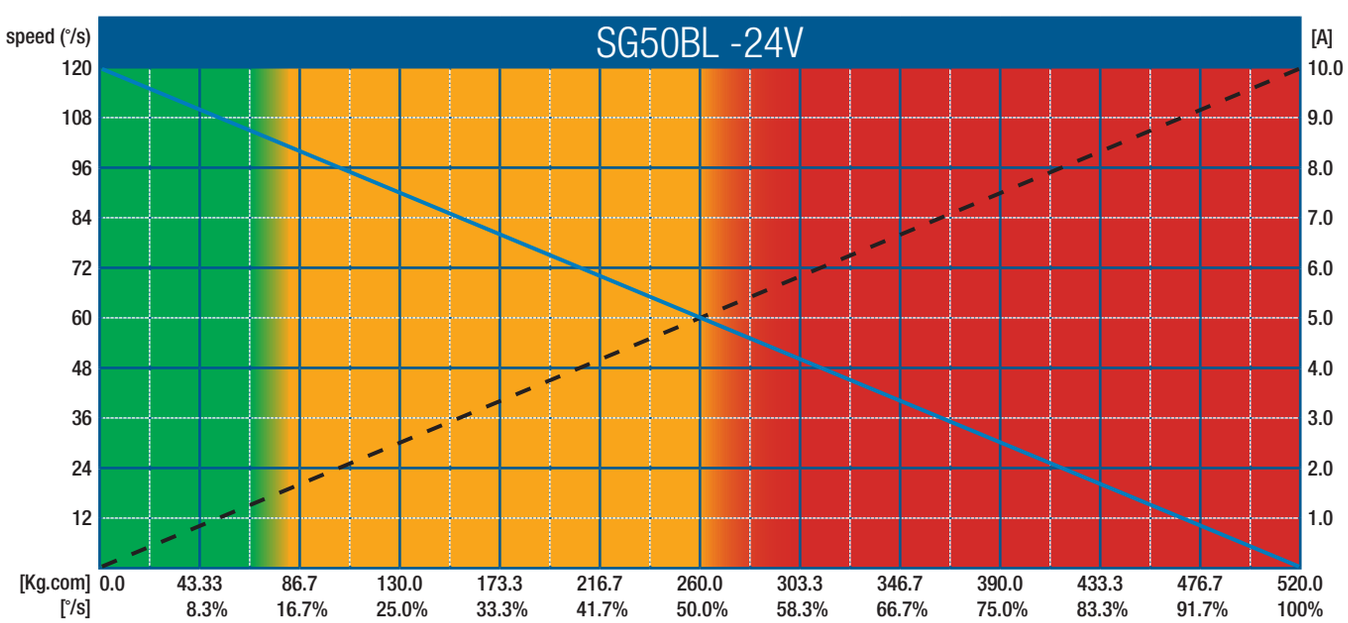


General Specification	SG33BL-T-CAN-24V (Circular)			
Control System	CAN BUS			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Circular			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	BLDC			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	18.0 ~ 32.0V			
Operating Voltage	At 24.0V			
No Load Speed	324°/s (54RPM)			
Stall Torque	147.0kgcm (1441.58Ncm)			
Idle Current	20mA			
No Load Running Current	230mA			
Stall Current	6,400mA			
Deadband Width	-			
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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 ~ +70°C (-4°F ~ +158°F)			
Storage Temperature Range	-40°C ~ +80°C (-40°F ~ +176°F)			
Vibrations at No Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	-			
Connector Wire Gauge	-			
Connector Wire Strand Count	80EA			
Outline Dimensions	64.0 x 33.0 x 90.0mm			
Weight*	475.0g			
Ball Bearing	6 Ball Bearings & 2 Needle Bearings			
Case Material	Rugged Aluminium Alloy			
Gear Material	1 Metal-Plastic-Metal & 3 Hardened Steel Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Square 6.5 x 6.5			
Accessories	Mounting Hardware, I-MOS			
Dust & Water Protection class	IP68			
Revision & Stand	Rev. 1.0 / 17.03.2022			
Changelog	-			

*of the servo only w/o horns and accessories

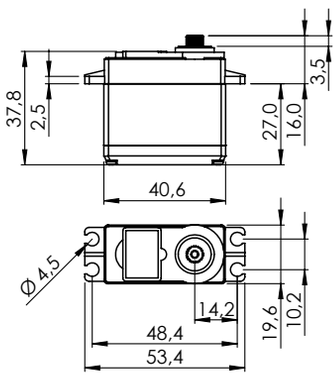
PERFORMANCE CHARTS





HSR-2645CR

#138645

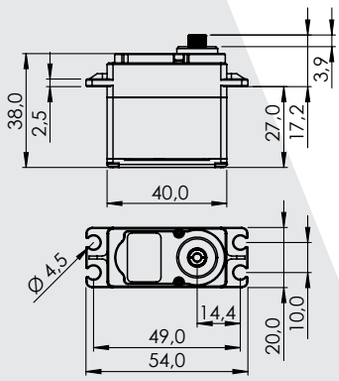


General Specification	HSR-2645CR	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	1500µs Neutral I 2000µs Frame
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Non	
Motor Type	Cored Carbon Brush	
Controller (MCU)	Digital Programmable	
Operating Voltage Range	4.8V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	276°/s (46RPM)	432°/s (72RPM)
Stall Torque	8.0kgcm (78.45Ncm)	12.0kgcm (117.68Ncm)
Idle Current	3mA	3mA
No Load Running Current	110mA	140mA
Stall Current	1,700mA	2,400mA
Deadband Width	-	-
Operating Travel	Default	-
	Programmable	-
	Multi Turn	n/a
	Continuous Rotation	yes
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	60EA	
Outline Dimensions	40.6 x 19.8 x 37.8mm	
Weight*	50.3g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Plastic-Metal & 3 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, R-O	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HSB-M9381TH

#1-01191

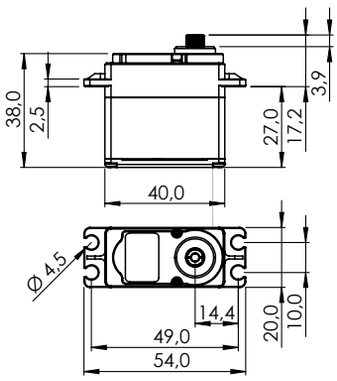


General Specification	HSB-M9381TH	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Semi Indirect Drive / 4 Slider / 1M Cylce Long Life	
Motor Type	BLDC	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
No Load Speed	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	34.0kgcm (333.43Ncm)	34.0kgcm (333.43Ncm)
Idle Current	27mA	27mA
No Load Running Current	250mA	250mA
Stall Current	2,700mA	2,100mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +70°C (-4°F ~ +158°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 38.0mm	
Weight*	78.0g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Rugged 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, HS-X25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HSB-9381TH

#1-00074

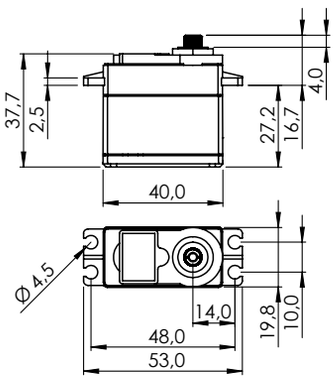


General Specification	HSB-9381TH	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cycle Long Life	
Motor Type	BLDC	
Controller (MCU)	16 Bit Programmable Digital	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
No Load Speed	353°/s (59RPM)	429°/s (71RPM)
Stall Torque	34.0kgcm (333.43Ncm)	34.0kgcm (333.43Ncm)
Idle Current	27mA	27mA
No Load Running Current	250mA	250mA
Stall Current	2,700mA	2,100mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	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	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 38.0mm	
Weight*	79.0g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Rugged 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, HS-X25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HSB-9485SH

#116485

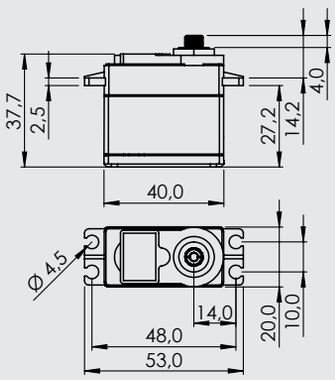


General Specification	HSB-9485SH	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cylce Long Life	
Motor Type	BLDC	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
No Load Speed	333°/s (56RPM)	400°/s (67RPM)
Stall Torque	23.0kgcm (225.55Ncm)	23.0kgcm (225.55Ncm)
Idle Current	30mA	30mA
No Load Running Current	300mA	300mA
Stall Current	1,100mA	900mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60° **
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 37.0mm	
Weight*	61.7g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Karbonite & 3 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HS-X25, HD-IL25, HD-LL25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories
** also available with 270°

HSB-9465SH

#116465

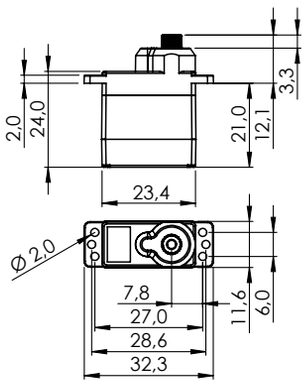


General Specification	HSB-9465SH	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cylce Long Life	
Motor Type	BLDC	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
No Load Speed	667°/s (111RPM)	587°/s (143RPM)
Stall Torque	13.5kgcm (132.39Ncm)	13.5kgcm (132.39Ncm)
Idle Current	30mA	30mA
No Load Running Current	250mA	200mA
Stall Current	1,100mA	900mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 37.0mm	
Weight*	62.2g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Karbonite & 3 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HS-X25, HD-IL25, HD-LL25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

MD65MG-CAN/UAVCAN

#1-01707, #1-01643

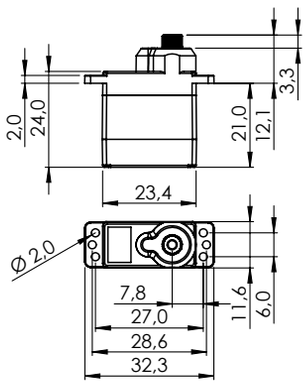


General Specification	MD65MG-CAN/UAVCAN			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	Cored			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 6.0V			
Operating Voltage	At 4.8V	At 6.0V		
No Load Speed	428.6°/s (71.4RPM)	545.5°/s (90.9RPM)		
Stall Torque	1.8kgcm (17,65Ncm)	2.2kgcm (21,58Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	180mA	220mA		
Stall Current	960mA	1,200mA		
Deadband Width	4Step	4Step		
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	28AWG			
Connector Wire Strand Count	20EA			
Outline Dimensions	23.6 x 11.4 x 25.8mm			
Weight*	12.8g			
Ball Bearing	Single Ball Bearing / MR85			
Case Material	Engineering Plastic			
Gear Material	1 Resin & 4 Metal Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Micro 25T Ø5.0			
Accessories	Mounting Hardware, MS-I25, MS-L25, MS-X25			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD70MH-CAN/UAVCAN

#1-01201, #1-01644

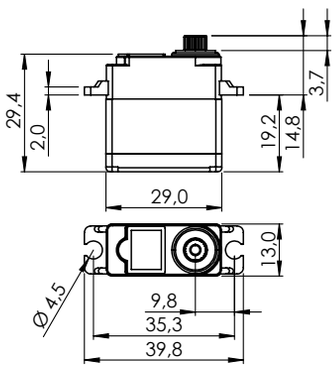


General Specification	MD70MH-CAN/UAVCAN			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Cored			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	4.8V ~ 7.8V			
Operating Voltage	At 6.0V	At 7.4V		
No Load Speed	400°/s (67RPM)	500°/s (83RPM)		
Stall Torque	3.1kgcm (30.40Ncm)	3.8kgcm (37.27Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	200mA	240mA		
Stall Current	1,000mA	1,300mA		
Deadband Width	4µs	4µs		
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	24AWG			
Connector Wire Strand Count	40EA			
Outline Dimensions	23.6 x 11.6 x 29.0mm			
Weight*	14.2g			
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	Micro 25T Ø5.0			
Accessories	Mounting Hardware, MS-I25, MS-L25, MS-X25			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD85MG

#1-01656

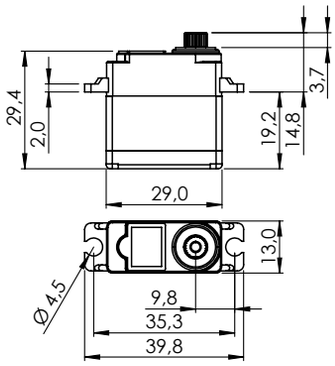


General Specification	MD85MG	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Magnetic Rotary Encoder	
Motor Type	DC Carbon Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	353°/s (59RPM)	462°/s (77RPM)
Stall Torque	3.6kgcm (35.30Ncm)	4.3kgcm (42.17Ncm)
Idle Current	-	30mA
No Load Running Current	-	-
Stall Current	-	1,800mA
Deadband Width	2µs	2µs
Operating Travel	**Default**	±60°
	Programmable	±160°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20EA	
Outline Dimensions	29.0 x 13.0 x 30.0mm	
Weight*	21.5g	
Ball Bearing	Single Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	5 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, M-I, M-X, M-O	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

MD85MG-CAN/UAVCAN

#1-01573, #1-01645

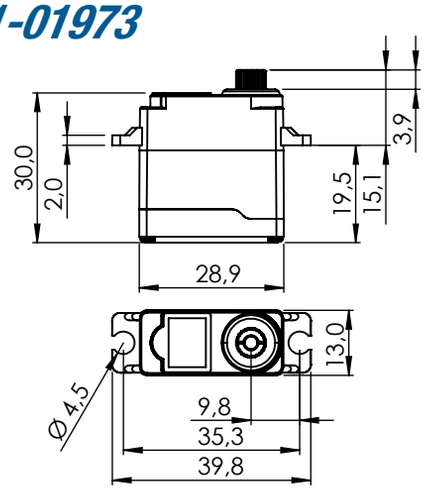


General Specification	MD85MG-CAN/UAVCAN			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	Cored			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 6.0V			
Operating Voltage	At 4.8V	At 6.0V		
No Load Speed	353°/s (59RPM)	462°/s (77RPM)		
Stall Torque	3.6kgcm (35.30Ncm)	4.3kgcm (42.17Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	320mA	380mA		
Stall Current	1,500mA	1,800mA		
Deadband Width	4Step	4Step		
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	28AWG			
Connector Wire Strand Count	20EA			
Outline Dimensions	29.0 x 13.0 x 30.0mm			
Weight*	22.7g			
Ball Bearing	Single Ball Bearing / MR106			
Case Material	Engineering Plastic			
Gear Material	5 Metal Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	24T Ø5.76			
Accessories	Mounting Hardware, M-I, M-X, M-O			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD89MW-CAN/UAVCAN

#1-01972, #1-01973

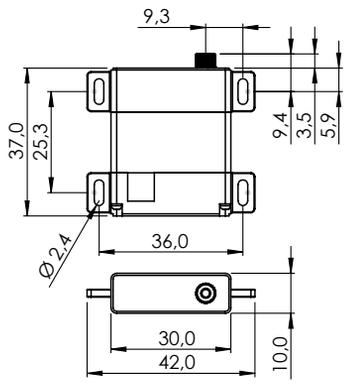


General Specification	MD89MW-CAN/UAVCAN			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Magnetic Encoder			
Motor Type	Coreless			
Controller (MCU)	32Bit programmable Digital			
Operating Voltage Range	4.0 ~ 8.4V			
Operating Voltage	At 4.8V	At 6.0V	At 7.4V	
No Load Speed	353°/s (59RPM)	462°/s (77RPM)	545°/s (91RPM)	
Stall Torque	5.3kgcm (51.98Ncm)	6.4kgcm (62.76Ncm)	8.5kgcm (83.36Ncm)	
Idle Current	30mA	30mA	30mA	
No Load Running Current	130mA	160mA	180mA	
Stall Current	1,800mA	2,200mA	2,700mA	
Deadband Width	-	-	-	
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	22AWG			
Connector Wire Strand Count	60EA			
Outline Dimensions	29.0 x 13.0 x 30.0mm			
Weight*	27.9g			
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, M-I, M-X, M-O			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD145SW-CAN/UAVCAN

#1-01787, #1-01641

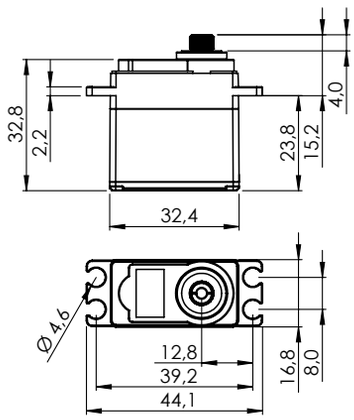


General Specification	MD145SW-CAN/UAVCAN			
Control System	CAN BUS			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	Cored			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 7.4V			
Operating Voltage	At 4.8V	At 7.4V		
No Load Speed	285°/s (47RPM)	428°/s (71RPM)		
Stall Torque	3.9kgcm (54.45Ncm)	6.0kgcm (83.78Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	120mA	180mA		
Stall Current	1,600mA	2,500mA		
Deadband Width	4Step	4Step		
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	24AWG			
Connector Wire Strand Count	40EA			
Outline Dimensions	30.0 x 10.0 x 37.0mm			
Weight*	27.7g			
Ball Bearing	Dual Ball Bearing / MR85			
Case Material	Engineering Plastic			
Gear Material	1 Metal-Plastic & 4 Metal Gears			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	Micro 25T Ø5.0			
Accessories	Mounting Hardware, MS-L25, MS-ML25			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD245MW-CAN/UAVCAN

#1-01574, #1-01642

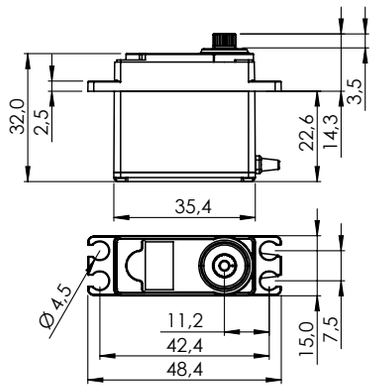


General Specification	MD245MW-CAN/UAVCAN			
Control System	CAN BUS **			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	DC Coreless Metal Brush			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 6.0V			
Operating Voltage	At 4.8V	At 7.4V		
No Load Speed	353°/s (59RPM)	545°/s (91RPM)		
Stall Torque	4.2kgcm (41.19Ncm)	6.4kgcm (62.76Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	110mA	190mA		
Stall Current	1,000mA	1,600mA		
Deadband Width	-	-		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	24AWG			
Connector Wire Strand Count	40EA			
Outline Dimensions	32.4 x 16.8 x 32.8mm			
Weight*	32.6g			
Ball Bearing	Dual Ball Bearing / MR106			
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, M-025			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories
** also available with RS-485

MD250MW

#1-00707



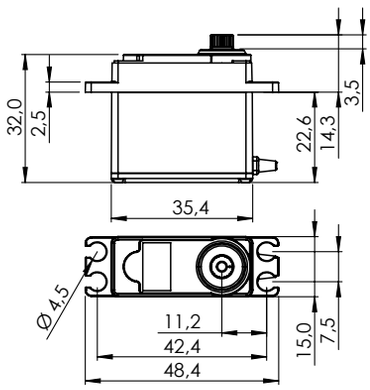
General Specification	MD250MW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Magnetic Rotary Encoder	
Motor Type	3 Poles Metal Brush	
Controller (MCU)	32Bit Digital Amplifier with Mosfet Drive	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	300°/s (50RPM)	462°/s (77RPM)
Stall Torque	4.9kgcm (48.05Ncm)	7.5kgcm (73.55Ncm)
Idle Current	40mA	40mA
No Load Running Current	110mA	190mA
Stall Current	1,000mA	1,600mA
Deadband Width	2µs	2µs
Operating Travel	**Default**	±60°
	Programmable	±160°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	24AWG	
Connector Wire Strand Count	40EA	
Outline Dimensions	35.0 x 15.0 x 33.0mm	
Weight*	38.3g	
Ball Bearing	Dual Ball Bearing / MR106, MR85	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 4 Steel Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, M-O25, M-I25, M-X25, MR-ML25	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

*of the servo only w/o horns and accessories

MD250MW-CAN/UAVCAN

#1-01666, #1-01572

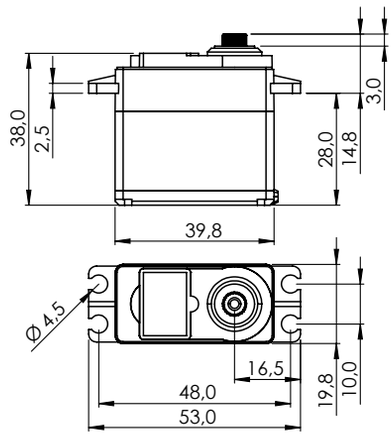


General Specification	MD250MW-CAN/UAVCAN			
Control System	CAN BUS **			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	DC Cored Carbon Brush			
Controller (MCU)	32 Bit			
Operating Voltage Range	4.8V ~ 6.0V			
Operating Voltage	At 4.8V	At 7.4V		
No Load Speed	354°/s (59RPM)	546°/s (91RPM)		
Stall Torque	4.9kgcm (48.05Ncm)	7.5kgcm (73.55Ncm)		
Idle Current	32mA	32mA		
No Load Running Current	110mA	190mA		
Stall Current	1,600mA	1,600mA		
Deadband Width	-	-		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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	-20°C ~ +60°C (-4°F ~ +140°F)			
Vibrations at No Load	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	24AWG			
Connector Wire Strand Count	40EA			
Outline Dimensions	35.0 x 15.0 x 33.0mm			
Weight*	40.0g			
Ball Bearing	Dual Ball Bearing / MR106			
Case Material	Engineering Plastic			
Gear Material	1 Metal-Plastic & 4 Steel			
Gear Train Backlash	Max 0.5°			
Horn Gear Spline	H25T Ø6.0			
Accessories	Mounting Hardware, M-I25			
Dust & Water Protection class	IP4X			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MD485MW

#1-01924

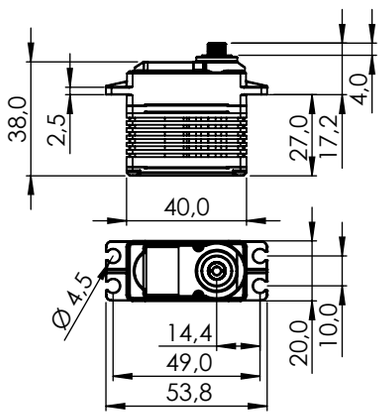


General Specification	MD485MW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Magnetic Rotary Encoder	
Motor Type	Carbon Brush	
Controller (MCU)	Digital Programmable Amplifier with Mosfet Drive	
Operating Voltage Range	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	300°/s (50RPM)	400°/s (67RPM)
Stall Torque	4.8kgcm (47.07Ncm)	7.4kgcm (72.57Ncm)
Idle Current	30mA	30mA
No Load Running Current	250mA	320mA
Stall Current	1,000mA	1,500mA
Deadband Width	2µs	2µs
Operating Travel	**Default**	±60°
	Programmable	±160°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	25AWG	
Connector Wire Strand Count	40EA	
Outline Dimensions	39.8 x 19.8 x 38.0mm	
Weight*	44.1g	
Ball Bearing	Single Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	Karbonite Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

MD950TW-CAN/UAVCAN

#1-01646, #1-01647

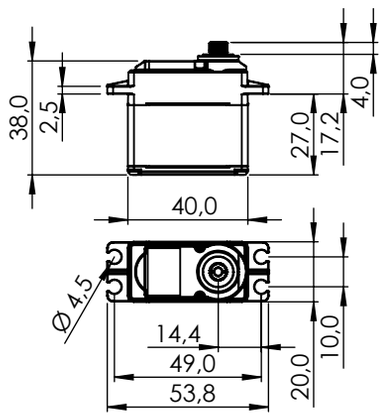


General Specification	MD950TW-CAN/UAVCAN			
Control System	CAN BUS **			
	Protocol (Mode)	**Standard 2.0A**	**Extended 2.0B**	**UAVCAN**
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	DC Coreless Metal Brush			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 7.4V			
Operating Voltage	At 4.8V	At 7.4V		
No Load Speed	261°/s (44RPM)	429°/s (72RPM)		
Stall Torque	21.0kgcm (205.94Ncm)	35.0kgcm (343.23Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	300mA	500mA		
Stall Current	3,700mA	6,200mA		
Deadband Width	4Step	4Step		
Travel	**Travel / Command**	90° / 4096		
	Servo mode	**Left**	**Center**	**Rigt**
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80EA			
Outline Dimensions	40.0 x 20.0 x 38.0mm			
Weight*	68.0g			
Ball Bearing	Dual Ball Bearing / MR106			
Case Material	Engineering Plastic & Hardened Metal			
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			
Dust & Water Protection class	IP54			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories

MDB952SH-CAN/UAVCAN

#1-02199

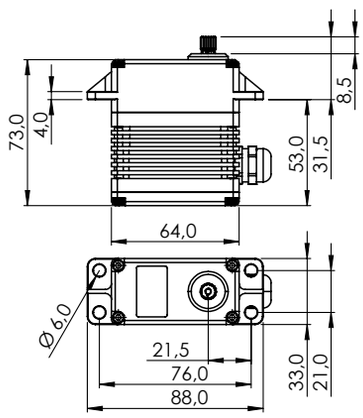


General Specification	MDB952SH-CAN/UAVCAN			
Control System	CAN BUS **			
	Protocol (Mode)	Standard 2.0A	Extended 2.0B	UAVCAN
	Baud-Rate	10kbps ~ 1Mbps		
	Sample-Point	50% or 87.5%		
	Available SERVO ID	1 ~ 254		1 ~ 127
	Available Node ID	1 ~ 2047	1 ~ 536870911	1 ~ 127
	Input Signal Range	0 ~ 5V		
Connector Type	Hitec 4P			
Position Sensor Type	Contactless Encoder			
Motor Type	DC Coreless Metal Brush			
Controller (MCU)	32Bit			
Operating Voltage Range	4.8V ~ 7.4V			
Operating Voltage	At 4.8V	At 7.4V		
No Load Speed	353°/s (59RPM)	429°/s (71RPM)		
Stall Torque	34.0kgcm (333.43Ncm)	34.0kgcm (333.43Ncm)		
Idle Current	30mA	30mA		
No Load Running Current	300mA	500mA		
Stall Current	3,700mA	6,200mA		
Deadband Width	-	-		
Travel	Travel / Command	90° / 4096		
	Servo mode	Left	Center	Rigt
	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	MIL-STD-810G 514.6C-VII			
Connector Wire Length	300mm			
Connector Wire Gauge	20AWG			
Connector Wire Strand Count	80EA			
Outline Dimensions	40.0 x 20.0 x 38.0mm			
Weight*	70.2g			
Ball Bearing	Dual Ball Bearing / MR106			
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, HD-IM25, HD-LS25, HD-OS25, HS-X25			
Dust & Water Protection class	IP54			
Revision	Rev. 1.0 / 17.02.2022			
Changelog	-			

*of the servo only w/o horns and accessories
** also available with RS-485

MD1100WP

#1-01638

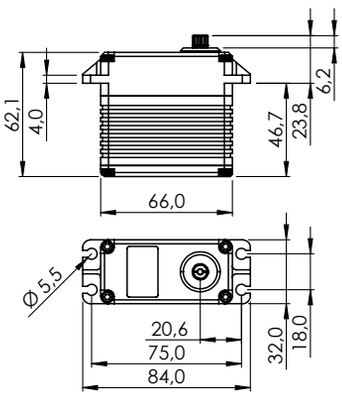


General Specification	MD1100WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Magnetic Encoder	
Motor Type	5 Poles DC Cored Carbon Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	11.1V ~ 14.8V	
Operating Voltage	At 11.1V	At 14.8V
No Load Speed	231°/s (38RPM)	316°/s (53RPM)
Stall Torque	84.0kgcm (823.76Ncm)	110.0kgcm (1078.73Ncm)
Idle Current	90mA	90mA
No Load Running Current	550mA	500mA
Stall Current	6,500mA	8,000mA
Deadband Width	2µs	2µs
Operating Travel	**Default**	±60°
	Programmable	±160°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	IEC-60068-2-64	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	64.0 x 33.0 x 73.0mm	
Weight*	363.0g	
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, I-MO	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 23.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

MDR845WP

#1-01329

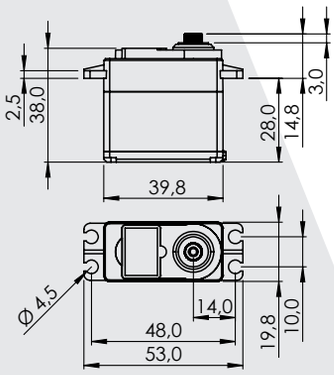


General Specification	MDR845WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contactless Magnetic Encoder	
Motor Type	Cored Carbon Brush	
Controller (MCU)	32Bit Programmable Digital	
Operating Voltage Range	4.8V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	231°/s (38RPM)	353°/s (59RPM)
Stall Torque	32.5kgcm (318.72Ncm)	50.0kgcm (490.33Ncm)
Idle Current	30mA	30mA
No Load Running Current	1,100mA	1,600mA
Stall Current	6,000mA	10,000mA
Deadband Width	2µs	2µs
Operating Travel	Default	±1800°
	Programmable	-
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-30°C ~ +80°C (-31°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	66.0 x 32.0 x 62.0mm	
Weight*	227.0g	
Ball Bearing	Dual Ball Bearing / MR148	
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, Q-MIA, Q-XA, Q-IA	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 23.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

D485HW

#1-00066

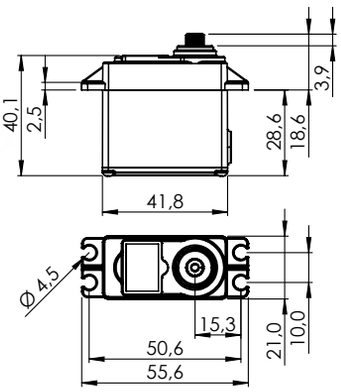


General Specification	D485HW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	Cored Metal Brush	
Controller (MCU)	Digital Programmable Amplifier with Mosfet Drive	
Operating Voltage Range	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	300°/s (50RPM)	400°/s (67RPM)
Stall Torque	5.2kgcm (50.99Ncm)	7.5kgcm (73.55Ncm)
Idle Current	30mA	30mA
No Load Running Current	250mA	320mA
Stall Current	1,000mA	1,500mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	25AWG	
Connector Wire Strand Count	40EA	
Outline Dimensions	39.8 x 19.8 x 38.0mm	
Weight*	43.2g	
Ball Bearing	Single Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	Karbonite Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

D646WP

#1-00072

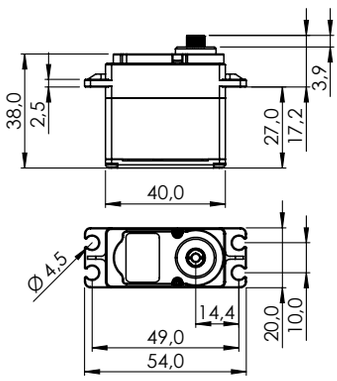


General Specification	D646WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Magnetic Encoder / 4 Slider / 1M Cycle Long Life	
Motor Type	Cored Carbon Brush	
Controller (MCU)	32Bit Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.8V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	250°/s (42RPM)	375°/s (63RPM)
Stall Torque	7.5kgcm (73.55Ncm)	11.6kgcm (113.76Ncm)
Idle Current	30mA	30mA
No Load Running Current	270mA	330mA
Stall Current	1,500mA	2,200mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count	60EA	
Outline Dimensions	41.8 x 21.0 x 40.0mm	
Weight*	57.3g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

D951TW

#116951

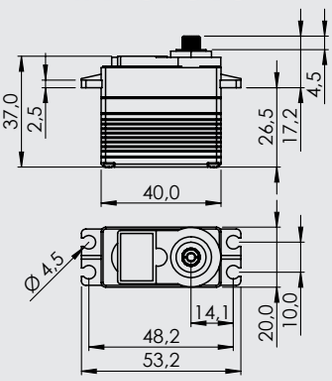


General Specification	D951TW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	Coreless Metal Brush	
Controller (MCU)	Digital Programmable Amplifier with Mosfet Drive	
Operating Voltage Range	3.5V ~ 8.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	261°/s (43RPM)	429°/s (71RPM)
Stall Torque	21.0kgcm (205.94Ncm)	35.0kgcm (343.23Ncm)
Idle Current	30mA	30mA
No Load Running Current	300mA	500mA
Stall Current	3,700mA	6,200mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 38.0mm	
Weight*	78.7g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Full Metal Case	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

D954SW

#116954
#1-01310

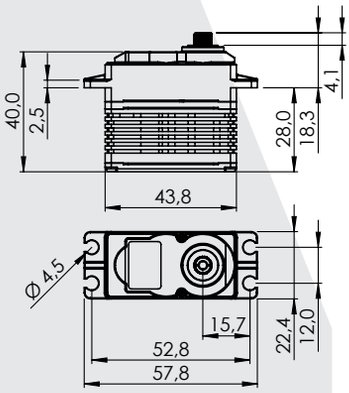


General Specification	D954SW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	Coreless Metal Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	4.7V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	316°/s (53RPM)	500°/s (83RPM)
Stall Torque	16.0kgcm (156.91Ncm)	24.5kgcm (240.26Ncm)
Idle Current	30mA	30mA
No Load Running Current	300mA	500mA
Stall Current	3,200mA	5,200mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60° **
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 37.0mm	
Weight*	64.7g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Steel Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories
** also available with 270°

D980TW

#116980

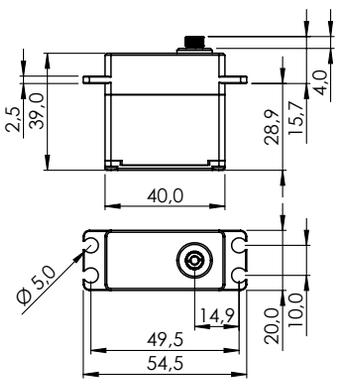


General Specification	D980TW	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 4 Slider / 1M Cylce Long Life	
Motor Type	Coreless Metal Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	214°/s (36RPM)	343°/s (59RPM)
Stall Torque	26.0kgcm (254.97Ncm)	44.0kgcm (431.49Ncm)
Idle Current	30mA	30mA
No Load Running Current	300mA	500mA
Stall Current	4,800mA	6,200mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	43.8 x 22.4 x 40.0mm	
Weight*	75.8g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Titanium Alloy Gears	
Gear Train Backlash	-	
Horn Gear Spline	H25T Ø6.0	
Accessories	Mounting Hardware, HD-IM25, HD-LS25, HD-OS25, HD-X25, HD-IL25, HD-LL25, HD-IG25, HD-LG25	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

DB961WP

#1-02571

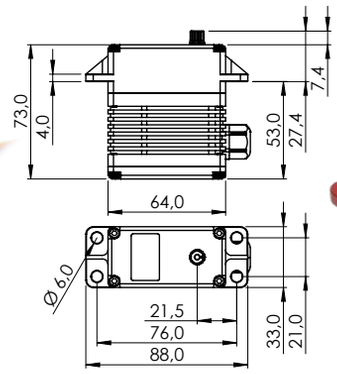


General Specification	DB961WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	BLDC	
Controller (MCU)	16Bit Digital Programmable	
Operating Voltage Range	6.0 ~ 7.4V	
Operating Voltage	At 4.8V	At 7.4V
No Load Speed	333°/s (56RPM)	400°/s (67RPM)
Stall Torque	55.0kgcm (539.37Ncm)	55.0kgcm (539.37Ncm)
Idle Current	35mA	35mA
No Load Running Current	330mA	330mA
Stall Current	8,000mA	6,500mA
Deadband Width	1µs	1µs
Operating Travel	Default	±60°
	Programmable	±87,5°
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	MIL-STD-810G 514.6C-VII	
Vibrations at No Load	-30°C ~ +80°C (-31°F ~ +176°F)	
Connector Wire Length	300mm	
Connector Wire Gauge	20AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	40.0 x 20.0 x 39.0mm	
Weight*	90.0g	
Ball Bearing	Dual Ball Bearing	
Case Material	Rugged Aluminum Alloy	
Gear Material	5 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	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-1005SGT

#138105

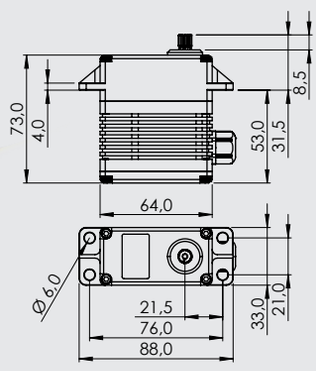


General Specification	HS-1005SGT	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	5 Poles DC Cored Carbon Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	11.1V ~ 14.8V	
Operating Voltage	At 11.1V	At 14.8V
No Load Speed	231°/s (38RPM)	316°/s (53RPM)
Stall Torque	84.0kgcm (823.76Ncm)	110.0kgcm (1078.73Ncm)
Idle Current	90mA	130mA
No Load Running Current	1100mA	1300mA
Stall Current	5,500mA	6,500mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	IEC-60068-2-64	
Connector Wire Length	250mm	
Connector Wire Gauge	Signal - 21AWG / Motor - 19AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	64.0 x 33.0 x 73.0mm	
Weight*	363.0g	
Ball Bearing	Dual Ball Bearing / MR148	
Case Material	Rugged 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, I-MO	
Dust & Water Protection class	IP54	
Revision	Rev. 1.0 / 29.06.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-1100WP

#138100

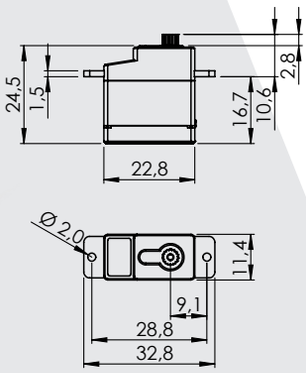


General Specification	HS-1100WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Indirect Drive / 1M Cycle Long Life	
Motor Type	5 Poles DC Cored Carbon Brush	
Controller (MCU)	Digital Amplifier with Mosfet Drive	
Operating Voltage Range	11.1V ~ 14.8V	
Operating Voltage	At 11.1V	At 14.8V
No Load Speed	231°/s (38RPM)	316°/s (53RPM)
Stall Torque	84.0kgcm (823.76Ncm)	110.0kgcm (1078.73Ncm)
Idle Current	90mA	130mA
No Load Running Current	1100mA	1300mA
Stall Current	5,500mA	6,500mA
Deadband Width	2µs	2µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	Signal - 20AWG / Motor - 18AWG	
Connector Wire Strand Count	80EA	
Outline Dimensions	64.0 x 33.0 x 73.0mm	
Weight*	363.0g	
Ball Bearing	Dual Needle Bearing	
Case Material	Rugged Aluminum Alloy	
Gear Material	1 Metal-Plastic & 3 Hardened Steel Gears	
Gear Train Backlash	-	
Horn Gear Spline	15T Ø8.0	
Accessories	Mounting Hardware, I-MO	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 29.06.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-53

#112053

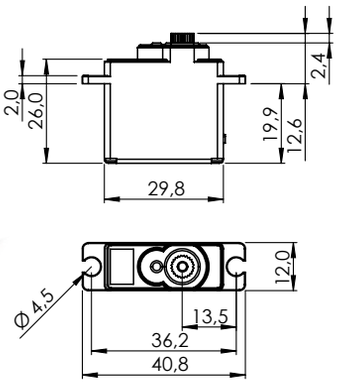


General Specification	HS-53	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 2 Slider	
Motor Type	Cored Metal Brush	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	375°/s (63RPM)	462°/s (77RPM)
Stall Torque	1.2kgcm (11.77Ncm)	1.5kgcm (14.71Ncm)
Idle Current	8mA	10mA
No Load Running Current	100mA	125mA
Stall Current	440mA	550mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20EA	
Outline Dimensions	28.6 x 11.6 x 24.1mm	
Weight*	7.6g	
Ball Bearing	Non	
Case Material	Engineering Plastic	
Gear Material	POM Normal Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	15T Ø4.0	
Accessories	Mounting Hardware, FS-IL, FS-X	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-81

#112081

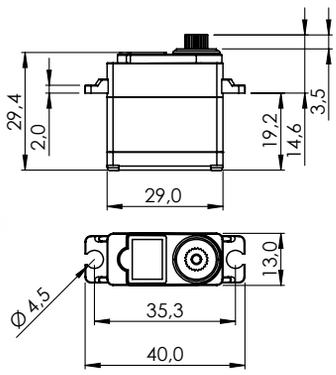


General Specification	HS-81	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive	
Motor Type	Cored / 3 poles Ferrite Motor	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	545°/s (91RPM)	667°/s (111RPM)
Stall Torque	2.6kgcm (25.50Ncm)	3.0kgcm (29.42Ncm)
Idle Current	8.8mA	9.1mA
No Load Running Current	220mA	280mA
Stall Current	-	-
Deadband Width	8µs	8µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	160mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20EA	
Outline Dimensions	29.8 x 12.0 x 29.6mm	
Weight*	16.3g	
Ball Bearing	-	
Case Material	Engineering Plastic	
Gear Material	Nylon Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, M-I, M-X, M-O	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-85MG

#112086

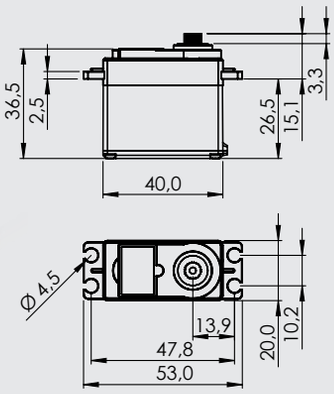


General Specification	HS-85MG	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive	
Motor Type	Cored / 3 Pole Ferrite Motor	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	375°/s (63RPM)	429°/s (71RPM)
Stall Torque	3.0kgcm (29.42Ncm)	3.5kgcm (34.32Ncm)
Idle Current	8mA	8mA
No Load Running Current	240mA	240mA
Stall Current	-	-
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20EA	
Outline Dimensions	29.0 x 13.0 x 30.0mm	
Weight*	21.2g	
Ball Bearing	Single Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	4 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, M-I, M-X, M-O	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-311

#112311

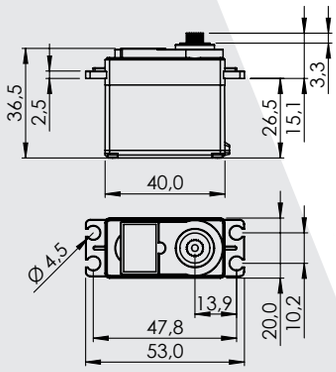


General Specification	HS-311	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 4 Slider	
Motor Type	Cored Metal Brush	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	316°/s (53RPM)	400°/s (67RPM)
Stall Torque	3.0kgcm (29.42Ncm)	3.7kgcm (36.28Ncm)
Idle Current	7.4mA	7.7mA
No Load Running Current	160mA	180mA
Stall Current	700mA	800mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	25AWG	
Connector Wire Strand Count	40EA	
Outline Dimensions	40.0 x 20.0 x 36.5mm	
Weight*	42.5g	
Ball Bearing	Single Resin Bushing	
Case Material	Engineering Plastic	
Gear Material	Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, R-O, R-X, R-I, R-D, R-C, R-XA	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-322HD

#11326

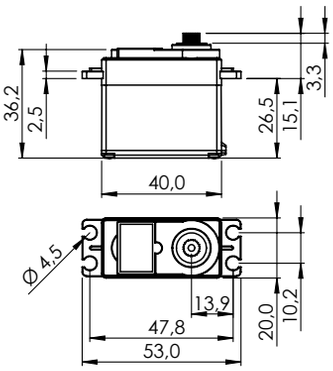


General Specification	HS-322HD	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 2 Slider	
Motor Type	Cored Metal Brush	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	375°/s (63RPM)	462°/s (77RPM)
Stall Torque	1.2kgcm (11.77Ncm)	1.5kgcm (14.71Ncm)
Idle Current	8mA	10mA
No Load Running Current	100mA	125mA
Stall Current	440mA	550mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	250mm	
Connector Wire Gauge	28AWG	
Connector Wire Strand Count	20EA	
Outline Dimensions	28.6 x 11.6 x 24.1mm	
Weight*	7.6g	
Ball Bearing	Non	
Case Material	Engineering Plastic	
Gear Material	POM Normal Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	15T Ø4.0	
Accessories	Mounting Hardware, FS-IL, FS-X	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-325HB

#112325

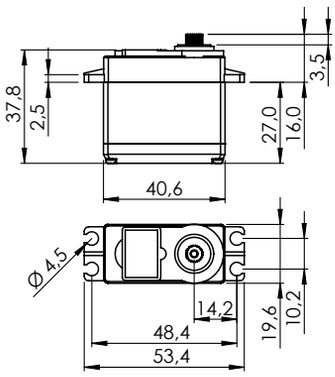


General Specification	HS-325HB	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Direct Drive / 4 Slider	
Motor Type	Cored Metal Brush	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	316°/s (53RPM)	400°/s (67RPM)
Stall Torque	3.0kgcm (29.42Ncm)	3.7kgcm (36.28Ncm)
Idle Current	7.4mA	7.7mA
No Load Running Current	160mA	180mA
Stall Current	700mA	800mA
Deadband Width	5µs	5µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	25AWG	
Connector Wire Strand Count	40EA	
Outline Dimensions	40.0 x 20.0 x 36.5mm	
Weight*	42.7g	
Ball Bearing	Single Ball Bearing	
Case Material	Engineering Plastic	
Gear Material	2 Heavy Duty Resin Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, R-O, R-X, R-I, R-D, R-C	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-645MG

#112645

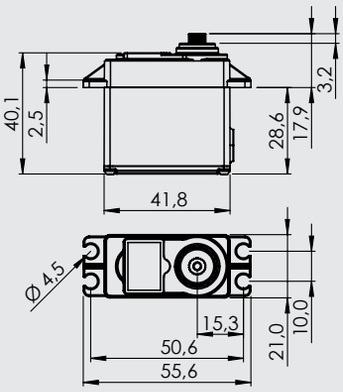


General Specification	HS-645MG	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 2100µs
Connector Type	Hitec 3P (JR 3P compatible)	
Position Sensor Type	Contact Analog Potentiometer	
Motor Type	Cored / 3 Pole Ferrite Motor	
Controller (MCU)	-	
Operating Voltage Range	4.8V ~ 6.0V	
Operating Voltage	At 4.8V	At 6.0V
No Load Speed	250°/s (42RPM)	300°/s (50RPM)
Stall Torque	7.7kgcm (75.51Ncm)	9.6kgcm (94.14Ncm)
Idle Current	8.8mA	9.1mA
No Load Running Current	350mA	450mA
Stall Current	-	-
Deadband Width	8µs	8µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	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	60EA	
Outline Dimensions	40.6 x 19.8 x 37.8mm	
Weight*	52.5g	
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 / Ø5.76	
Accessories	Mounting Hardware, R-O, R-XA, HD-IS, HD-LS, HD-OS	
Dust & Water Protection class	IP4X	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

HS-646WP

#115646



General Specification	HS-646WP	
Control System	Pulse Width Modulation (PWM)	
	PWM Range	900µs I 1500µs I 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	
Controller (MCU)	-	
Operating Voltage Range	6.0V ~ 7.4V	
Operating Voltage	At 6.0V	At 7.4V
No Load Speed	300°/s (50RPM)	353°/s (59RPM)
Stall Torque	9.6kgcm (94.14Ncm)	11.6kgcm (113.76Ncm)
Idle Current	8mA	8mA
No Load Running Current	400mA	600mA
Stall Current	2,000mA	2,200mA
Deadband Width	4µs	4µs
Operating Travel	Default	±60°
	Programmable	n/a
	Multi Turn	n/a
	Continuous Rotation	n/a
Operating Temperature Range	-20°C ~ +60°C (-4°F ~ +140°F)	
Storage Temperature Range	-	
Vibrations at No Load	-	
Connector Wire Length	300mm	
Connector Wire Gauge	22AWG	
Connector Wire Strand Count	60EA	
Outline Dimensions	41.8 x 21.0 x 40.0mm	
Weight*	57.7g	
Ball Bearing	Dual Ball Bearing / MR106	
Case Material	Engineering Plastic	
Gear Material	1 Metal-Plastic & 3 Metal Gears	
Gear Train Backlash	-	
Horn Gear Spline	24T Ø5.76	
Accessories	Mounting Hardware, R-O, R-XA, HD-IS, HD-LS, HS-OS	
Dust & Water Protection class	IP67	
Revision	Rev. 1.0 / 17.02.2022	
Changelog	-	

*of the servo only w/o horns and accessories

Anwendungsbeispiel für HiTEC-Servos

Hier im Roboter-Arm

Typical application for HiTEC servos –

here in a robot arm

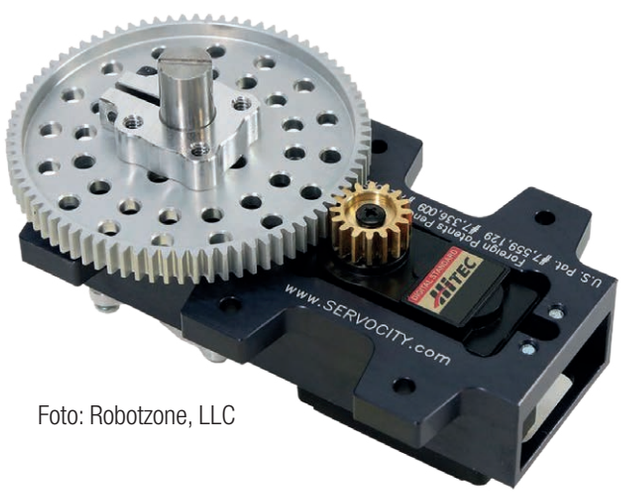


Foto: Robotzone, LLC

ROBOTZONE™
INVENTING THE PARTS FOR YOUR IDEAS

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 Warenausgangsprüfung (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)

INDIVIDUAL ADAPTATION TO MEET CLIENTS' REQUIREMENTS

As an affiliate company to Hitec RCD Korea Inc. we are able to fulfil requirements specific to particular clients. The following adaptations / modifications are possible:

- Changes to cable type and cable length
- Change to different connector
- Different selection of accessories
- Adaptation to packaging (external packaging, container size)
- Programming service
- Installation service
- Expanded goods output testing (test stand, logging)
- Changes to printed legends (nameplate, serial No., etc.)
- Product adaptation (e.g. gearbox reduction ratio)
- Fulfilment of particular certification requirements
- Component tracing
- Special delivery agreements (order framework, guaranteed delivery capacity)

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 ein 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.

PROGRAMMING DEVICES

Hitec digital actuators include the facility to adjust various settings, and / or to activate safety features. Changes to these parameters can be made using various programming devices.

HFP-30

The Hitec HFP-30 offers comprehensive adjustment facilities and test functions. The compact dimensions of the HFP-30 make it ideal for mobile use, as no computer is required. All Hitec digital PWM actuators can be programmed using the HFP-30.

DPC-11

The Hitec DPC-11 is a reasonably priced programming interface which is used in conjunction with a computer running the Windows operating system. All settings can be modified conveniently in this way, with the option of saving the settings. For example, the selected settings can easily be archived, or transferred to further servos. The connection is via USB.

DPC-CAN

The Hitec DPC-CAN interface can be used to configure, update and test Hitec CAN and UAVCAN servos. Various software applications are available for this purpose. A computer running the Windows operating system is required for this. The connection is via 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.

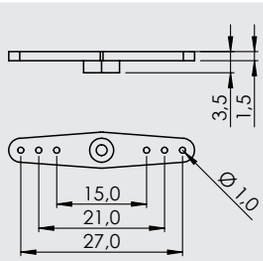
SERVO OUTPUT ARMS

A wide range of output arms is available for the entire Hitec servo portfolio. Most servos are supplied complete with a selection of suitable output devices.

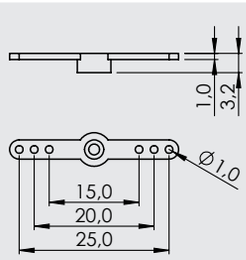
If you have particular requirements, it is possible to select items from our wide range. Please contact us for details.

15T (Ø4,0)

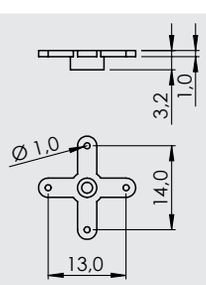
FS-IL15



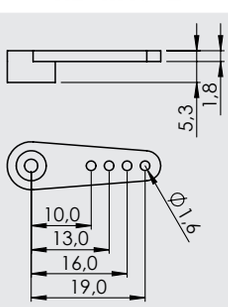
FS-IS15



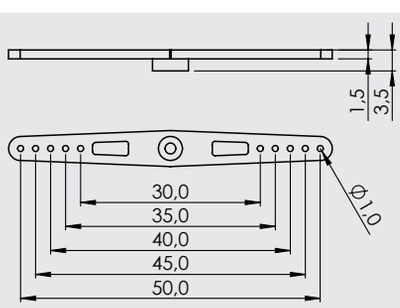
FS-X15



HD-M15-L

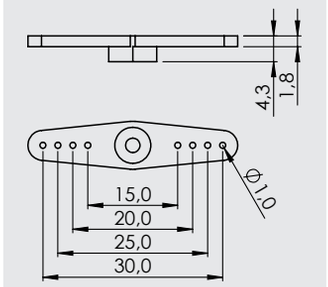


FS-IXL15

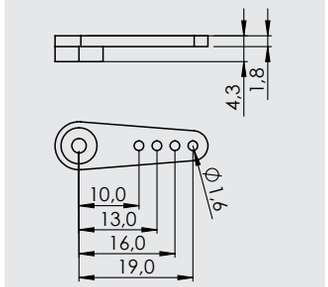


25T (Ø5,0)

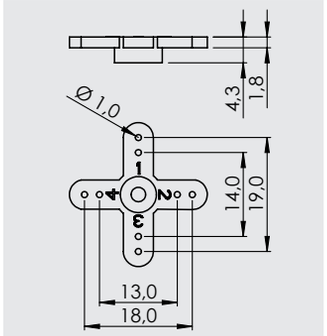
MS-I25



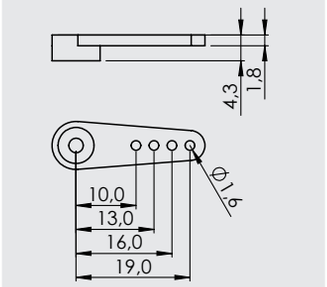
MS-L25



MS-X25

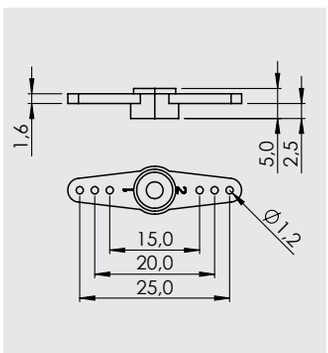


MS-ML25

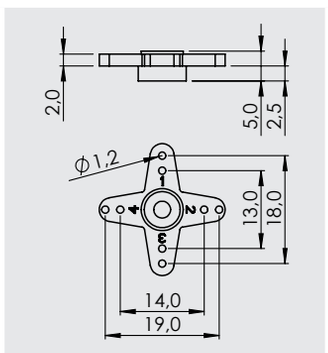


24T (Ø5,76)

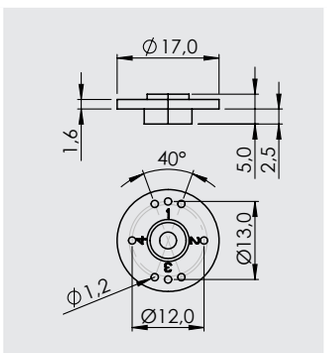
M-I24



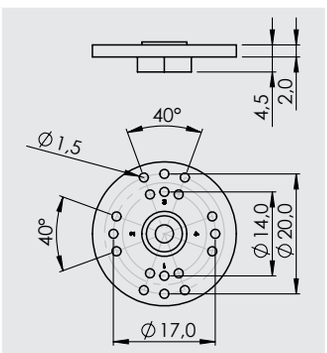
M-X24



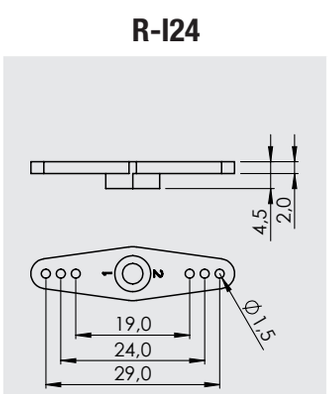
M-O24



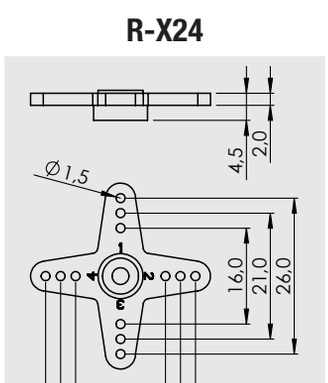
R-O24



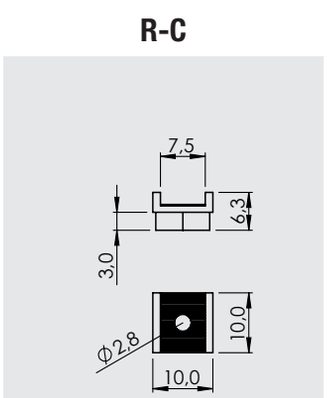
R-I24



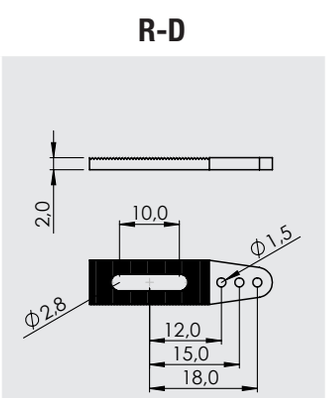
R-X24



R-C



R-D



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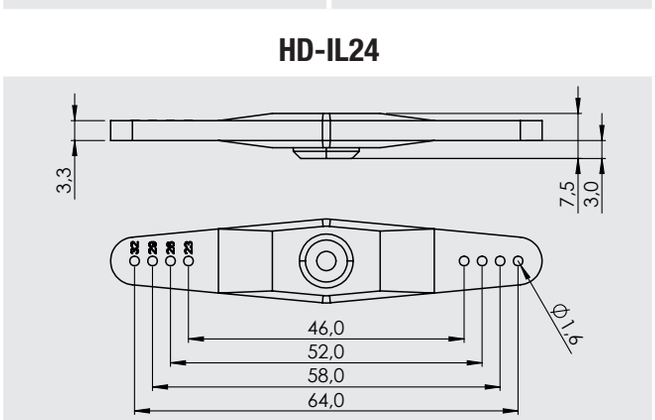

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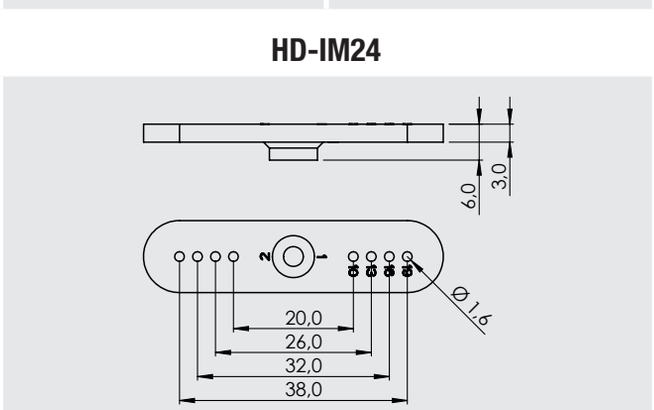

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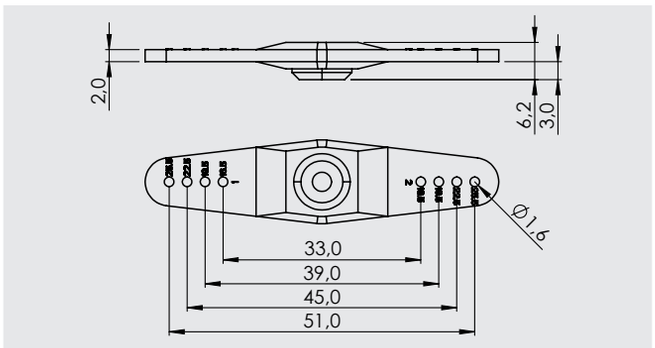
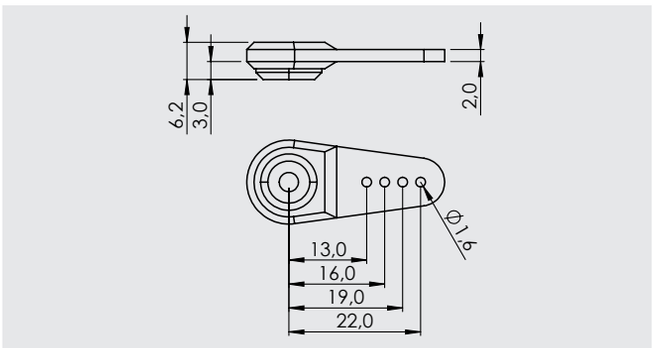
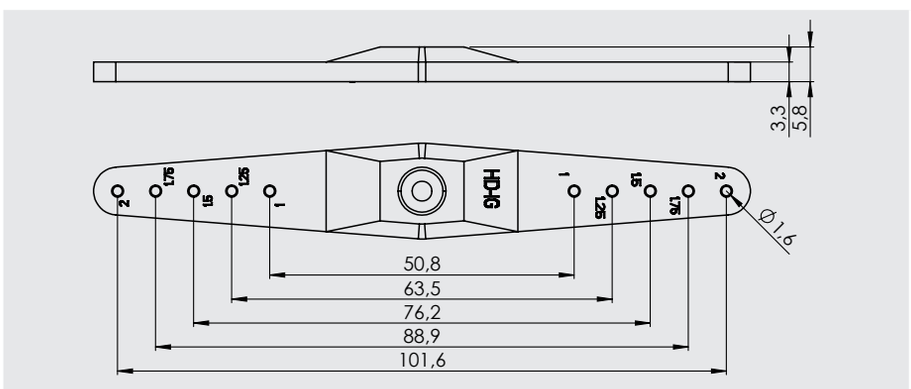


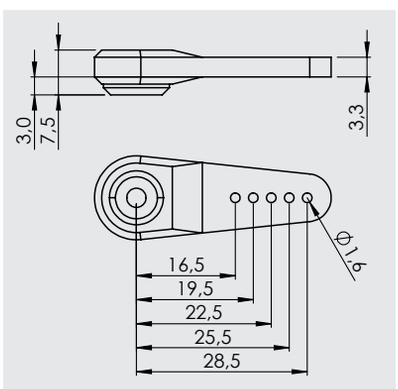
HD-LS24



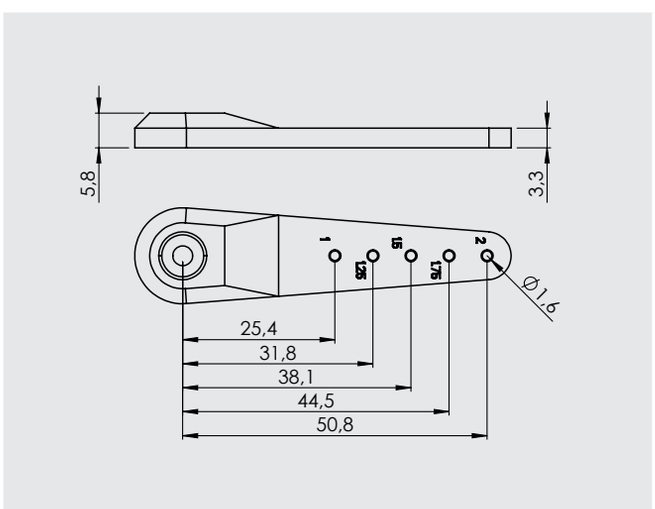
HD-IG24



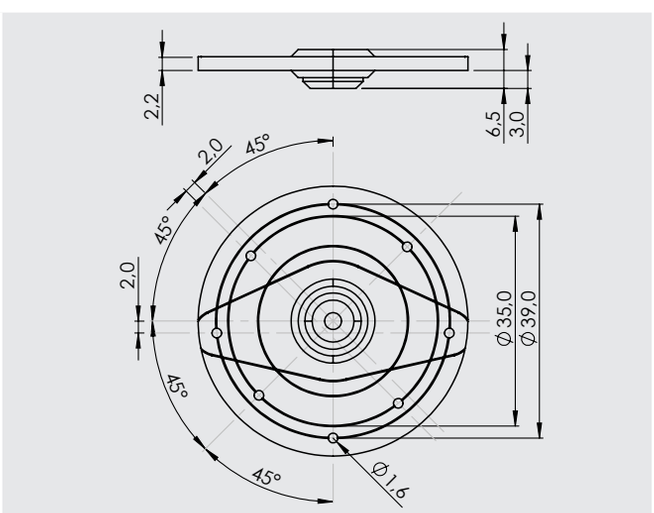
HD-LL24



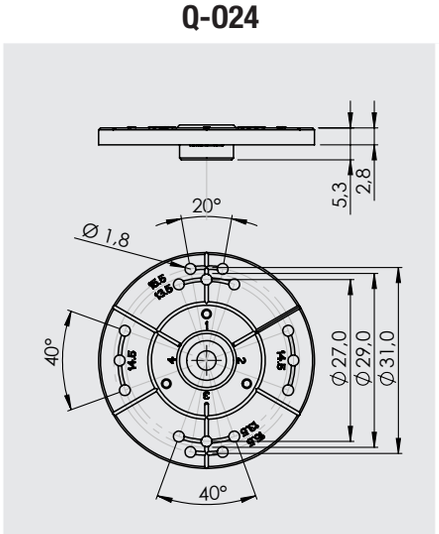
HD-LG24



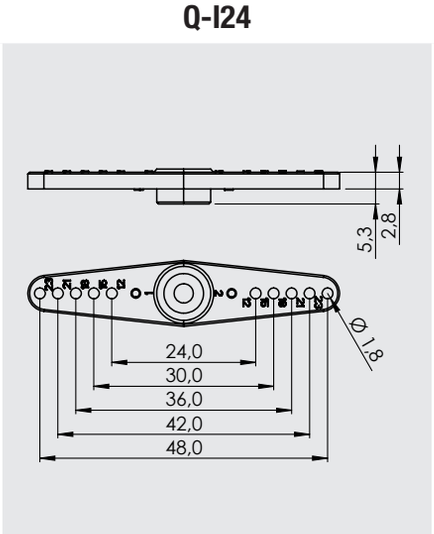
HD-OS24



Q-O24



Q-I24



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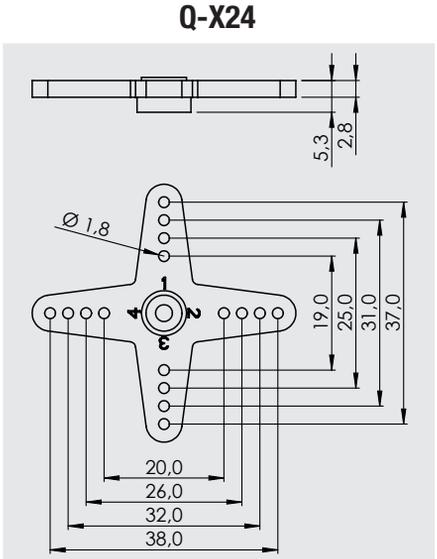

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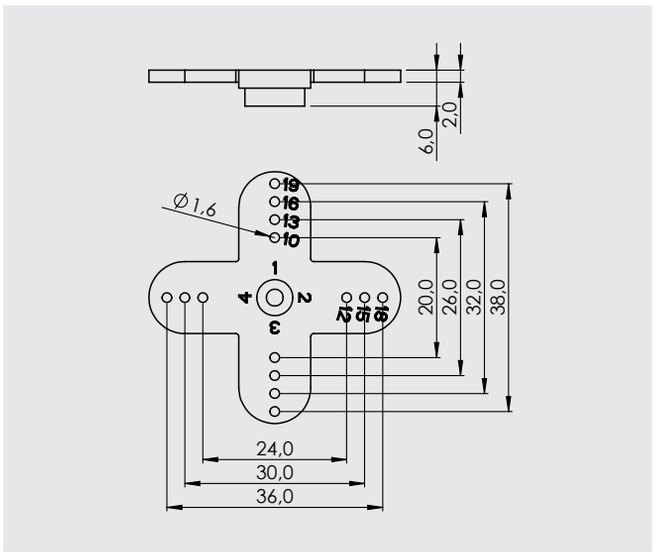
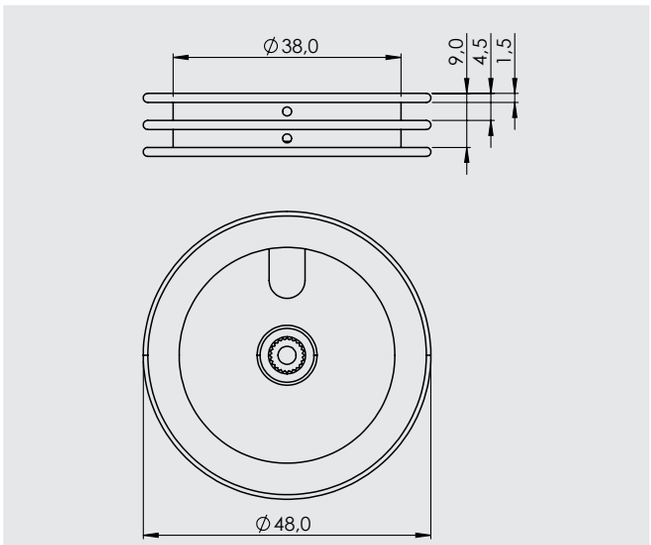
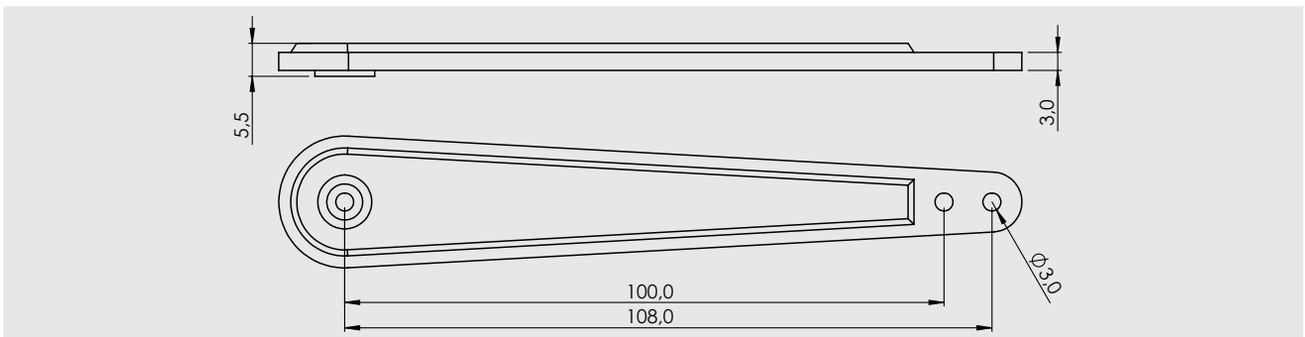


SP-24



715SA-24



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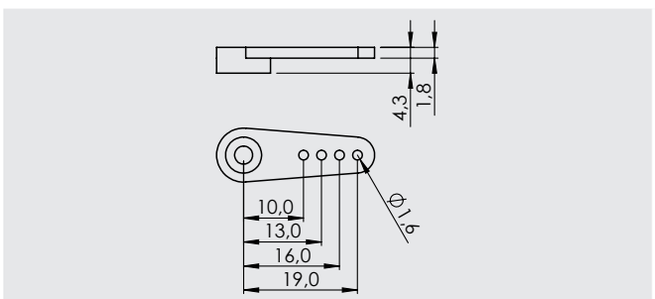

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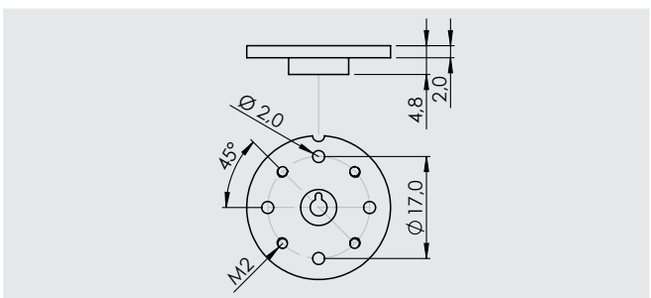

H25T (Ø6,0)

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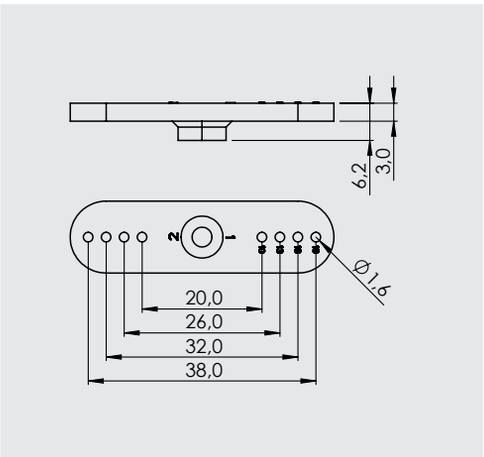

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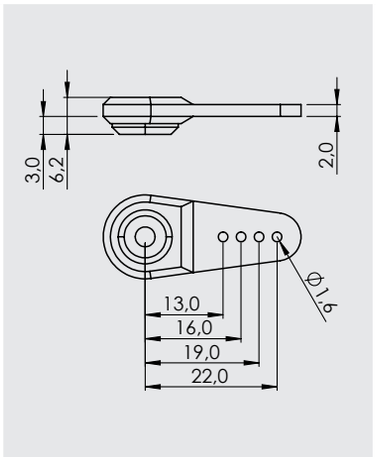

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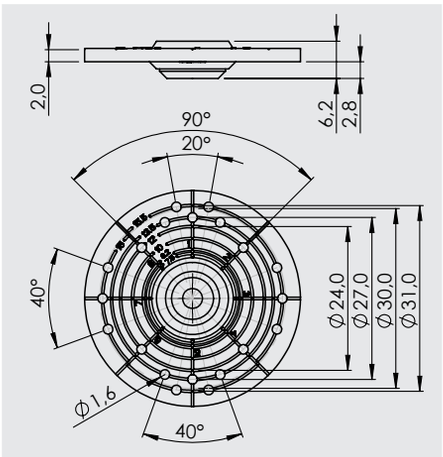

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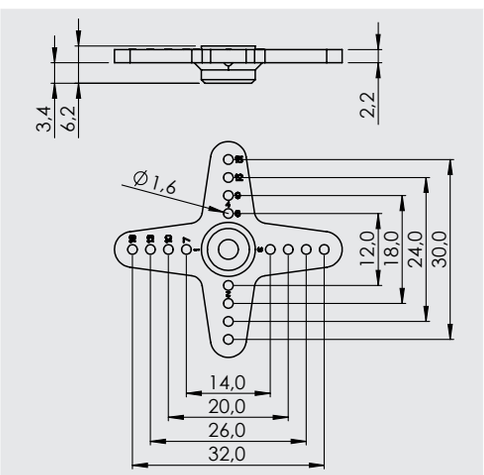

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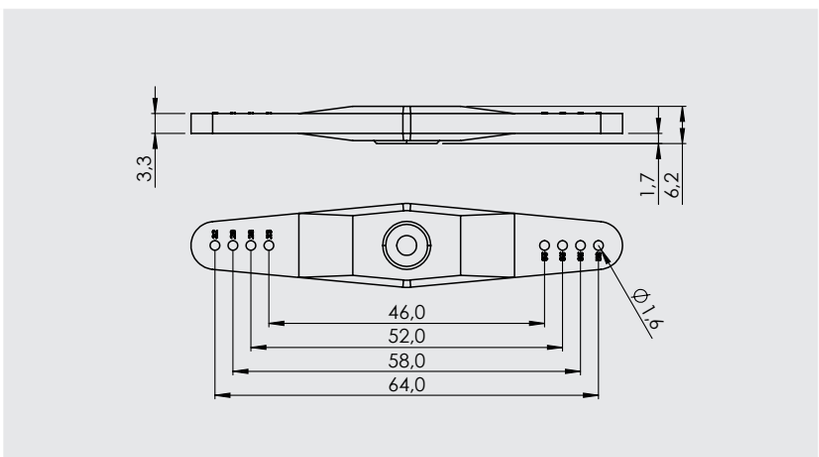

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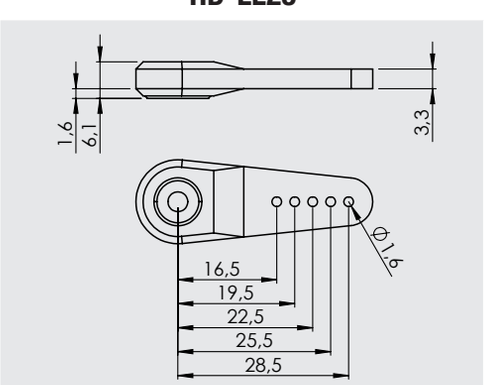

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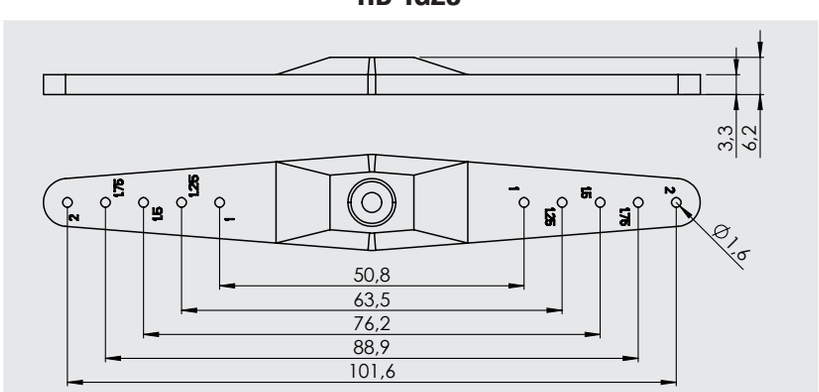

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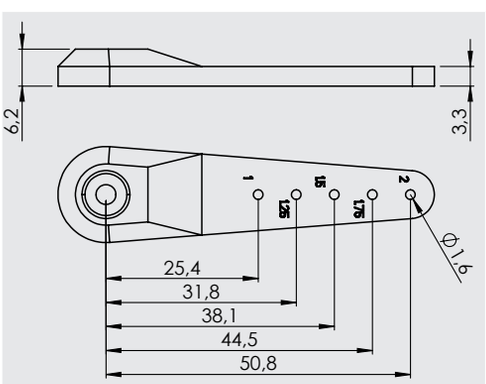

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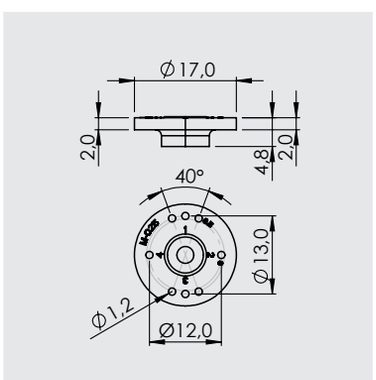

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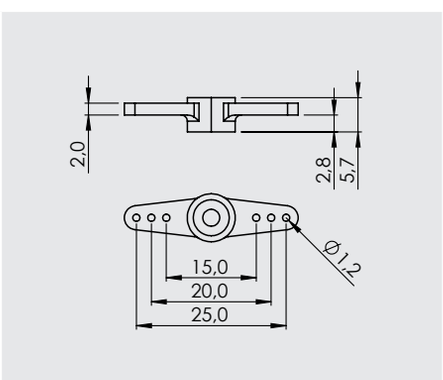

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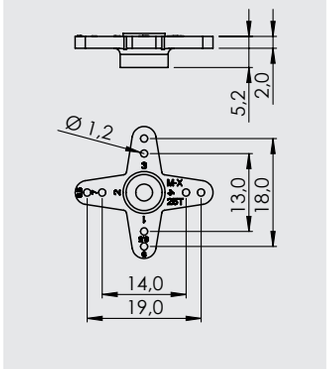

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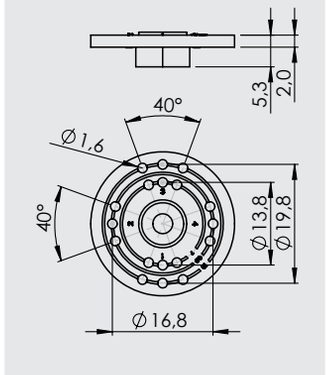

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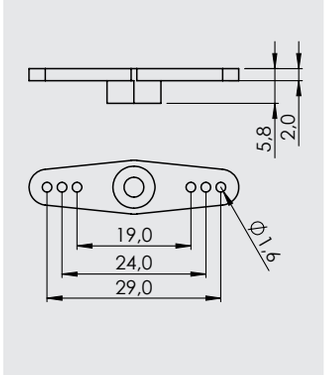

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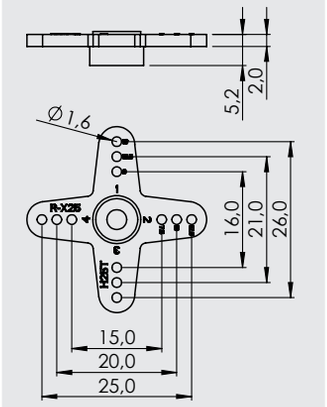
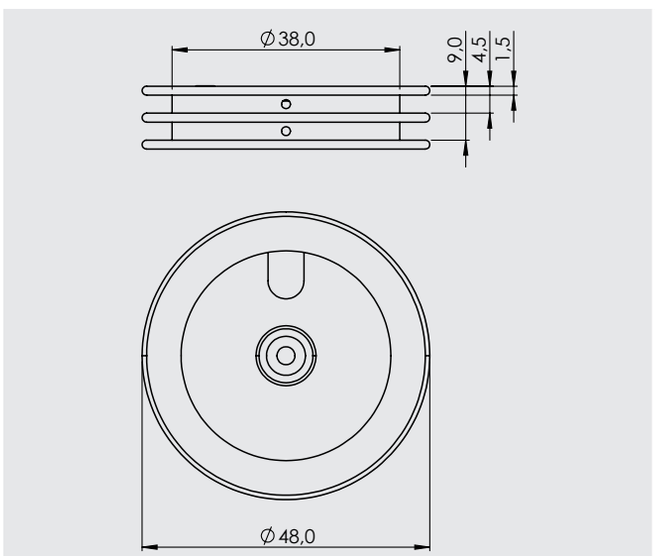
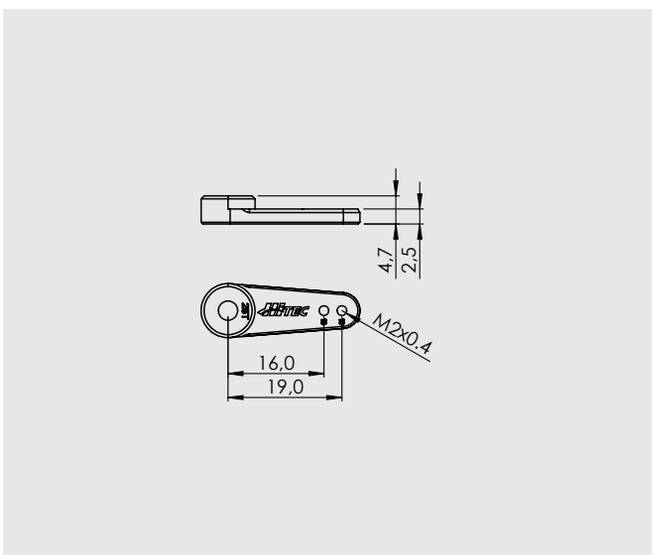


SP-25



R-ML25



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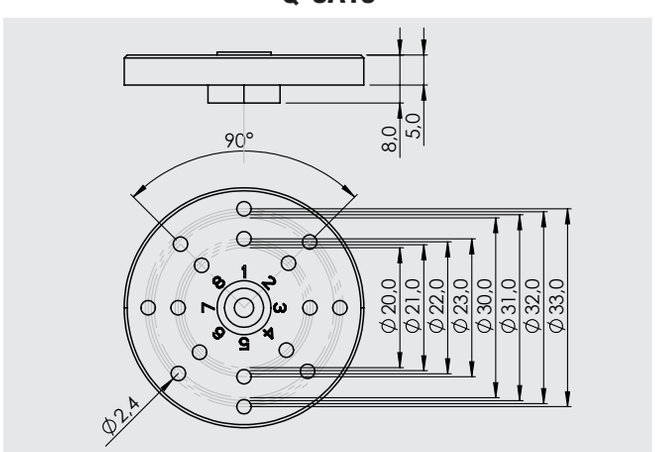

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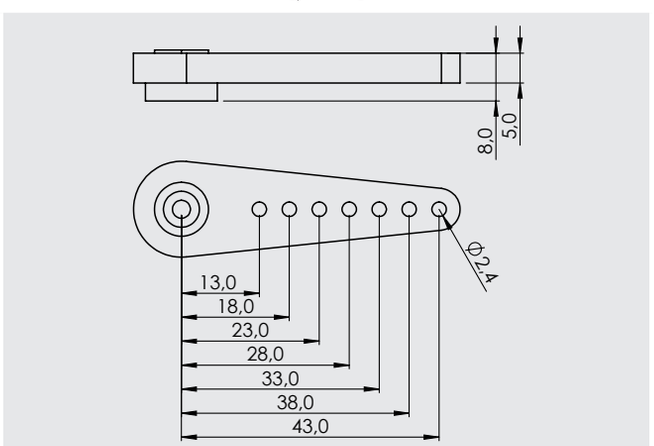

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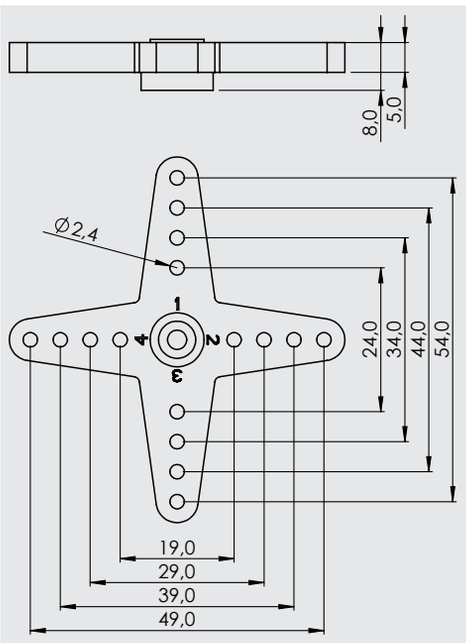

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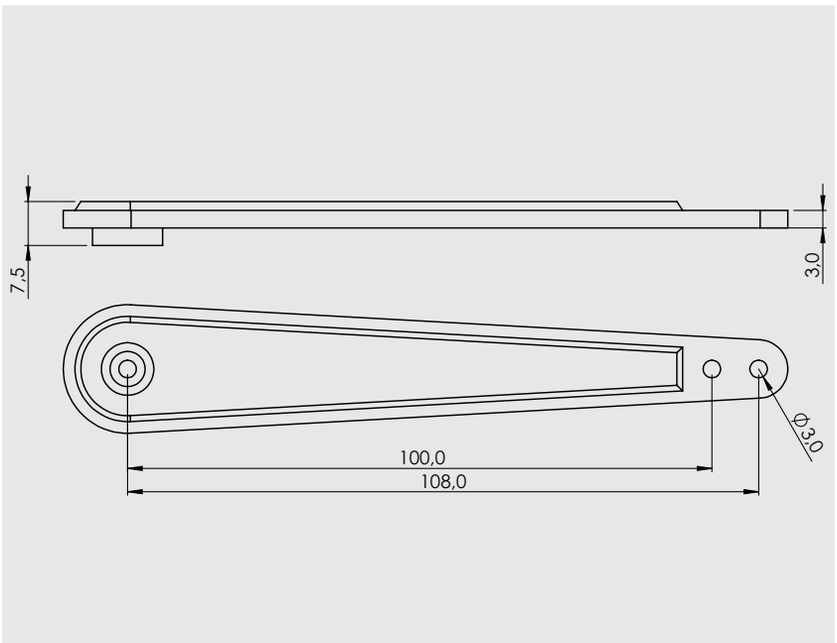

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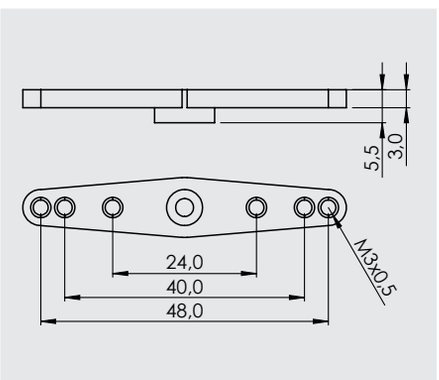

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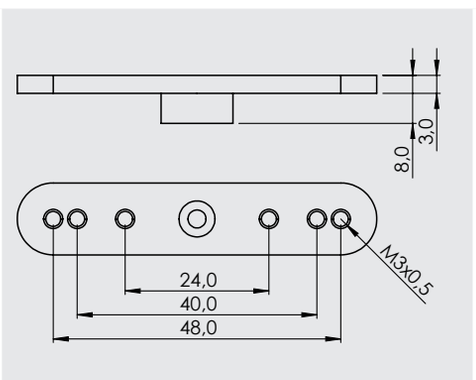

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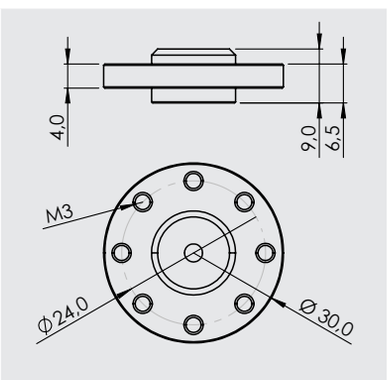
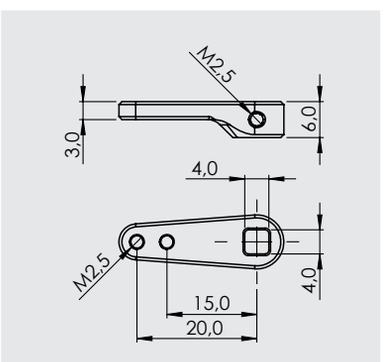


SQUARE 4

SQUARE 5

MIS4-A



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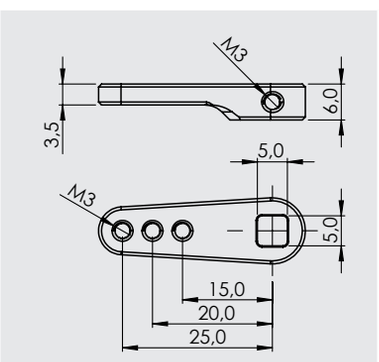
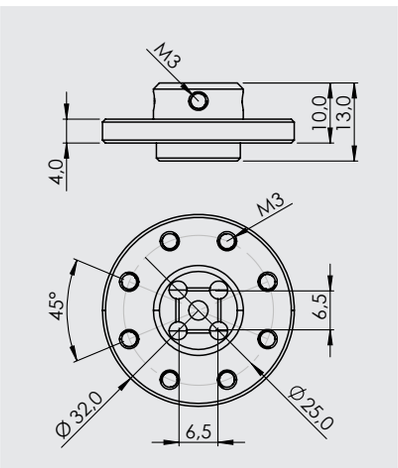


SQUARE 6.5

MOS6.5-S



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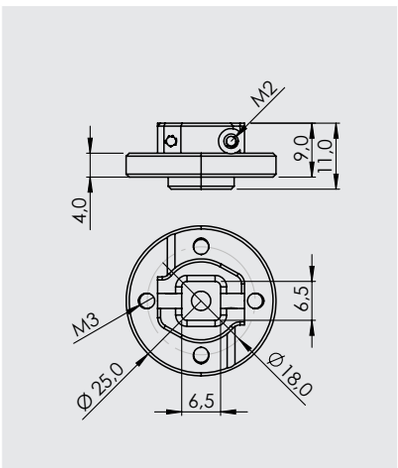

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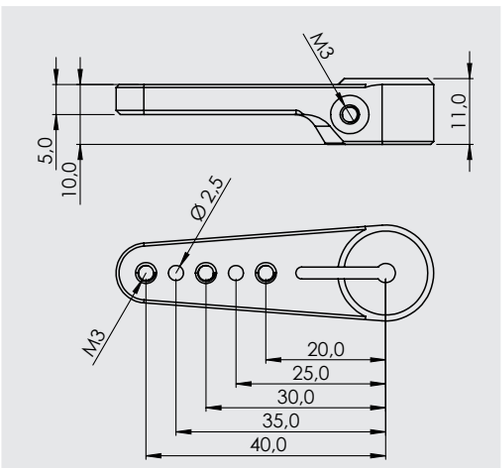

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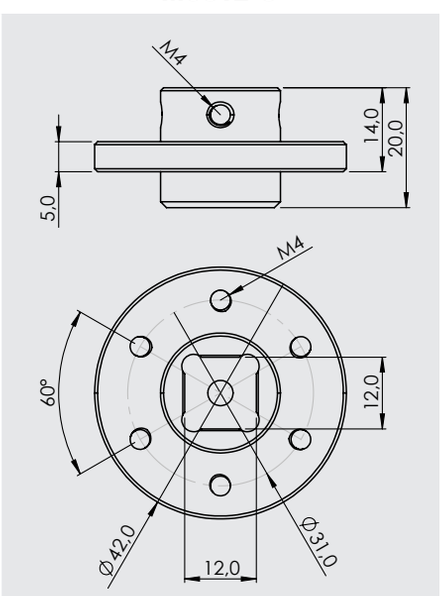

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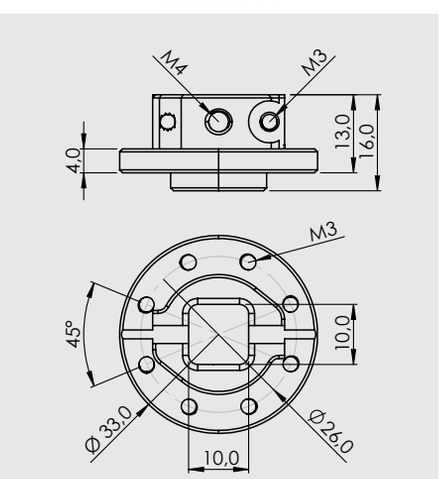

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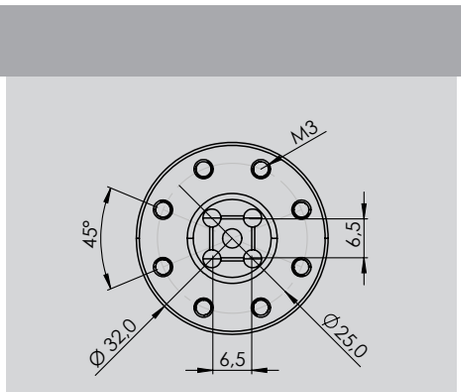

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