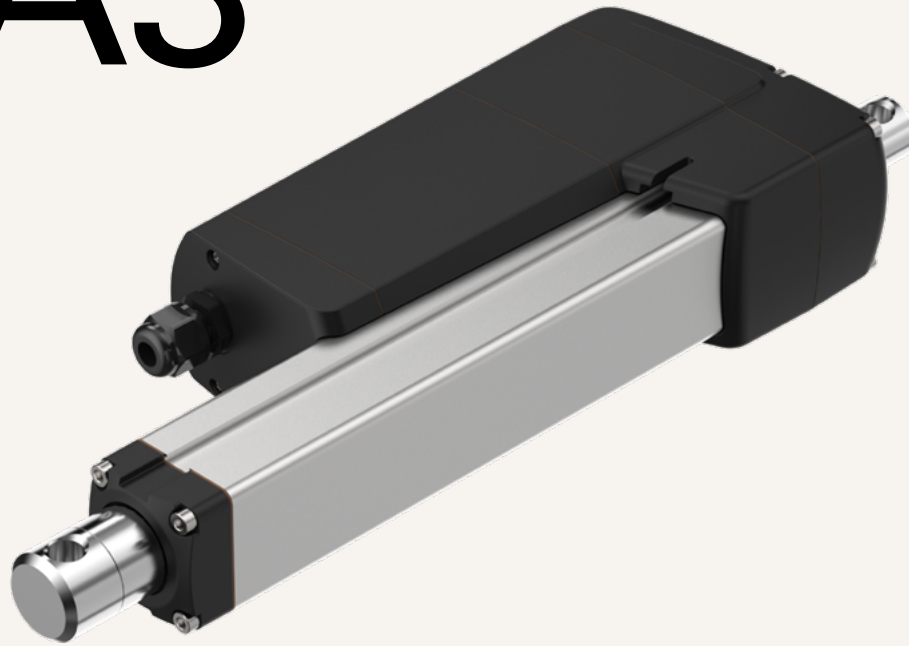


MA3

series



Product Segments

• Industrial Motion

TiMOTION's MA3 is engineered for heavy-duty applications and harsh environments. With a maximum push/pull force of 16,000N, the MA3 provides a robust and reliable alternative to hydraulic cylinders. Additionally, the MA3 has an optional T-Smart version. Embedded with a driver board, the MA3 allows for easy integration with a variety of control interfaces, eliminating the need for an external control box.

The MA3 is available in two T-Smart alternatives:

1) T-Smart Advanced

The actuator is controlled by an embedded PCBA, providing advanced functionality and real-time feedback.

The T-Smart Advanced configuration allows for synchronization of up to 8 actuators, as well as providing accurate position feedback through a variety of options (Hall, Hall-Pot., PWM).

*TiMOTION's software program, PGMA, exclusively supports the T-smart Advanced configuration, providing the user autonomy to adjust many parameters such as speed, stroke limits, soft-stop, soft-start, and much more.

2) T-Smart Bus Communication

The actuator is controlled by the customer's control system, such as their ECU or PLC.

- SAE J1939: This protocol provides seamless integration with CAN bus SAE J1939 interfaces, the standardized communication protocol commonly implemented in off-road vehicles and other industrial applications.

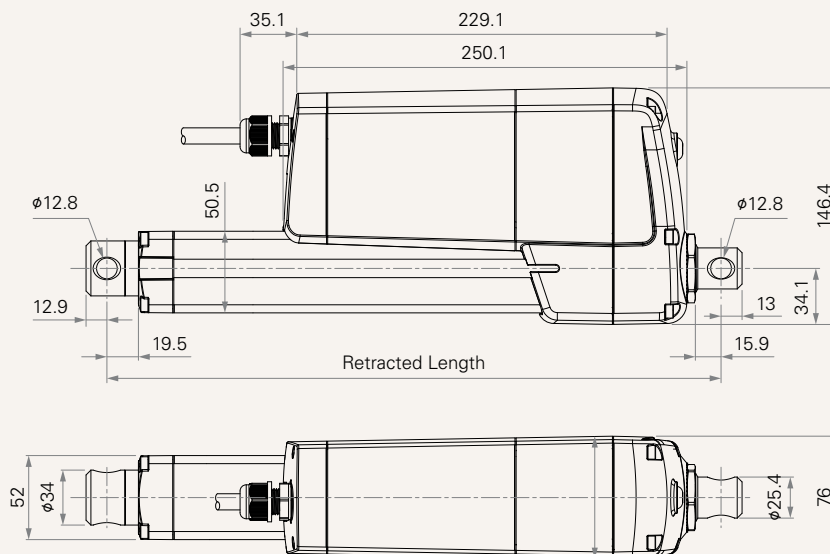
- Modbus: This is a serial communication protocol predominantly used in industrial automation and process control. The T-Smart Modbus protocol can be smoothly incorporated into existing industrial systems through its interface.

General Features

Max. load	16,000N (push/pull)
Max. speed at max. load	8.9mm/s
Max. speed at no load	172.5mm/s
Retracted length	≥ Stroke + 200mm
IP rating	IP69K
Certificate	UL73, EMC
Stroke	25~1000mm
Output signals	Mechanical Pot., external signal of actuator, NPN Hall sensors, PNP Hall sensors
Voltage	12/24V DC; 12/24V DC (thermal switch)
Operational temperature range	-40°C~+85°C
Operational temperature range at full performance	+5°C~+45°C
Manual drive	

Drawing

Standard Dimensions
(mm)



Load and Speed

Spindle Type	CODE	Load (N)		Self Locking Force (N)	Duty Cycle	Typical Current (A)		Typical Speed (mm/s)	
		Push	Pull			No Load	With Load	No Load	With Load
				Mechanical Brake		24VDC	24VDC	24VDC	24VDC
Motor Speed (5100RPM)									
ACME screw	F	500	500	650	25%	2.5	10.2	172.5	152.0
	K	1000	1000	1300	25%	2.5	10.2	86.0	76.0
	G	2500	2500	3250	25%	2.5	10.5	43.0	38.0
	H	5000	5000	6500	25%	2.5	10.2	21.5	19.0
	M	7500	7500	9750	25%	2.5	11.4	14.0	12.4
	N	10000	10000	13000	25%	2.5	11.3	10.5	9.3
	J	16000	16000	20800	15%	2.5	12.6	7.2	6.2
Ball screw	P	7500	7500	9750	25%	3.0	12.0	21.3	18.2
	Q	10000	10000	13000	25%	3.0	10.5	14.2	12.5
	R	16000	16000	20800	15%	3.0	13.0	10.6	8.9

Note

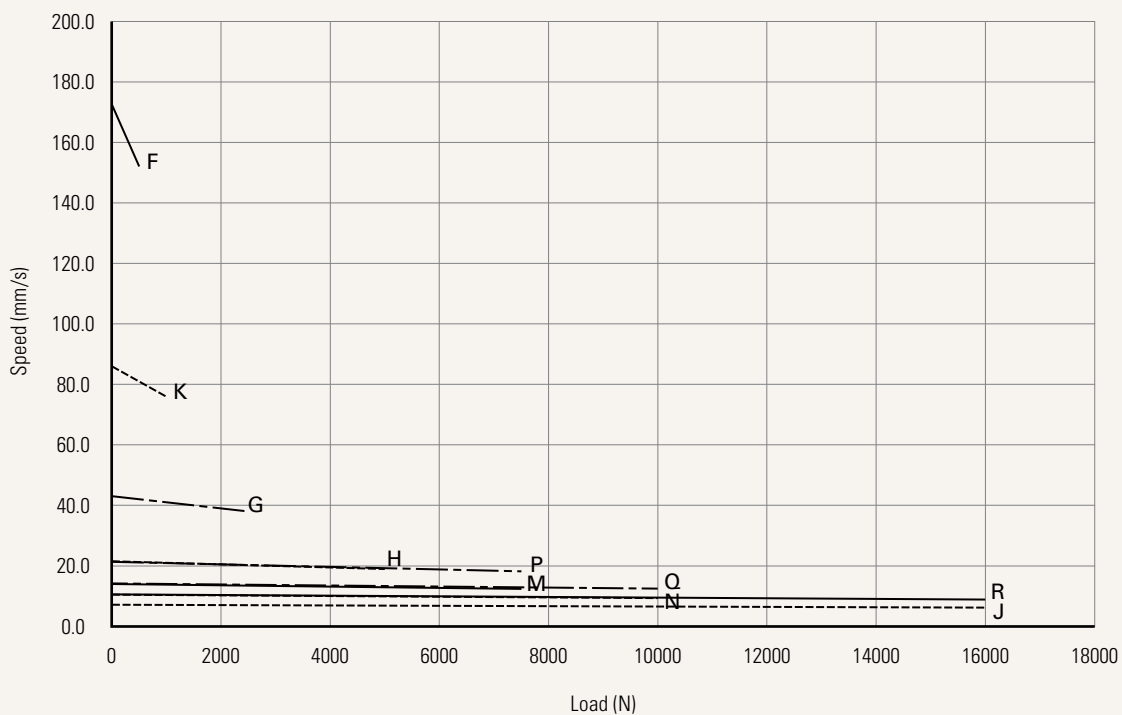
- 1 Please refer to the approved drawing for the final authentic value.
- 2 The current & speed in table are tested with 24V DC motor. With a 12V DC motor, the current is approximately twice the current measured in 24V DC. With a 36V DC motor, the current is approximately two-thirds the current measured in 24V DC. With a 48V DC motor, the current is approximately half the current measured in 24V DC. Speed will be similar for all the voltages.
- 3 The current & speed in table are tested when the actuator is extending under push load.
- 4 The current & speed in table and diagram are tested with a stable 24V DC power supply.
- 5 Without load, noise level ≤ 78 dB(A) (by TiMOTION test standard, ambient noise level ≤ 36 dB(A)).
- 6 Standard stroke: Min. 25mm, Max. please refer to below table.

CODE	Load (N)	Max Stroke (mm)
F, K, G	≤ 2500	1000
H	≤ 5000	800
M, N, P, Q	≤ 10000	600
J, R	≤ 16000	400

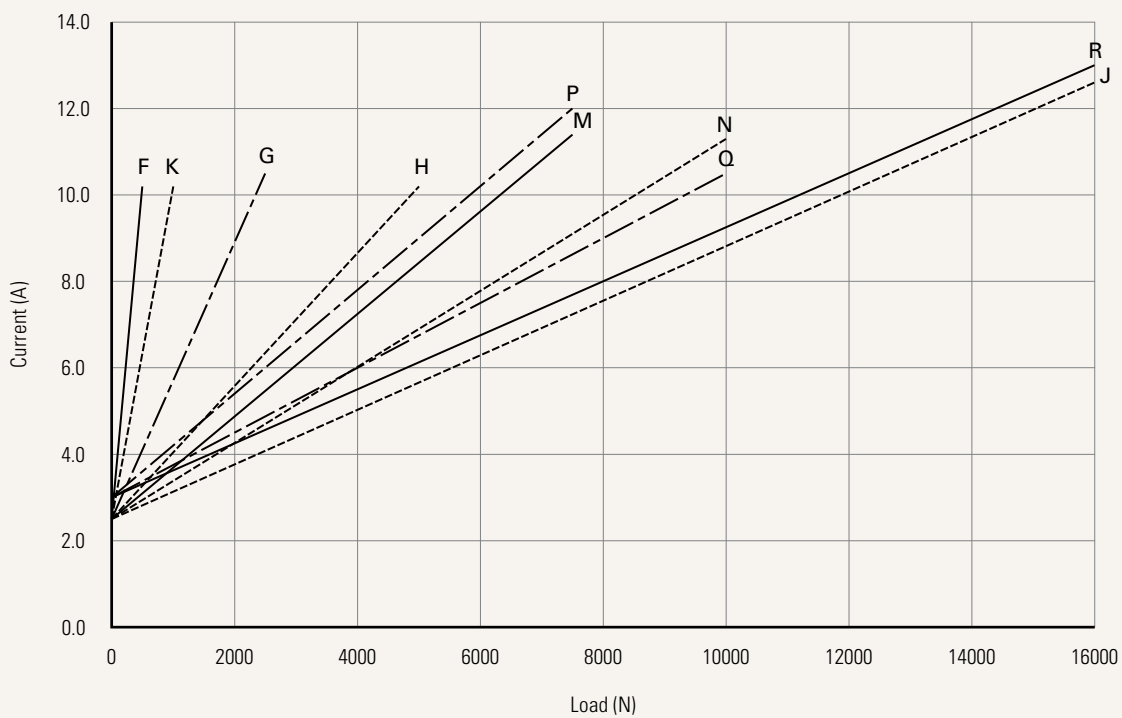
Performance Data (24V DC Motor)

Motor Speed (5100RPM)

Speed vs. Load



Current vs. Load



Type	N = Normal		T = T-Smart	
Voltage	1 = 12V DC	2 = 24V DC	6 = 12V DC, thermal switch	5 = 24V DC, thermal switch
Load & Speed	See page 2			
Stroke (mm)	See page 2			
Retracted Length (mm)	See page 5			
Rear Attachment (mm) See page 6	1 = #45 Steel, slotless, hole 10.2 2 = #45 Steel, slotless, hole 12.8 3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 5 = Stainless Steel, slotless, hole 10.2		6 = Stainless Steel, slotless, hole 12.8 7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 9 = #45 Steel, slotless, hole 16.2	
Front Attachment (mm) See page 6-7	1 = #45 Steel, slotless, hole 10.2 2 = #45 Steel, slotless, hole 12.8 3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 5 = Stainless Steel, slotless, hole 10.2		6 = Stainless Steel, slotless, hole 12.8 7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 9 = #45 Steel, slotless, hole 16.2 K = Rod end bearing, hole 12.8	
Direction of Rear Attachment (Counterclockwise) See page 7	1 = 0°	2 = 45°	3 = 90°	4 = 135°
Function of Limit Switches See page 8	1 = Two limit switches cut off the actuator at EOS (with MCU embedded) 3 = Two limit switches send signal at EOS (signal type: normally closed)		D = Two limit switches send signal at EOS (exclusive option for TID1) 6 = Two limit switches cut off the actuator and send signal at EOS (signal type: normally open, when choosing #6, output signal is restricted to #0_without)	
External Signal of Actuator	0 = Without	1 = Reed switch*1, tinned leads	2 = Reed switch*2, tinned leads	
Output Signal	0 = Without 1 = Mechanical Pot. N = NPN Hall sensor*2		P = PNP Hall sensor*2 T = Hall sensor*2 input to T-Smart PCBA (T-Smart dedicated option)	
IP Rating	1 = Without 6 = IP66M	7 = IP67 8 = IP68	9 = IP69K	
Cable Exit	1 = Single cable T = Direct cable out, 1+1 type: Military connector (A1) + Molex 6P connector (P2)			
A1 / P1 Connector (mm) See page 7	01 = Tinned leads, unsheathed wire 50, stripped wire 10			
A1 / P1 Cable Length (mm)	0500 = 500	1000 = 1000	1500 = 1500	2000 = 2000
P2 Connector	00 = Without		0P = Rubber seal plug (T-Smart dedicated option)	
P2 Cable Length (mm)	0000 = Without			
P3 Connector	00 = Without			
P3 Cable Length (mm)	0000 = Without			
Alternative	N = Normal T = Advanced J = SAE J1939 (transmission rate 250Kbps, J1939 default, proposal#PF22018)	L = SAE J1939 (transmission rate 250Kbps, J1939 Secure version, proposal#PF24032)	K = SAE J1939 (transmission rate 500Kbps, proposal#DS23021)	M = Modbus (proposal# PF22082) A = Customized, proposal number needed
Packaging (mm²)	0 = Sample packaging C = Standard package, US fumigated pallet (1219*1016) 1 = Standard package, EU fumigated pallet (1200*800) 2 = Standard package, EU fumigated pallet (1500*800)		E = Standard package, US plywood pallet (1219*1016) 5 = Standard package, EU plywood pallet (1200*800) 6 = Standard package, EU plywood pallet (1500*800)	

Retracted Length (mm)

1. Calculate $A+B+C+D = Y$
2. Retracted length needs to $\geq \text{Stroke}+Y$

Important notice:

Depending on the attachments, the motor cover might interfere with the customer's device, when retracted length is between 225~318mm. Please confirm before placing order.

A.

Front Attach.	Rear Attach.		
	1, 2, 5, 6	3, 4, 7, 8	9
1, 2, 5, 6	+200	+208	+205
3, 4, 7, 8	+207	+215	+212
9	+203	+211	+208
K	+225	+233	+230

B.

Stroke (mm)	Load & speed type (N)
	F, K, G, H, M, N, J, P, Q, R
25~150	-
151~200	-
201~250	+10
251~300	+20
301~350	+30
351~400	+40
401~450	+50
451~500	+60
501~550	+70
551~600	+80
601~650	+90
651~700	+100
701~750	+110
751~800	+120
801~850	+130
851~900	+140
901~950	+150
951~1000	+160

C. Output Signal

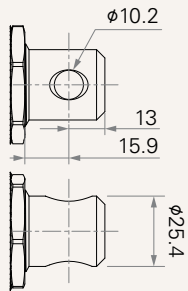
0, 4, 5, N, P	-
1	+18

D. Load and Speed

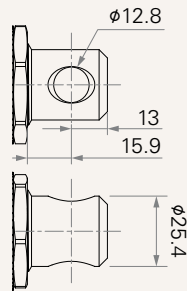
K, G, H, M, N, J	-
F	+13
P, Q, R	+20

Rear Attachment (mm)

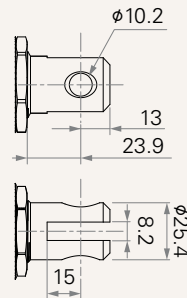
1 = #45 Steel, slotless, hole 10.2



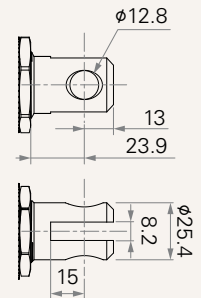
2 = #45 Steel, slotless, hole 12.8



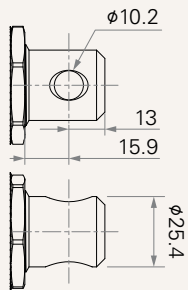
3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



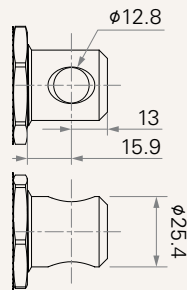
4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8



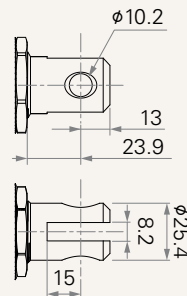
5 = Stainless Steel, slotless, hole 10.2



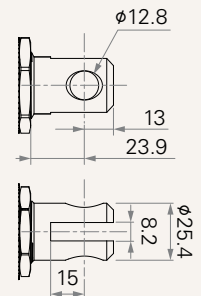
6 = Stainless Steel, slotless, hole 12.8



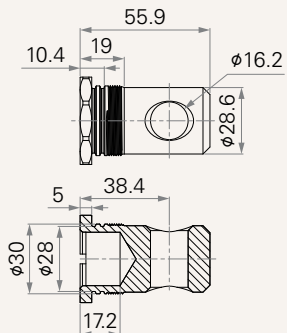
7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8

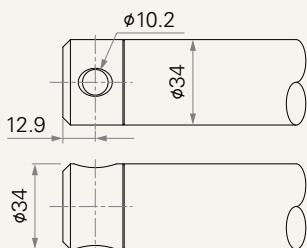


9 = #45 Steel, slotless, hole 16.2

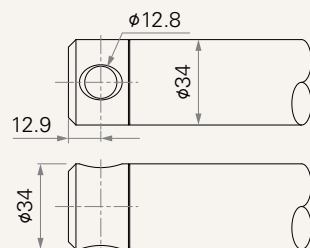


Front Attachment (mm)

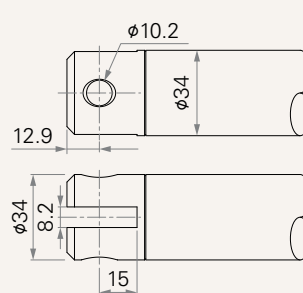
1 = #45 Steel, slotless, hole 10.2



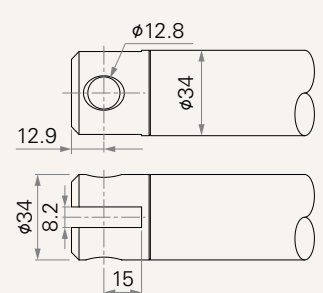
2 = #45 Steel, slotless, hole 12.8



3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2

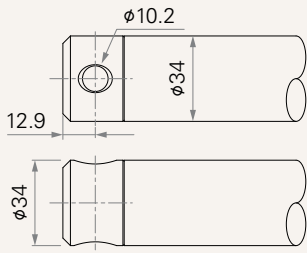


4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8

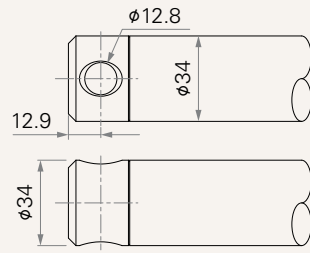


Front Attachment (mm)

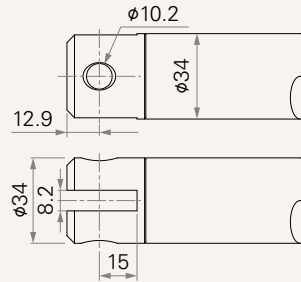
5 = Stainless Steel, slotless, hole 10.2



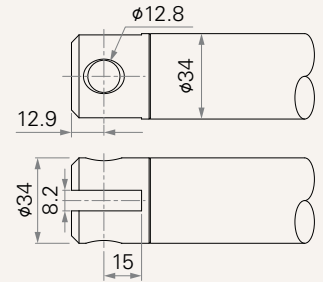
6 = Stainless Steel, slotless, hole 12.8



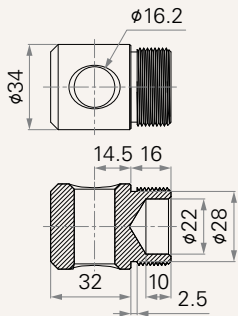
7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



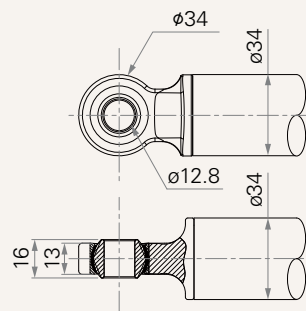
8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8



9 = #45 Steel, slotless, hole 16.2

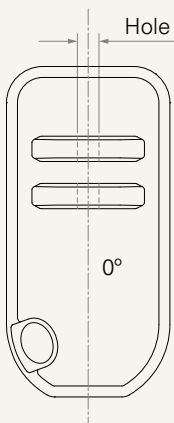


K = Rod end bearing, hole 12.8

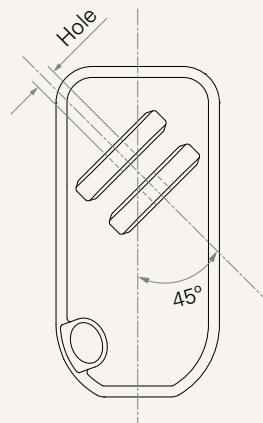


Direction of Rear Attachment (Counterclockwise)

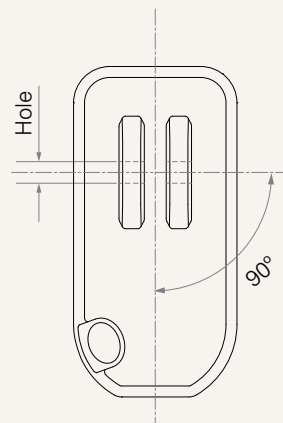
1 = 0°



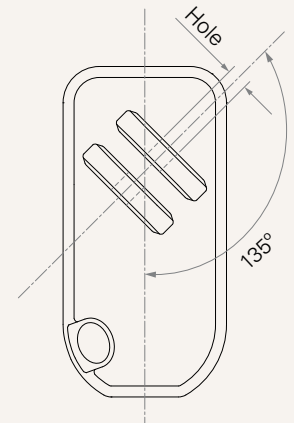
2 = 45°



3 = 90°

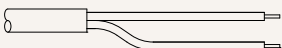


4 = 135°



Connector (mm)

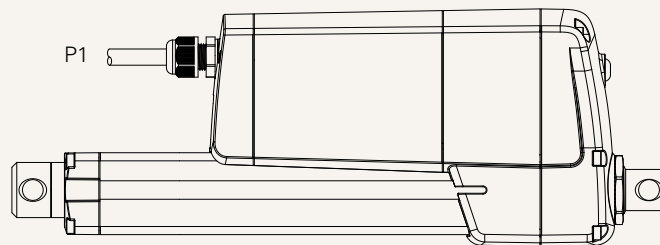
01 = Tinned leads, unsheathed wire 50, stripped wire 10



Wire Definition

DC, Normal

Port	Function of Limit Switches	Wire Color	Wire Gauge (AWG)	Position Feedback			
				0. Without	1. Mechanical Pot.	N. NPN Hall*2	P. PNP Hall*2
P1	1. Two Micro Switches Cut off The Actuator at EOS	● RD	14	EXT+	EXT+	EXT+	EXT+
		● BK	14	RET+	RET+	RET+	RET+
		● RD	20	-	V-out	Vcc	Vcc
		○ WH	20	-	V-in	S1	S1
		● BU	20	-	-	S2	S2
		● BK	20	-	GND	GND	GND
		● BN	20	-	-	-	-
		● OG	20	-	-	-	-
		● VT	20	-	-	-	-
		3. D. 6. Two Micro Switches Send Signal at EOS	● RD	14	EXT+	EXT+	EXT+
	● BK		14	RET+	RET+	RET+	RET+
	● RD		20	COM	COM	Vcc	Vcc
	○ WH		20	EOS-extended	EOS-extended	S1	S1
	● BU		20	-	EOS-retracted	S2	S2
	● BK		20	EOS-retracted	GND	GND	GND
	● BN		20	-	V-in	EOS-extended	EOS-extended
	● OG		20	-	V-out	EOS-retracted	EOS-retracted
	● VT		20	-	-	COM	COM



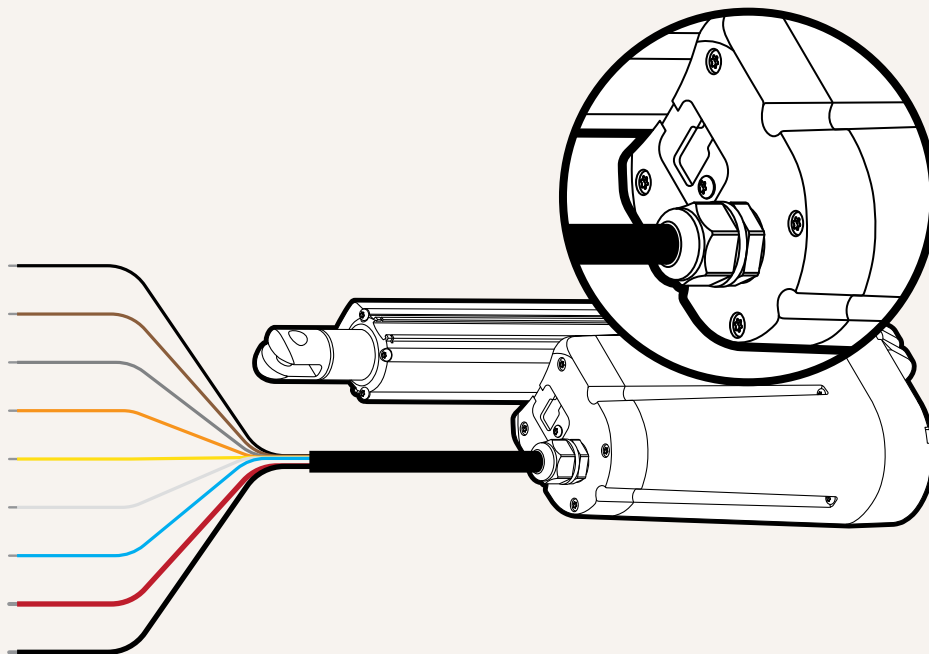
Wire Definition

#T_Smart

Direct Cable Out, 1+1 Type: Military Connector (A1) + Molex 6P Connector (P2) (T-Smart Dedicated Option)

Port	Wire Color	AWG	Signal
A1	● RD	14	+Vcc
	● BK	14	Power ground
	● BN	20	Ctrl - Extend
	● GY	20	Ctrl - Retract
	● OG	20	EOS-extended
	● YE	20	EOS-retracted
	○ WH	20	Hall-Pot./ Hall A/ Commu. A
	● BU	20	PWM/ Hall B/ Commu. B
	● BK	20	Signal ground
	P2	● RD	20
○ WH		20	
● BU		20	
● BK		20	
● BN		20	
● GY		20	

* Control motor movement: when Vcc wire is short circuit with Ctrl-Extend / Ctrl-retract wire.



Terms of Use

The user is responsible for determining the suitability of TiMOTION products for a specific application. TiMOTION products are subject to change without prior notice.