

# Linear DC-Servomotors

with Analog Hall Sensors  
QUICKSHAFT® Technology

## 1,03 N

For combination with  
Drive Electronics:  
Motion Controller

### Series LM 0830 ... 01

	LM 0830-	015-01	040-01		
1 Continuous force <sup>1)</sup>	$F_{e \max.}$	1,03		N	
2 Peak force <sup>1) 2)</sup>	$F_{p \max.}$	2,74		N	
3 Continuous current <sup>1)</sup>	$I_{e \max.}$	0,53		A	
4 Peak current <sup>1) 2)</sup>	$I_{p \max.}$	1,41		A	
5 Back-EMF constant	$k_E$	1,58		V/m/s	
6 Force constant <sup>3)</sup>	$k_F$	1,94		N/A	
7 Terminal resistance, phase-phase	$R$	7,37		$\Omega$	
8 Terminal inductance, phase-phase	$L$	117		$\mu\text{H}$	
9 Stroke length	$s_{\max.}$		15	40	mm
10 Repeatability <sup>4)</sup>			40	40	$\mu\text{m}$
11 Precision <sup>4)</sup>			120	140	$\mu\text{m}$
12 Acceleration <sup>5)</sup>	$a_{e \max.}$		206,9	147,8	$\text{m/s}^2$
13 Speed <sup>5) 6)</sup>	$v_{e \max.}$		1,8	2,4	m/s
14 Thermal resistance	$R_{th1} / R_{th2}$	6,6 / 37,4			K/W
15 Thermal time constant	$\tau_{w1} / \tau_{w2}$	4 / 291			s
16 Operating temperature range		- 20 ... +125			$^{\circ}\text{C}$
17 Rod weight <sup>7)</sup>	$m_m$		5	7	g
18 Total weight <sup>7)</sup>	$m_t$		15	17	g
19 Magnetic pitch	$\tau_m$	12			mm
20 Rod bearings		polymer sleeves			
21 Housing material		metal, non-magnetic			
22 Direction of movement		electronically reversible			

<sup>1)</sup> thermal resistance  $R_{th2}$  by 55% reduced

<sup>2)</sup> for max. 1 second with a duty cycle of 10%

<sup>3)</sup> with sine wave commutation

<sup>4)</sup> typical values with integrated linear Hall sensors and Motion Controller.

The values depend on conditions of use

<sup>5)</sup> theoretical value, referring only to the motor

<sup>6)</sup> with a triangular speed profile and the max. stroke

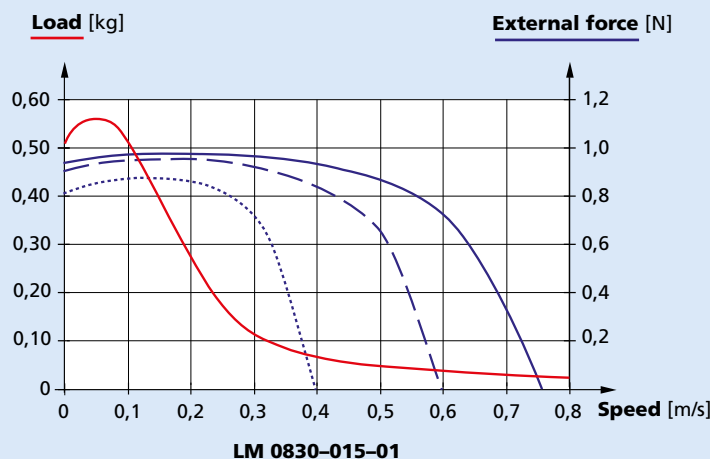
<sup>7)</sup> rounded value, for reference only

**Notes:** These motors are for operation with DC-voltage < 50 V DC.

The given values are for free standing motors.

The mounting with magnetic conductive metal can influence the characteristics of the motor.

**Caution:** Presence of strong magnetic fields. Static sensitive device.



**Trapezoidal motion profile** ( $t_1 = t_2 = t_3$ )

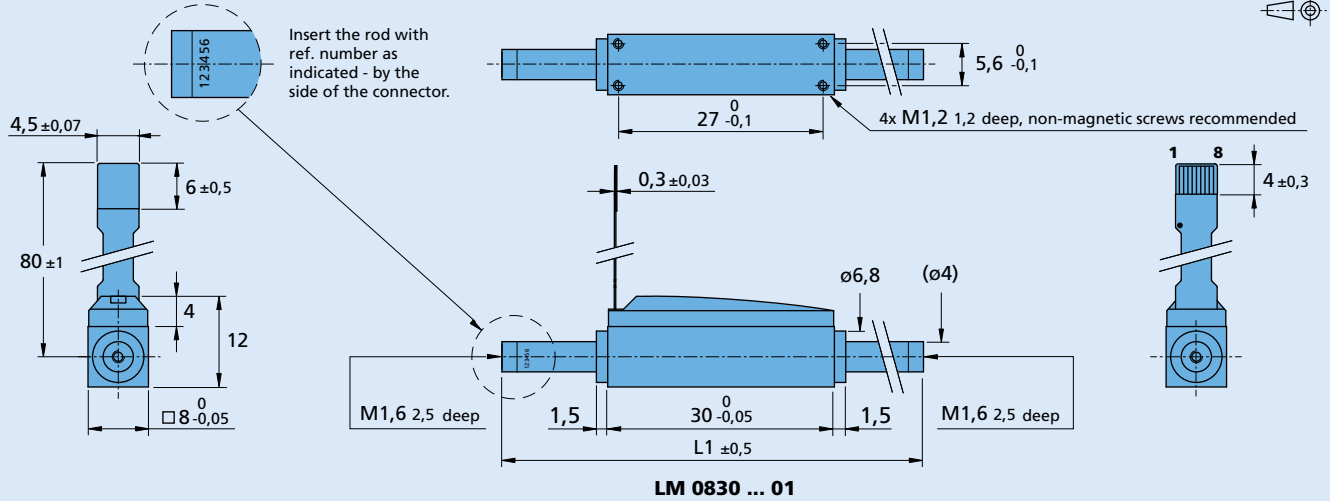
Displacement distance:	15 mm
Friction coefficient:	0,2
Slope angle:	$0^{\circ}$
Rest time:	0,1 s

**Load:** The max. permissible load at a given speed with an external force of 0 N

**External force:** The max. permissible external force at a given speed with a load of:

- 0,035 Kg	—————
- 0,05 Kg	- - - - -
- 0,1 Kg	.....

### Linear DC-Servomotor LM 0830



### Ordering information

#### Linear DC-Servomotors Series

Series	Stroke mm	Rod length L1 ± 0,5 mm
LM 0830-015-01	-7,5   0   +7,5	58
LM 0830-040-01	-20   0   +20	82

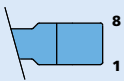
Note: Single rod available on request.

#### Options

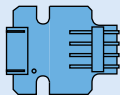
- Flexboard adapter (part no. 6501.00117), size 18 x 23 x 6 mm
- Cable with connector (part no. 6501.00118), 200 mm length ± 10 mm, 8 conductors

### Cable and connection information

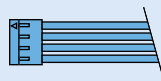
#### Motor flexboard



#### Flexboard adapter

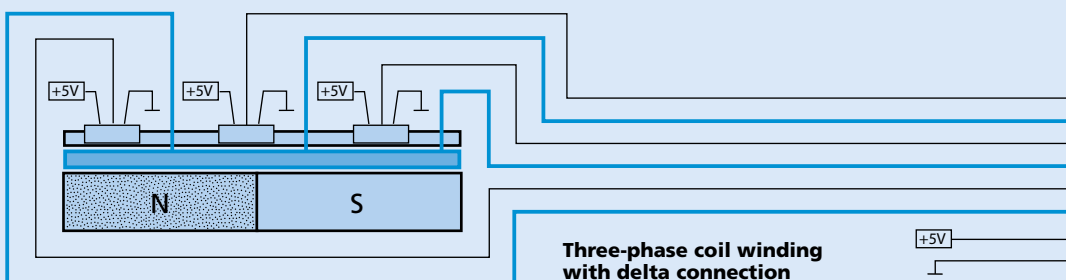
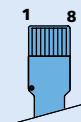


#### Cable for connection with Motion Controller



**Recommended connector**  
Molex - ZIF connector, Nr. 52746

**Flexboard**  
8 circuits; 0,5mm pitch



#### Connection

No.	Function	Color
6	Hall sensor C	grey
1	Phase C	yellow
7	Hall sensor B	blue
2	Phase B	orange
8	Hall sensor A	green
3	Phase A	brown
5	+5V	red
4	GND	black

# Linear DC-Servomotors

with Analog Hall Sensors  
QUICKSHAFT® Technology

## 3,6 N

For combination with  
Drive Electronics:  
Motion Controller

### Series LM 1247 ... 11

	LM 1247-	020-11	040-11	060-11	080-11	100-11	120-11	
1 Continuous force <sup>1)</sup>	$F_e \text{ max.}$	3,6						N
2 Peak force <sup>1) 2)</sup>	$F_p \text{ max.}$	10,7						N
3 Continuous current <sup>1)</sup>	$I_e \text{ max.}$	0,55						A
4 Peak current <sup>1) 2)</sup>	$I_p \text{ max.}$	1,66						A
5 Back-EMF constant	$k_E$	5,25						V/m/s
6 Force constant <sup>3)</sup>	$k_F$	6,43						N/A
7 Terminal resistance, phase-phase	$R$	13,17						$\Omega$
8 Terminal inductance, phase-phase	$L$	820						$\mu\text{H}$
9 Stroke length	$s_{\text{max.}}$	20	40	60	80	100	120	mm
10 Repeatability <sup>4)</sup>		40	40	40	40	40	40	$\mu\text{m}$
11 Precision <sup>4)</sup>		120	140	160	180	200	220	$\mu\text{m}$
12 Acceleration <sup>5)</sup>	$a_e \text{ max.}$	198,0	148,5	127,3	101,8	91,4	82,9	$\text{m/s}^2$
13 Speed <sup>5) 6)</sup>	$v_e \text{ max.}$	2,0	2,4	2,8	2,9	3,0	3,2	m/s
14 Thermal resistance	$R_{th1} / R_{th2}$	3,2 / 20,0						K/W
15 Thermal time constant	$\tau_{w1} / \tau_{w2}$	11 / 624						s
16 Operating temperature range		- 20 ... +125						$^{\circ}\text{C}$
17 Rod weight <sup>7)</sup>	$m_m$	18	24	28	35	39	43	g
18 Total weight <sup>7)</sup>	$m_t$	57	63	67	74	78	82	g
19 Magnetic pitch	$\tau_m$	18						mm
20 Rod bearings		polymer sleeves						
21 Housing material		metal, non-magnetic						
22 Direction of movement		electronically reversible						

<sup>1)</sup> thermal resistance  $R_{th2}$  by 55% reduced

<sup>2)</sup> for max. 1 second with a duty cycle of 10%

<sup>3)</sup> with sine wave commutation

<sup>4)</sup> typical values with integrated linear Hall sensors and Motion Controller.

The values depend on conditions of use

<sup>5)</sup> theoretical value, referring only to the motor

<sup>6)</sup> with a triangular speed profile and the max. stroke

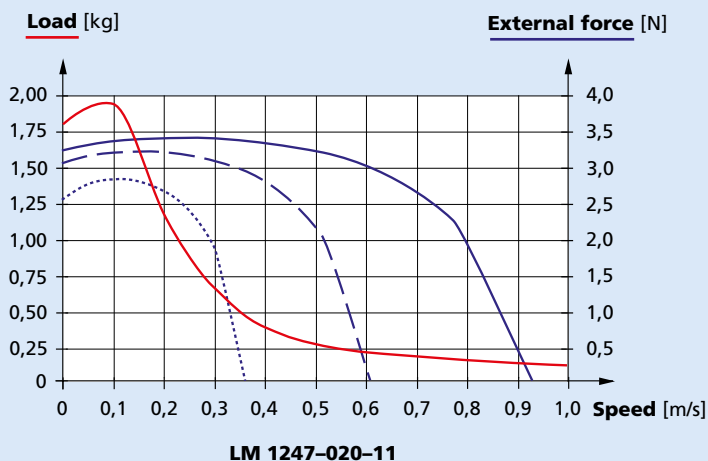
<sup>7)</sup> rounded value, for reference only

**Notes:** These motors are for operation with DC-voltage < 75 V DC.

The given values are for free standing motors.

The mounting with magnetic conductive metal can influence the characteristics of the motor.

**Caution:** Presence of strong magnetic fields. Static sensitive device.



**Trapezoidal motion profile** ( $t_1 = t_2 = t_3$ )

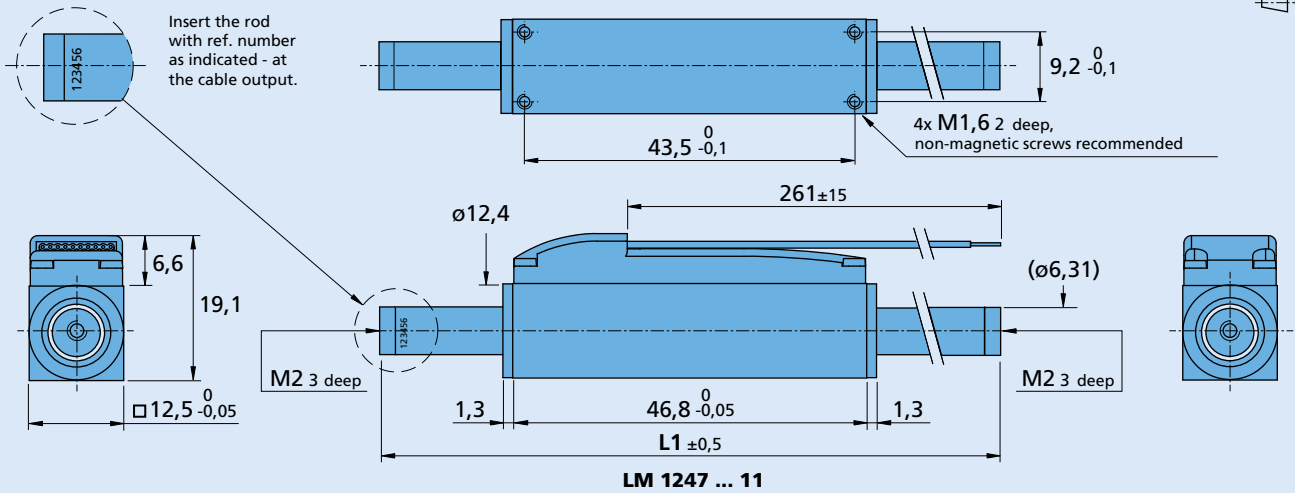
Displacement distance:	20 mm
Friction coefficient:	0,2
Slope angle:	$0^{\circ}$
Rest time:	0,1 s

**Load:** The max. permissible load at a given speed with an external force of 0 N

**External force:** The max. permissible external force at a given speed with a load of:

- 0,1 Kg —————
- 0,2 Kg - - - - -
- 0,5 Kg ·········

### Linear DC-Servomotor LM 1247 ... 11 with axial connection



### Ordering information

#### Linear DC-Servomotors Series

#### Stroke mm

#### Rod length L1 ±0,5 mm

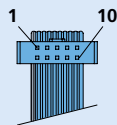
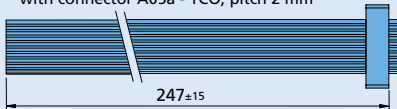
Series	Stroke mm	Rod length L1 ±0,5 mm
LM 1247-020-11	-10   0   +10	82
LM 1247-040-11	-20   0   +20	109
LM 1247-060-11	-30   0   +30	127
LM 1247-080-11	-40   0   +40	154
LM 1247-100-11	-50   0   +50	172
LM 1247-120-11	-60   0   +60	190

Note: Single rod available on request.

### Cable and connection information

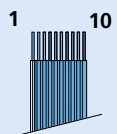
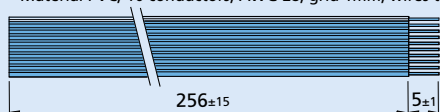
#### Cable for LM 1247-...-11C

Material PVC, 10 conductors, AWG 28 with connector A05a - TCO, pitch 2 mm



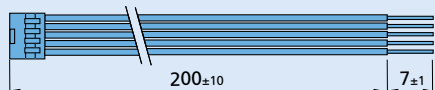
#### Cable for LM 1247-...-11

Material PVC, 10 conductors, AWG 28, grid 1mm, wires tinned

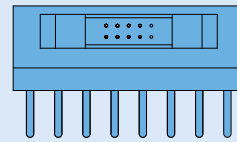


#### Cable for LM 1247-...-01

Single wires, material PVC, 10 conductors, AWG 28. Recommended connector: Molex - Nr. 51110-1060



\* The color reference refers only to the LM 1247-...-01 version.



#### Adapter for LM 1247-...-11C

for connection with Motion Controllers MCLM 3006 S RS/CF (part no. 6501.00182). MCLM 3002 S RS/CF (part no. 6501.00171).

#### Connection LM 1247-...-01

PIN	Function	Color*
1	Phase C	yellow
7	Phase B	orange
8	Phase A	brown
4	GND	black
3	+5V	red
6	Hall sensor C	grey
5	Hall sensor B	blue
2	Hall sensor A	green
9	N.C.	white
10	N.C.	purple

#### LM 1247-...-11 / 11C

PIN	Function
1	Phase C
2	Phase B
3	Phase A
4	GND
5	+5V
6	Hall sensor C
7	Hall sensor B
8	Hall sensor A
9	N.C.
10	N.C.

# Linear DC-Servomotors

3,6 N

for sin/cos control  
QUICKSHAFT® Technology

## Series LM 1247 ... 12

	LM 1247-	020-12	040-12	060-12	080-12	100-12	120-12	
1 Continuous force <sup>1)</sup>	$F_e \text{ max.}$	3,6						N
2 Peak force <sup>1) 2)</sup>	$F_p \text{ max.}$	10,7						N
3 Continuous current <sup>1)</sup>	$I_e \text{ max.}$	0,55						A
4 Peak current <sup>1) 2)</sup>	$I_p \text{ max.}$	1,66						A
5 Back-EMF constant	$k_E$	5,25						V/m/s
6 Force constant <sup>3)</sup>	$k_F$	6,43						N/A
7 Terminal resistance, phase-phase	$R$	13,17						$\Omega$
8 Terminal inductance, phase-phase	$L$	820						$\mu\text{H}$
9 Stroke length	$s_{\text{max}}$	20	40	60	80	100	120	mm
10 Repeatability <sup>4)</sup>		80	80	80	80	80	80	$\mu\text{m}$
11 Precision <sup>4)</sup>		200	220	240	260	280	300	$\mu\text{m}$
12 Acceleration <sup>5)</sup>	$a_e \text{ max.}$	198,0	148,5	127,3	101,8	91,4	82,9	$\text{m/s}^2$
13 Speed <sup>5) 6)</sup>	$v_e \text{ max.}$	2,0	2,4	2,8	2,9	3,0	3,2	m/s
14 Thermal resistance	$R_{th1} / R_{th2}$	3,2 / 20,0						K/W
15 Thermal time constant	$\tau_{w1} / \tau_{w2}$	11 / 624						s
16 Operating temperature range		- 20 ... +125						$^{\circ}\text{C}$
17 Rod weight <sup>7)</sup>	$m_m$	18	24	28	35	39	43	g
18 Total weight <sup>7)</sup>	$m_t$	57	63	67	74	78	82	g
19 Magnetic pitch	$\tau_m$	18						mm
20 Rod bearings		polymer sleeves						
21 Housing material		metal, non-magnetic						
22 Direction of movement		electronically reversible						

<sup>1)</sup> thermal resistance  $R_{th2}$  by 55% reduced

<sup>2)</sup> for max. 1 second with a duty cycle of 10%

<sup>3)</sup> with sine wave commutation

<sup>4)</sup> typical values with integrated linear Hall sensors (sin/cos) and Motion Controller Elmo "Whistle" SOL-WHI2.5/60I01.

The values depend on conditions of use

<sup>5)</sup> theoretical value, referring only to the motor

<sup>6)</sup> with a triangular speed profile and the max. stroke

<sup>7)</sup> rounded value, for reference only

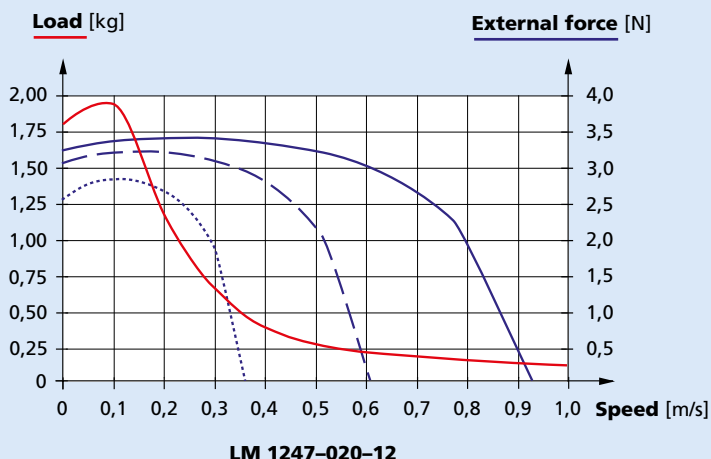
**Notes:** These motors are for operation with DC-voltage < 75 V DC.

The given values are for free standing motors.

The mounting with magnetic conductive metal can influence the characteristics of the motor.

For more information about drive electronics, please contact your local sales representative.

**Caution:** Presence of strong magnetic fields. Static sensitive device.



**Trapezoidal motion profile** ( $t_1 = t_2 = t_3$ )

Displacement distance:	20 mm
Friction coefficient:	0,2
Slope angle:	$0^{\circ}$
Rest time:	0,1 s

**Load:** The max. permissible load at a given speed with an external force of 0 N

**External force:** The max. permissible external force at a given speed with a load of:

- 0,1 Kg —————
- 0,2 Kg - - - - -
- 0,5 Kg ·········



# Linear DC-Servomotors

with Analog Hall Sensors  
QUICKSHAFT® Technology

## 9,2 N

For combination with  
Drive Electronics:  
Motion Controller

### Series LM 2070 ... 11

	LM 2070-	040-11	080-11	120-11	160-11	220-11	
1 Continuous force <sup>1)</sup>	$F_e \text{ max.}$	9,2					N
2 Peak force <sup>1) 2)</sup>	$F_p \text{ max.}$	27,6					N
3 Continuous current <sup>1)</sup>	$I_e \text{ max.}$	0,79					A
4 Peak current <sup>1) 2)</sup>	$I_p \text{ max.}$	2,37					A
5 Back-EMF constant	$k_E$	9,5					V/m/s
6 Force constant <sup>3)</sup>	$k_F$	11,64					N/A
7 Terminal resistance, phase-phase	$R$	10,83					$\Omega$
8 Terminal inductance, phase-phase	$L$	1 125					$\mu\text{H}$
9 Stroke length	$s_{\text{max}}$	40	80	120	160	220	mm
10 Repeatability <sup>4)</sup>		60	60	60	60	80	$\mu\text{m}$
11 Precision <sup>4)</sup>		200	300	400	500	600	$\mu\text{m}$
12 Acceleration <sup>5)</sup>	$a_e \text{ max.}$	93,9	65,7	54,8	46,0	36,8	$\text{m/s}^2$
13 Speed <sup>5) 6)</sup>	$v_e \text{ max.}$	1,9	2,3	2,6	2,7	2,8	m/s
14 Thermal resistance	$R_{th1} / R_{th2}$	3,1 / 9,3					K/W
15 Thermal time constant	$\tau_{w1} / \tau_{w2}$	30 / 1 200					s
16 Operating temperature range		- 20 ... +125					$^{\circ}\text{C}$
17 Rod weight <sup>7)</sup>	$m_m$	98	140	168	200	250	g
18 Total weight <sup>7)</sup>	$m_t$	236	278	306	338	388	g
19 Magnetic pitch	$\tau_m$	24					mm
20 Rod bearings		polymer sleeves					
21 Housing material		metal, non-magnetic					
22 Direction of movement		electronically reversible					

<sup>1)</sup> thermal resistance  $R_{th2}$  by 55% reduced

<sup>2)</sup> for max. 1 second with a duty cycle of 10%

<sup>3)</sup> with sine wave commutation

<sup>4)</sup> typical values with integrated linear Hall sensors and Motion Controller.

The values depend on conditions of use

<sup>5)</sup> theoretical value, referring only to the motor

<sup>6)</sup> with a triangular speed profile and the max. stroke

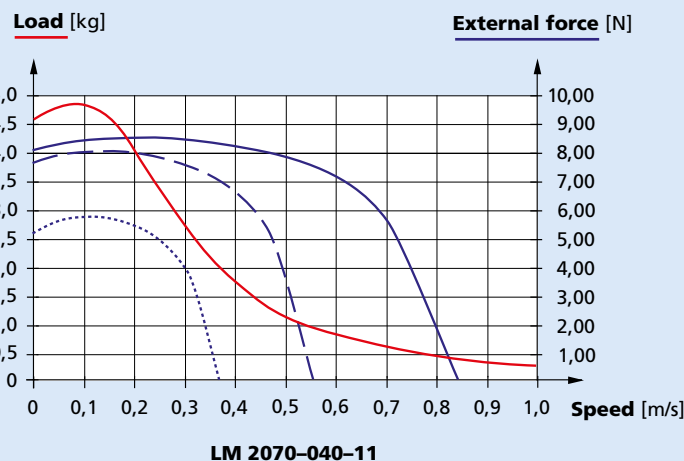
<sup>7)</sup> rounded value, for reference only

**Notes:** These motors are for operation with DC-voltage < 75 V DC.

The given values are for free standing motors.

The mounting with magnetic conductive metal can influence the characteristics of the motor.

**Caution:** Presence of strong magnetic fields. Static sensitive device.



**Trapezoidal motion profile** ( $t_1 = t_2 = t_3$ )

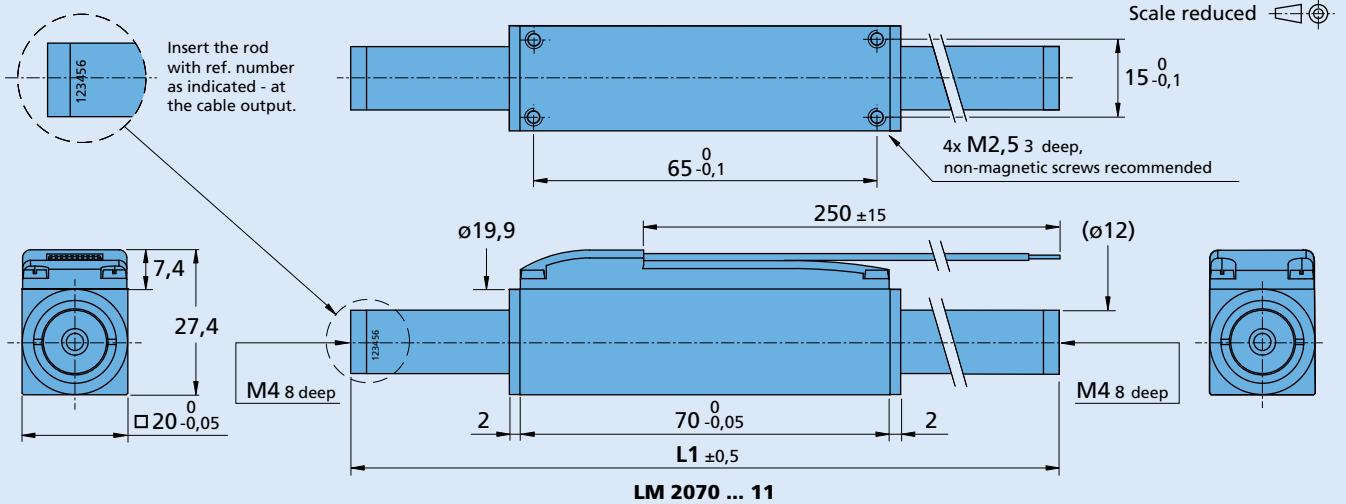
Displacement distance:	40 mm
Friction coefficient:	0,2
Slope angle:	$0^{\circ}$
Rest time:	0,1 s

**Load:** The max. permissible load at a given speed with an external force of 0 N

**External force:** The max. permissible external force at a given speed with a load of:

- 0,5 Kg —————
- 1,0 Kg - - - - -
- 2,0 Kg ·········

### Linear DC-Servomotor LM 2070 ... 11 with axial connection



### Ordering information

#### Linear DC-Servomotors Series

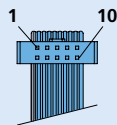
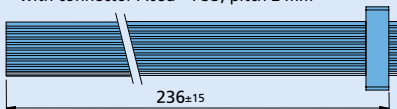
Series	Stroke mm	Rod length L1 ±0,5 mm
LM 2070-040-11	- 20   0   + 20	134
LM 2070-080-11	- 40   0   + 40	182
LM 2070-120-11	- 60   0   + 60	218
LM 2070-160-11	- 80   0   + 80	254
LM 2070-220-11	- 110   0   + 110	314

**Note:** Single rod available on request.

### Cable and connection information

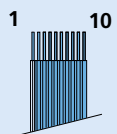
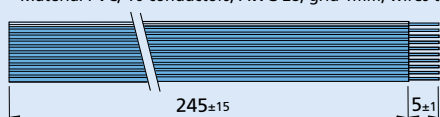
#### Cable for LM 2070-...-11C

Material PVC, 10 conductors, AWG 28 with connector A05a - TCO, pitch 2 mm



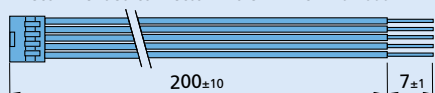
#### Cable for LM 2070-...-11

Material PVC, 10 conductors, AWG 28, grid 1mm, wires tinned

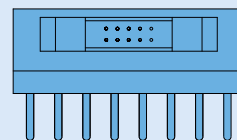


#### Cable for LM 2070-...-01

Single wires, material PVC, 10 conductors, AWG 28. Recommended connector: Molex - Nr. 51110-1060



\* The color reference refers only to the LM 2070-...-01 version.



**Adapter for LM 2070-...-11C**  
for connection with Motion Controllers MCLM 3006 S RS/CF (part no. 6501.00182).

#### Connection LM 2070-...-01

PIN	Function	Color*
1	Phase C	yellow
7	Phase B	orange
8	Phase A	brown
4	GND	black
3	+5V	red
6	Hall sensor C	grey
5	Hall sensor B	blue
2	Hall sensor A	green
9	N.C.	white
10	N.C.	purple

#### LM 2070-...-11 / 11C

PIN	Function
1	Phase C
2	Phase B
3	Phase A
4	GND
5	+5V
6	Hall sensor C
7	Hall sensor B
8	Hall sensor A
9	N.C.
10	N.C.



# Linear DC-Servomotors

9,2 N

for sin/cos control  
QUICKSHAFT® Technology

## Series LM 2070 ... 12

	LM 2070-	040-12	080-12	120-12	160-12	220-12	
1 Continuous force <sup>1)</sup>	$F_e \text{ max.}$	9,2					N
2 Peak force <sup>1) 2)</sup>	$F_p \text{ max.}$	27,6					N
3 Continuous current <sup>1)</sup>	$I_e \text{ max.}$	0,79					A
4 Peak current <sup>1) 2)</sup>	$I_p \text{ max.}$	2,37					A
5 Back-EMF constant	$k_E$	9,5					V/m/s
6 Force constant <sup>3)</sup>	$k_F$	11,64					N/A
7 Terminal resistance, phase-phase	$R$	10,83					$\Omega$
8 Terminal inductance, phase-phase	$L$	1 125					$\mu\text{H}$
9 Stroke length	$s_{\text{max.}}$	40	80	120	160	220	mm
10 Repeatability <sup>4)</sup>		100	100	100	100	120	$\mu\text{m}$
11 Precision <sup>4)</sup>		500	600	700	800	900	$\mu\text{m}$
12 Acceleration <sup>5)</sup>	$a_e \text{ max.}$	93,9	65,7	54,8	46,0	36,8	$\text{m/s}^2$
13 Speed <sup>5) 6)</sup>	$v_e \text{ max.}$	1,9	2,3	2,6	2,7	2,8	m/s
14 Thermal resistance	$R_{th1} / R_{th2}$	3,1 / 9,3					K/W
15 Thermal time constant	$\tau_{w1} / \tau_{w2}$	30 / 1 200					s
16 Operating temperature range		- 20 ... +125					$^{\circ}\text{C}$
17 Rod weight <sup>7)</sup>	$m_m$	98	140	168	200	250	g
18 Total weight <sup>7)</sup>	$m_t$	236	278	306	338	388	g
19 Magnetic pitch	$\tau_m$	24					mm
20 Rod bearings		polymer sleeves					
21 Housing material		metal, non-magnetic					
22 Direction of movement		electronically reversible					

<sup>1)</sup> thermal resistance  $R_{th2}$  by 55% reduced

<sup>2)</sup> for max. 1 second with a duty cycle of 10%

<sup>3)</sup> with sine wave commutation

<sup>4)</sup> typical values with integrated linear Hall sensors (sin/cos) and Motion Controller Elmo "Whistle" SOL-WHI2.5/60I01.

The values depend on conditions of use

<sup>5)</sup> theoretical value, referring only to the motor

<sup>6)</sup> with a triangular speed profile and the max. stroke

<sup>7)</sup> rounded value, for reference only

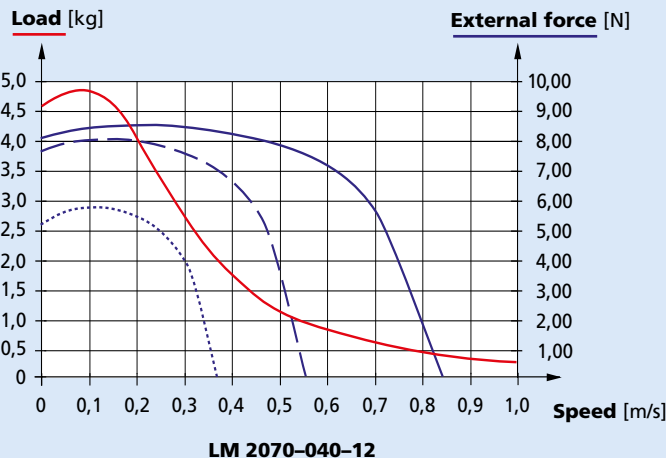
**Notes:** These motors are for operation with DC-voltage < 75 V DC.

The given values are for free standing motors.

The mounting with magnetic conductive metal can influence the characteristics of the motor.

For more information about drive electronics, please contact your local sales representative.

**Caution:** Presence of strong magnetic fields. Static sensitive device.



**Trapezoidal motion profile** ( $t_1 = t_2 = t_3$ )

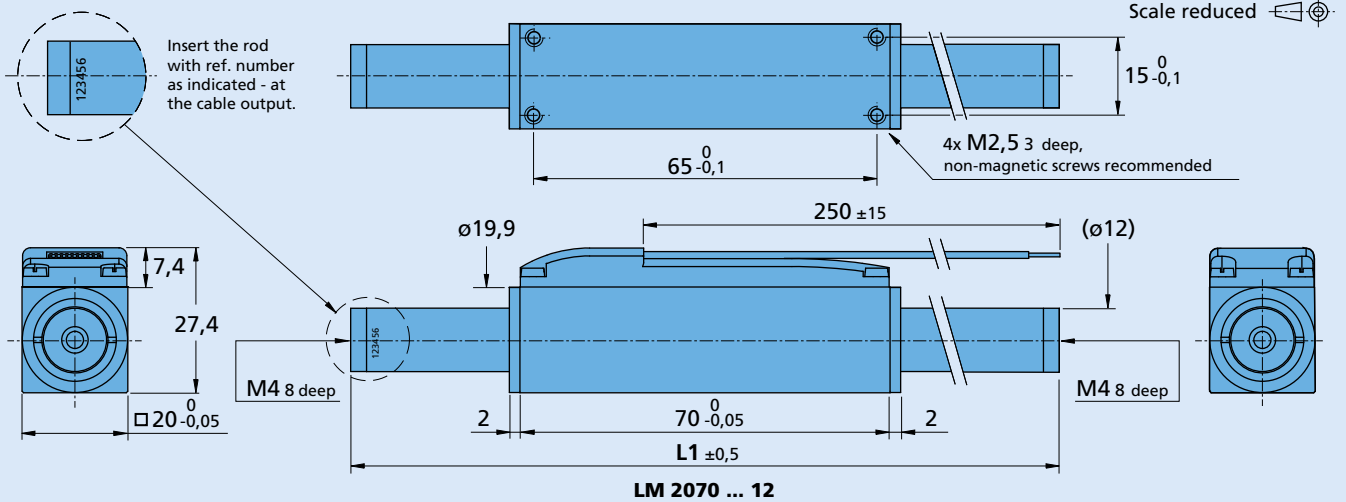
Displacement distance:	40 mm
Friction coefficient:	0,2
Slope angle:	$0^{\circ}$
Rest time:	0,1 s

**Load:** The max. permissible load at a given speed with an external force of 0 N

**External force:** The max. permissible external force at a given speed with a load of:

- 0,5 Kg —————
- 1,0 Kg - - - - -
- 2,0 Kg ·········

### Linear DC-Servomotor LM 2070 ... 12 with axial connection



### Ordering information

#### Linear DC-Servomotors Series

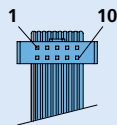
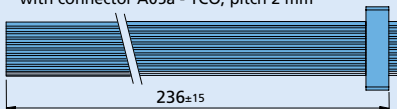
Series	Stroke mm	Rod length L1 ±0,5 mm
LM 2070-040-12	- 20   0   + 20	134
LM 2070-080-12	- 40   0   + 40	182
LM 2070-120-12	- 60   0   + 60	218
LM 2070-160-12	- 80   0   + 80	254
LM 2070-220-12	- 110   0   + 110	314

**Note:** Single rod available on request.

### Cable and connection information

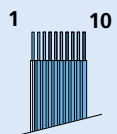
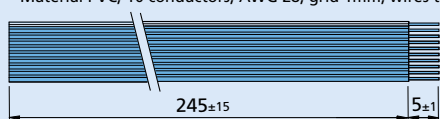
#### Cable for LM 2070-...-12C

Material PVC, 10 conductors, AWG 28 with connector A05a - TCO, pitch 2 mm



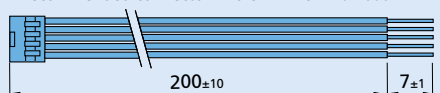
#### Cable for LM 2070-...-12

Material PVC, 10 conductors, AWG 28, grid 1mm, wires tinned



#### Cable for LM 2070-...-02

Single wires, material PVC, 10 conductors, AWG 28. Recommended connector: Molex - Nr. 51110-1060



\* The color reference refers only to the LM 2070-...-02 version.

#### Connection

##### LM 2070-...-02

PIN	Function	Color*
1	Phase C	yellow
7	Phase B	orange
8	Phase A	brown
4	GND	black
3	+5V	red
2	Sin +	green
5	Sin -	blue
6	Cos +	grey
9	Cos -	white
10	N.C.	purple

##### LM 2070-...-12 / 12C

PIN	Function
1	Phase C
2	Phase B
3	Phase A
4	GND
5	+5V
6	Sin +
7	Sin -
8	Cos +
9	Cos -
10	N.C.