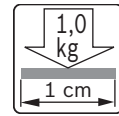


Lift EL 2



Lift for changing workpiece pallets between two different transport levels.

Required accessories

- ▶ Optical sensor for infeeding
- ▶ Rocker WI/M
- ▶ Pre-stop gate and sensors for pre-sorting

Recommended accessories

- ▶ Decentralized automatic lubrication unit LU 2
- ▶ Battery box with battery, see page 10
- ▶ Connection cable battery box – motor RKG 0062, see page 10
- ▶ Mains filter

Condition on delivery

- ▶ Motor control unit, assembled (GM = 1)
- ▶ Motor control unit, not assembled (GM = 0)
- ▶ Protective cover, partially assembled (c2, c4, c5 and c6 are assembled, see fig. on page 1 below)

- ▶ Drive through synchronous servomotor MSM with absolute encoder
 - Electrically released holding brake
 - Interface: Plug-in connectors for encoder connection and power connection
 - The following communication protocols are included: Sercos III, EtherCAT SOE, EtherCAT COE, Profinet/IO, Ethernet/IP
- ▶ Lift for conveying a workpiece pallet vertically from a lower conveying section to an upper conveying section or vice versa
- ▶ Designed as a head lift
- ▶ Suitable for use in an EPA
- ▶ For all workpiece pallet dimensions to 800 x 800 mm
- ▶ Lower conveying level possible from 290 mm
- ▶ Max. total workpiece pallet weight = 60 kg
- ▶ Short cycle times of up to 7.9 s are possible
- ▶ Strokes of up to 1500 mm can be achieved
- ▶ Maintenance hatch for service purposes included
- ▶ Options are available for protective cover material
- ▶ The product to be transported must not exceed b_{WT} or l_{WT} of the workpiece pallet

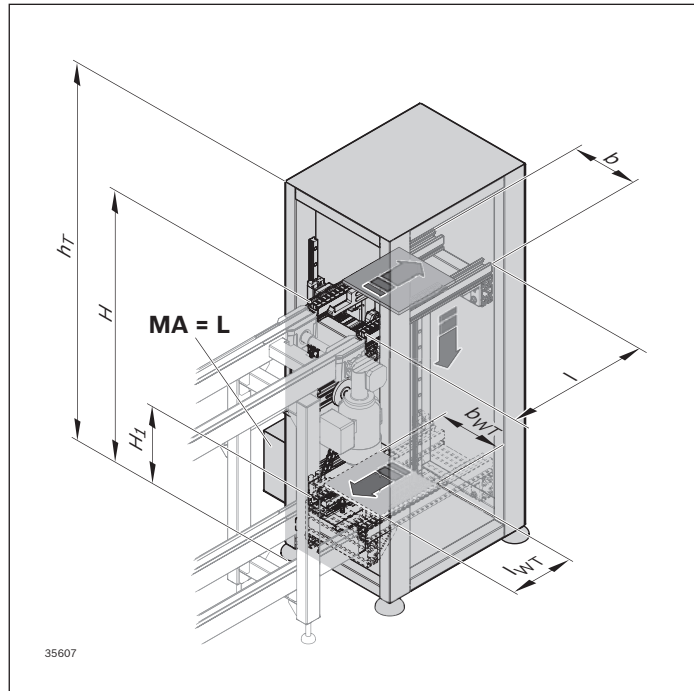
Notice:

- ▶ Accumulation operation not permitted, max. 1 WT per transfer process
- ▶ Upper transport level to maximum 1790 mm
- ▶ Reversible operation not permitted
- ▶ Fall protection via servomotor holding brake

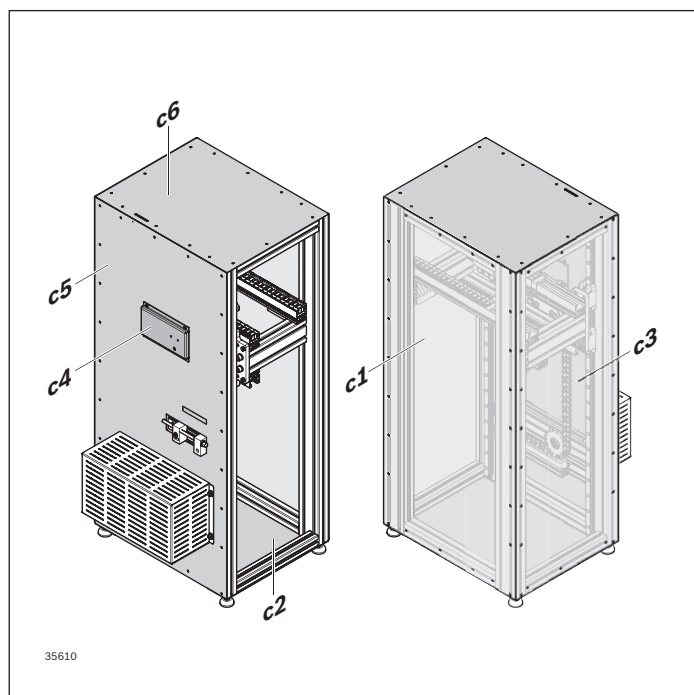
Scope of delivery

- ▶ GM = 0: Gear
- ▶ GM = 1: Gear, servomotor, power cable 5 m, compact converter, cable for compact converter 5 m
- ▶ Assembly and adapter set for the decentralized automatic lubrication unit LU 2
- ▶ Connection kit for mechanically connecting the EL 2 when inserting and removing it from adjacent sections
- ▶ Incl. 2x sensor M12x1, $S_N = 8$ mm (position detection WT, position detection EL 2)
- ▶ Protective cover (see page 2)

Ordering information



Protective cover



c1 (= side element, right), **c3** (= rear side): material selectable when not assembled: PC; transparent or aluminum; anodized
c2, c4, c5 and **c6**: pre-assembled
 Material: Aluminum; anodized

Material number		3842998861
b (mm)	Track width in direction of transport	160; 240; 320; 400; 480; 640; 800
l_T (mm)	Length in direction of transport	160; 240; 320; 400; 480; 640; 800
$b \times l_T$ (mm x mm)	Combination option	160 x 160; 240; 320 240 x 160; 240; 320; 400 320 x 160; 240; 320; 400; 480 400 x 240; 320; 400; 480; 640; 800 480 x 320; 400; 480; 640; 800 640 x 400; 480; 640; 800 800 x 400; 480; 640; 800
MA ¹⁾	Motor mounting R = right L = left	R; L
GM	Gear motor 0 = with gear, without motor, without compact converter 1 = with gear, motor and compact converter	0; 1
H1 (mm) ²⁾	Lower transport level	290 ... 1000
h_T (mm) ³⁾	Total lift height	1000; 1100; 1200; 1300; 1400; 1500; 1600; 1700; 1800; 1900; 2000; 2300; 2600; 2900
H (mm) ²⁾	Upper transportation height	690 ... 1790
RM ⁴⁾	Operating mode C = C-shape O = O-shape	C; O
TD ⁵⁾	Running direction D = downwards U = upwards	D; U
CT ⁶⁾	Material Protective cover 2 = c1, c3: PC; transparent 3 = c1, c3: Aluminum; anodized	2; 3

¹⁾ See also page 3

²⁾ Stroke: $s = H - H_1$, $400 \leq s \leq 1500$

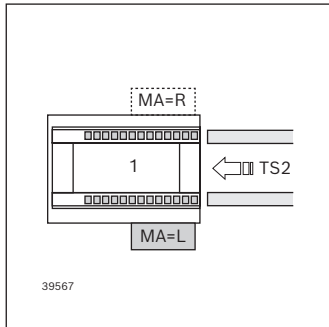
³⁾ $h_T \geq 250 + H$

⁴⁾ For selection, see technical data on page 3

⁵⁾ See also technical data on page 3

⁶⁾ See figure for protective cover, left

Motor mounting (parameter MA, see page 2)



MA=R: Motor mounting in direction of travel, right

MA= L: Motor mounting in direction of travel, left

1 = Lift EL 2

Technical data

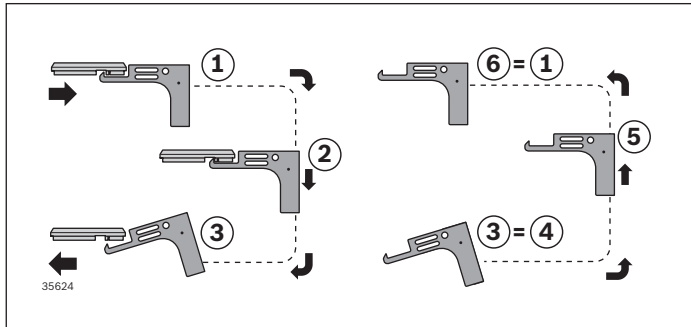
Material number	3842998861	
Max. section load in accumulation operation	kg	60
Specific section load	kg/cm	1
ESD		Yes
Material specification	Protective cover: PC, aluminum Vertical guide: Steel Guide profiles: PUHMW; black Chain wheel and chain tensioner: Steel Motor cover: Sheet, galvanized Feed hook: POM; black	
Stroke	mm	400 ... 1500

Combination options Lift EL 2 with sections

Lift EL 2 combined with...	Installation location and length of the drive head (mm)	C-shape/O-shape in relation to the length of the WT
BS 2	130	See selection table on page 4, A
BS 2/R-300, BS 2/R-700, BS 2/C-100, BS 2/C-250, AS 2/R-300, AS 2/R-700, AS 2/C-100, AS 2/C-250, AS 2/B-150, AS 2/B-250	170	See selection table on page 4, B
BS 2/R-H, BS 2/C-H, AS 2/C-400, AS 2/C-700, AS 2/R-1200, AS 2/R-2200	280	See selection table on page 4, C
Lift EL 2 combined with...	Installation location and length of return unit (mm)	C-shape/O-shape in relation to the length of the WT
Return unit of BS 2	30	See selection table on page 4, A
UM 2/C-60, (and return unit for BS 2/C... and BS 2/R...), UM 2/R-60	60	See selection table on page 4, B
UM 2/C-170 (and return unit for BS 2/R-H), UM 2/R-170	170	See selection table on page 4, C
UM 2/B	280	See selection table on page 4, C

Operating mode (parameter RM, see page 2)

C-shape: Running direction downwards (TD = D)

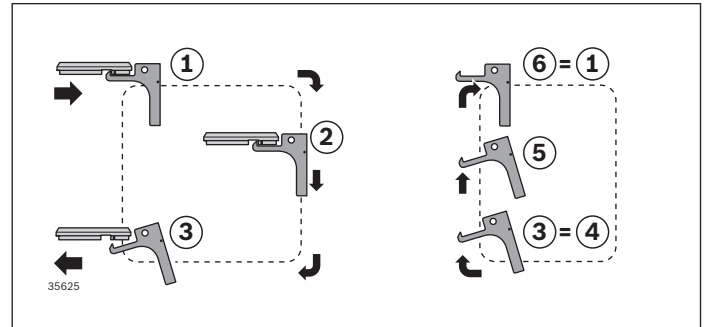


The gripper arm moves in a C-shape between the two transport levels.

- 1 Gripper arm retracts WT on upper transport level
- 2 Gripper arm conveys WT on lower transport level
- 3 Gripper arm ejects WT on lower transport level
- 4 Empty gripper arm is retracted
- 5 Empty gripper arm is conveyed on upper transport level
- 6 Empty gripper arm moves to position 1

If the running direction is upwards (TD = U), the sequence is reversed.

O-shape: Running direction downwards (TD = D)



The gripper arm moves in an O-shape between the two transport levels.

- 1 Gripper arm retracts WT on upper transport level
- 2 Gripper arm conveys WT on lower transport level
- 3 Gripper arm ejects WT on lower transport level
- 4 Empty gripper arm remains on lift front
- 5 Empty gripper arm is conveyed on front side on upper transport level
- 6 Empty gripper arm is at position 1

If the running direction is upwards (TD = U), the sequence is reversed.

C-shape/O-shape selection table

Workpiece pallet length l_{WT}	160	240	320	400	480	640	800
A ¹⁾ BS 2	C	C/O	C/O	C/O	C/O	C/O	C/O
B ¹⁾ BS 2/R, BS 2/C	C	C	C	C/O	C/O	C/O	C/O
C ¹⁾ BS 2/R-H, BS 2/C-H	–	–	–	C	C	C/O	C/O

Notice: For short circulation times we recommend the O-shape operating mode

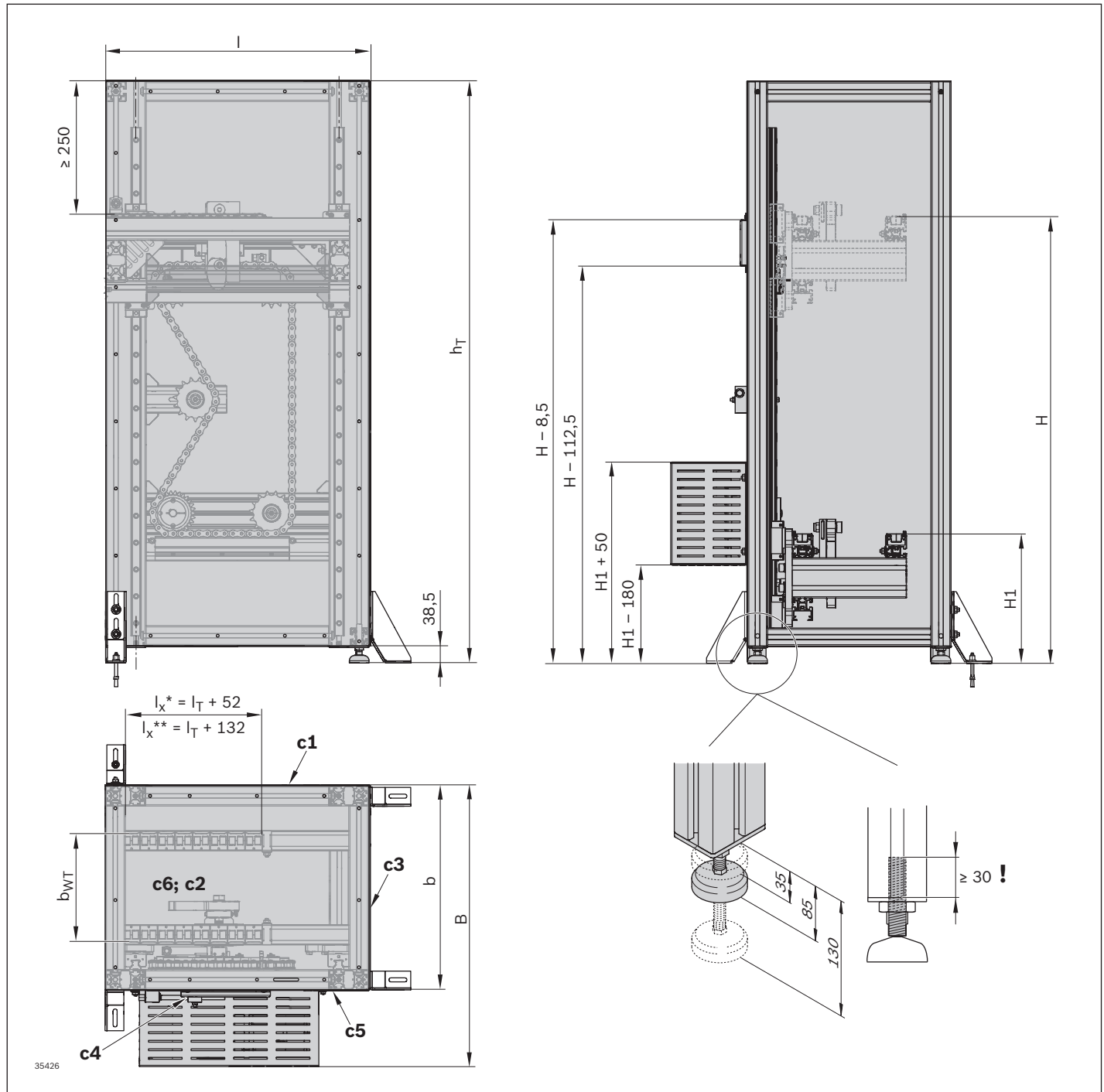
¹⁾ Reference to table Combination options Lift EL 2 with plug, see page 3

Cycle times* (s) in the C-shape/O-shape lift

Lift shape	Workpiece pallet length l_{WT}	Unit	160	240	320	400	480	640	800
C-shape	BS 2, BS 2/R, BS 2/C	s	8.48	8.48	9.28	10.08	10.88	12.48	14.08
	BS 2/R-H, BS 2/C-H	s				10.08	10.88	12.48	14.08
O-shape	BS 2	s		7.87	8.27	8.67	9.07	9.87	10.67
	BS 2/R, BS 2/C	s				8.67	9.07	9.87	10.67
	BS 2/R-H, BS 2/C-H	s						9.87	10.67

* Applies to connected belt sections with a transport speed of $v = 18$ m/min and a stroke height of 400 mm

Dimensions



$l = l$ (= see table below) = without protective cover
 $l = l$ (= see table below) = + 3 mm for CT = 2
 $l = l$ (= see table below) = + 1.5 mm for CT = 3

Information in mm:

l_{WT}	160	240	320	400	480	640	800
l	588.5	588.5	668.5	748.5	828.5	988.5	1148.5

* C-shape
 ** O-shape

$b = b_{WT} + 215$ without protective cover
 $b = b_{WT} + 219.5$ for CT = 2
 $b = b_{WT} + 218$ for CT = 3
 $b = b_{WT} + 386.5$ without protective cover
 $b = b_{WT} + 389.5$ for CT = 2
 $b = b_{WT} + 388$ for CT = 3

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Motor data

Identification of motor MSM 041

Type abbreviation	MSM041B-0300-NN-M5-ML1	
Material number	R911344228	
Product	MSM	= Synchronous servomotor MSM
Size	041	= 041
Length	B	= B
Winding	0300	= 0300
Cooling method	NN	= Natural convection
Transducer	M5	= Optical encoder, absolute multi-turn (20 bit)
Electrical connection	M	= Cable connection, round plug M17
Shaft	L	= Shaft with keyway, without shaft sealing ring
Holding brake	1	= Electrically released, 2.45 Nm

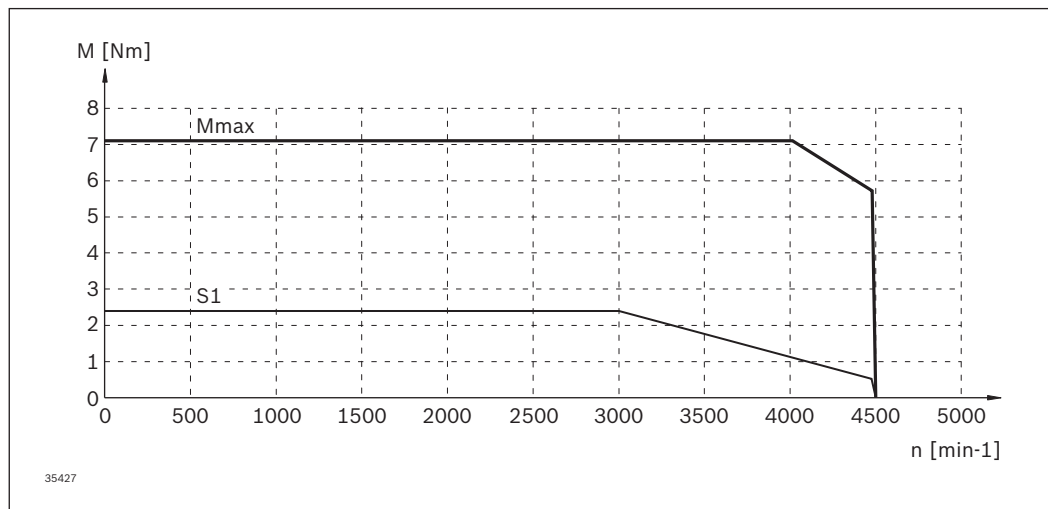
Performance characteristics of the motor MSM 041

Motor MSM	Continuous power PN (W)	Standstill torque MO (Nm)	Maximum torque M_{max} (Nm)	Maximum speed n_{max} (rpm)	Protection class
041B	750	2.4	7.1	4500	IP 54 (shaft IP 40)

Technical data, holding brakes (MSM041)

Designation	Symbol	Unit	Holding brake 1 (MSM041)
Holding torque	M_4	Nm	2.45
Rated voltage	U_N	V	24 ± 1.2
Rated current	I_N	A	0.42
Connection time	t_1	ms	70
Disconnection time	t_2	ms	20
Moment of inertia of the holding brake	J_{rot}	kg*m2	0.0000075

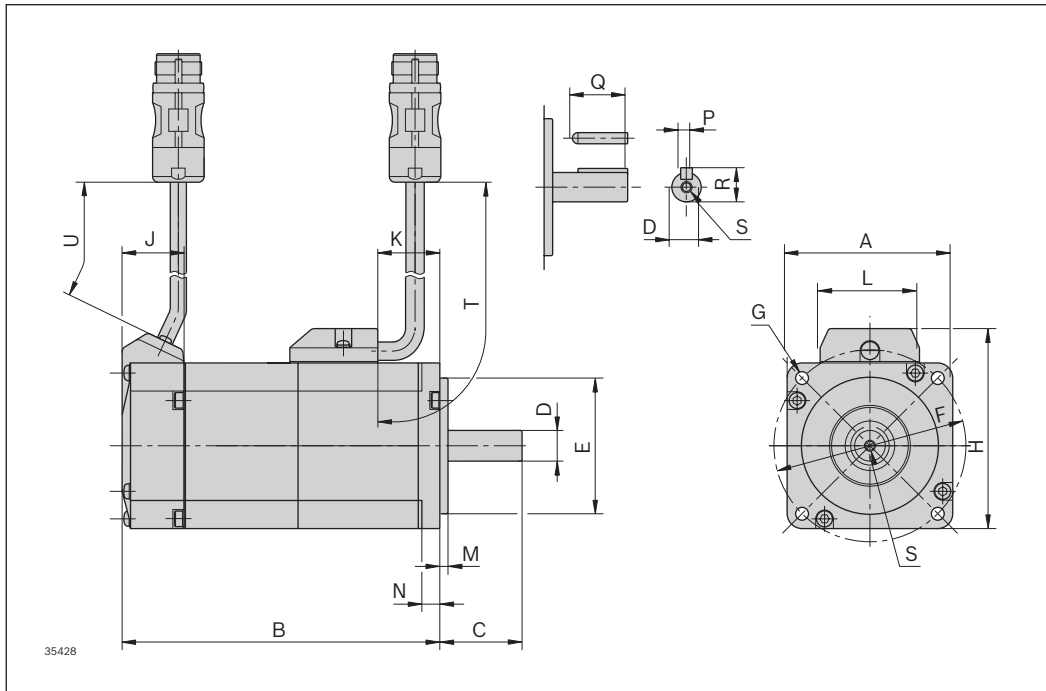
Torque speed characteristic curve



MSM041B-0300-NN with HCS01.1N-W0018 (Servo 400 ms) on 3x 230 V ($\pm 0\%$) / 4 kHz

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MSM041...M5-M... dimensions



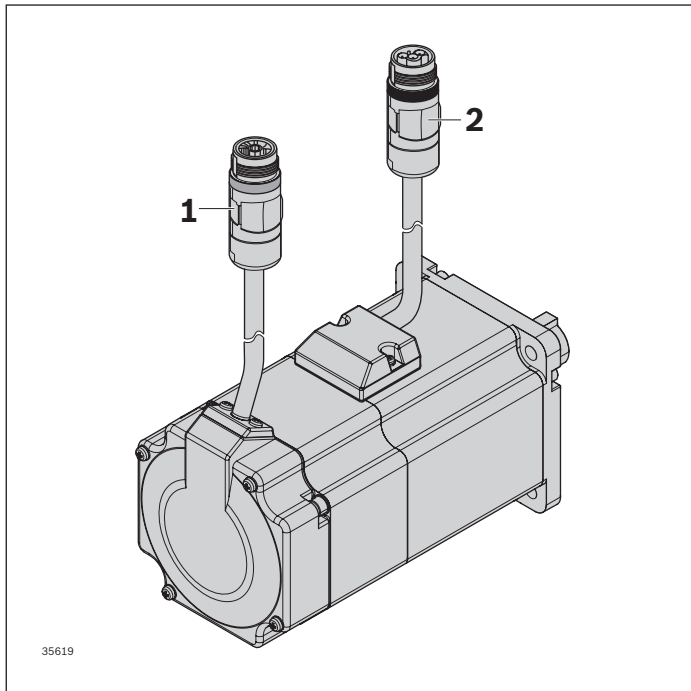
Motor / dimension	A	B	C	D	E	F	G	H	J	K
MSM041B-...-M5-M.1	80	149	35	19h6	70h7	90±0.20	6	93	25.5	52.2

Motor / dimension	L	M	N	P	Q	R	S	T	U
MSM041B-...-M5-M.1	36	3	8	6h9 (slot p9)	25	21.5	M5 (10 deep)	200	220

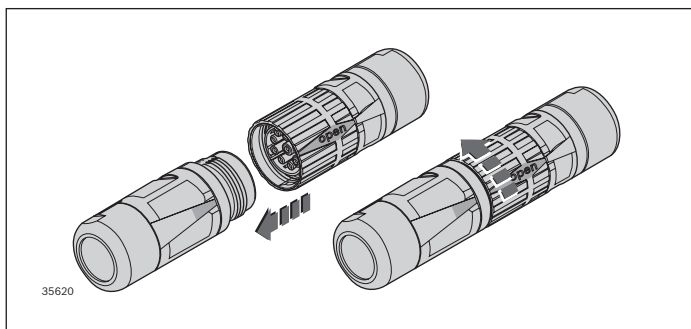
Technical data, motor encoder M5

Designation	Symbol	Unit	ENCODER M5 (MSM)	
External battery	–	–	–	Yes
Encoder design	–	–	Absolute single turn	Absolute multi-turn
Distinguishable revolutions	–	–	1	65536
Incremental signals	–	–	Without	Without
Encoder resolution	–	–	20 bit	20 + 16 bit
Typical/maximum system accuracy	–	"	±170 / ±240	±170 / ±240
Maximum encoder rotational speed		(rpm)	6000	6000
Supply voltage	VCC _{Encoder}	V	4.5 ... 5.5	4.5 ... 5.5
Max. current consumption	I _{Encoder}	mA	70	70

" Angular seconds



- 1 Encoder connection (green marking ring)
2 Power connection (black marking ring)



Electrical connection, round plug cable connection M17

Motor connection SpeedCon MSM

The power and encoder connections of the motor MSM are made via flexible connecting cables with round plug connectors M17 (IP 67) and a locking system SpeedCon.

Motor	Connection line length, Cable connection, round plug M17	
	Transducer	Service
MSM041	220 mm (+47 mm plug-in connector RGS1782)	200 mm (+47 mm plug-in connector RLS1722)

Quick locking system SpeedCon

Insert the cable plug in the open position, tighten the cable plug by hand with a turn of approximately 90°.

Ready-to-use connection cable

Product description	Designation	Material number
Power cable	Cable RKL 4804/005,0	R911379613
Encoder cable	Cable RKG 0062	R911380324

Motor transport

Environmental and operating conditions

Designation	Symbol	Unit	Value
Temperature range	$T_{a \text{ tran}}$	°C	-20 ... +80
Relative humidity		%	5 ... 95
Absolute humidity		g/m3	1 ... 60
Climate class (IEC721)			2K3
Condensation			Not permitted
Icing			Not permitted

Motor storage

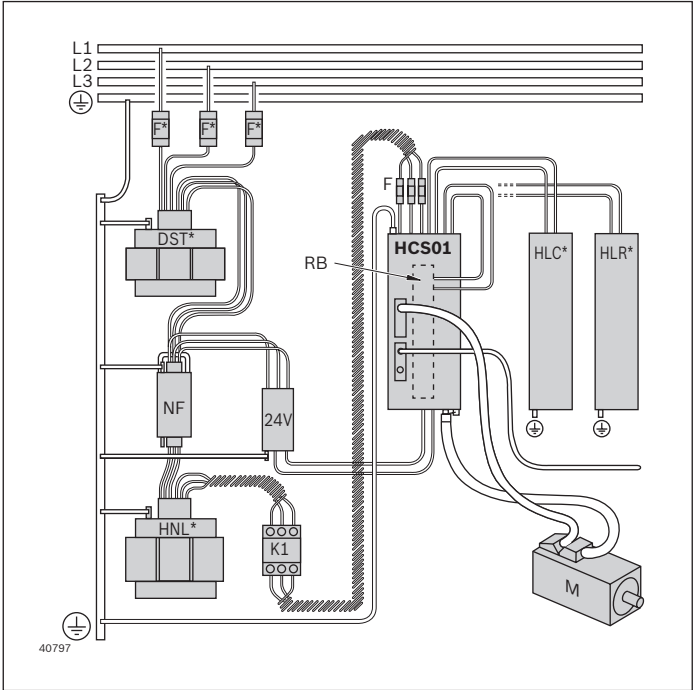
Environmental and operating conditions

Designation	Symbol	Unit	Value
Temperature range	$T_{a \text{ store}}$	°C	-20 ... +60
Relative humidity		%	5 ... 95
Absolute humidity		g/m3	1 ... 29
Climate class (IEC721)			1K3
Condensation			Not permitted
Icing			Not permitted

Ordering details encoder system

Product description	Designation	Material number
Compact converter	HCS01.1E-W0013-A-02-B-ET-EC-EP-NN-NN-FW	R911379677
Communication interface	FWA-INDRV*-MPB-21VRS-D5-1-NNN-NN	R911390803

Wiring diagram



- *

Optional
- 24V

Control voltage supply
- COM

Communication
- DST

Autotransformer
- F

Fuses
- HCS01

Converter
- HLC

Intermediate circuit capacitor unit
(for devices with DC link connection)
- HLR

External brake resistor
- HNL

Line reactor
- NF

Mains filter
- K1

External mains contactor
- M

Motor
- RB

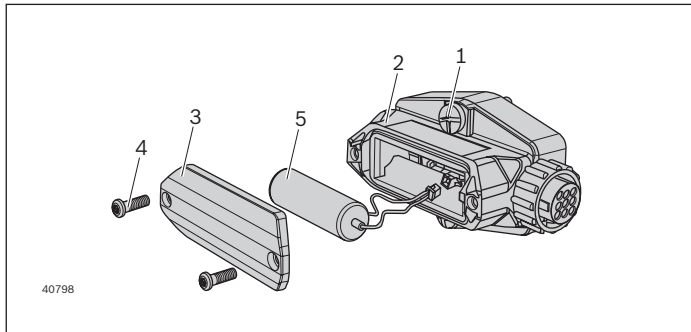
Integral brake resistance
(located at the rear of the drive control unit)

Technical data

Designation	Symbol	Unit	Regulator
Protection class			IP20
Mains connection voltage	U_{LN}	V	3 x AC 110 ... 230 V $\pm$ 10 % 3 x AC 200 ... 500 V $\pm$ 10 %
Output to UL standard (UL)			UL 508C
Performance according to CSA standard (UL)			Canadian National Standard(s) C22.2 No.
UL files (UL)			E134201

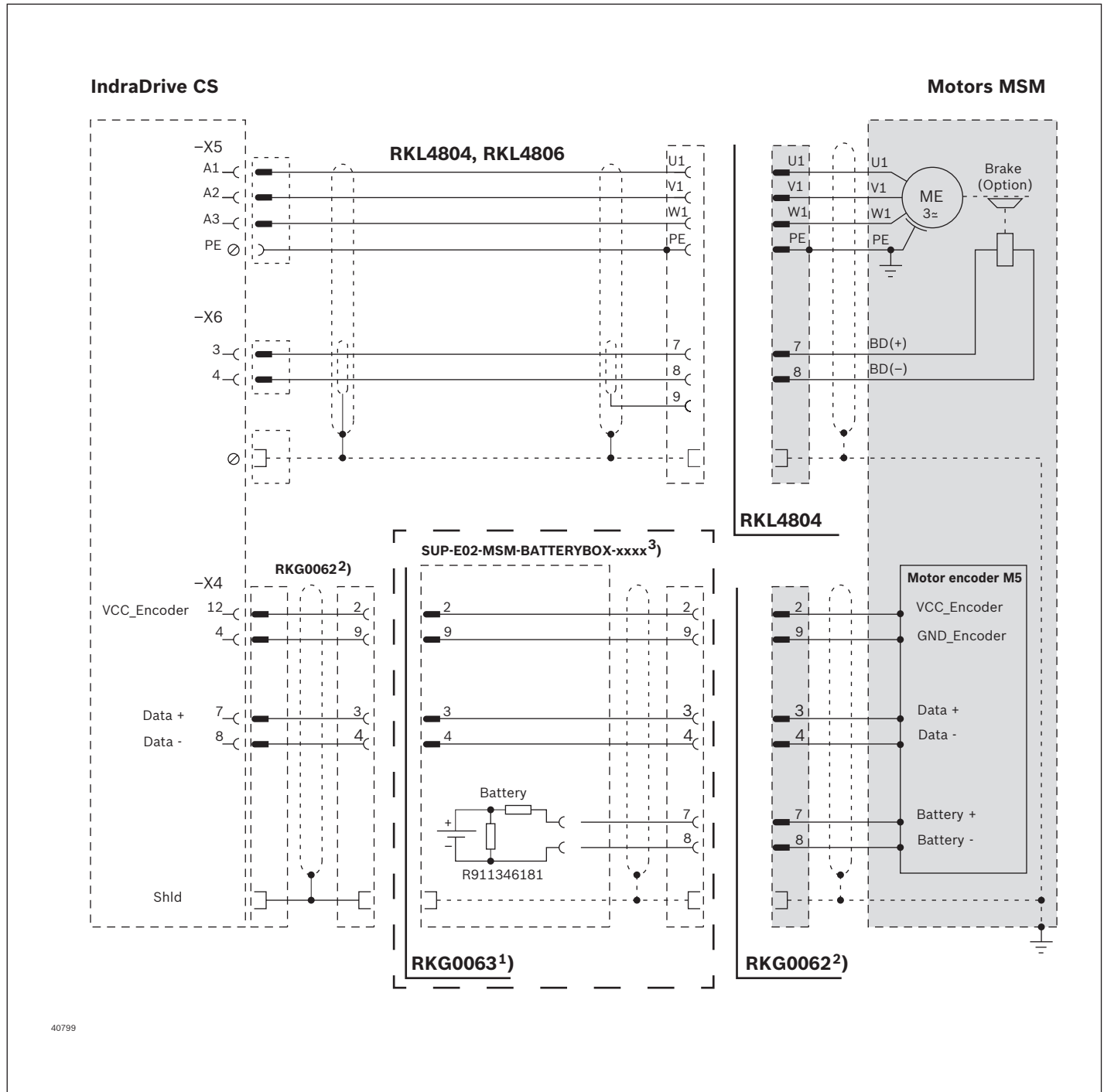
Ordering Information Battery box with battery

Product description	Designation	Length (mm)	Material number
Battery box	SUP-E02-MSM-BATTERYBOX-L010	1000	R911346063
Replacement battery (type: ER6C, 3.6 V; 1800 mA, lithium)	SUP-E02-MSM-BATTERY		R911369925
Encoder cable	Cable RKG 0062		R911380324



- 1 Mounting screw
- 2 Housing
- 3 Housing lid
- 4 Housing cover screw (self-tapping screw 30x10; tightening torque 0.8 Nm)
- 5 Battery (type: ER6C, 3.6 V; 1800 mA, lithium)

Circuit diagram MSM



- 40799
- 1) Optional extension cable
- 2) For single-turn applications the cable must be connected directly to the motor
- 3) SUP-E02-MSM-BATTERYBOX-XXXX only required when a battery is used to buffer data. Battery box scope of delivery: Box, battery, cable RKG 0065 is not part of the scope of delivery EL 2
- Shield connection via housing
- RKG 0063 Extension cable, optional
- EL 2 Scope of delivery EL 2: Motor MSM, compact converter HCS01, power cable RKL4804, encoder cable RKG 0062; (3) not part of the scope of delivery EL 2)

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