

Motor units MTR-DCI, intelligent servo motors



## Motor units MTR-DCI, intelligent servo motors

Key features

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### General information

The motor unit MTR-DCI is an innovative motor with integrated power electronics for positioning tasks.

#### Four components in one housing

Integrated in the MTR-DCI are the motor, gear unit, controller and power electronics. This means that there is no need for a control cabinet or extensive cabling.

#### Reliable

The integrated power electronics and controller removes the need for motor cables and improves the electromagnetic compatibility. Additional monitoring functions are integrated.

#### Uncomplicated

The complete commissioning process can be performed directly on the MTR-DCI via the optional LCD display or on a PC via the user-friendly menus in the FCT (Festo Configuration Tool). No matter which approach is used, all parameters are continuously controlled.

### At a glance

- Compact design
- Smooth profile prevents the ingress of dirt
- DC motor with planetary gear unit and encoder
- Gear unit ratio: 7:1; 14:1, 22:1
- Protection class IP54

#### Positioning functionality

- 16 traversing records (including homing)
- Constant acceleration and braking
- Positioning control

#### Protective functions

- Temperature monitoring
- Current monitoring
- Voltage failure detection
- Following error monitoring
- Software end-position detection

#### Easy actuation via

- I/O interface
- Profibus
- CANopen
- DeviceNet

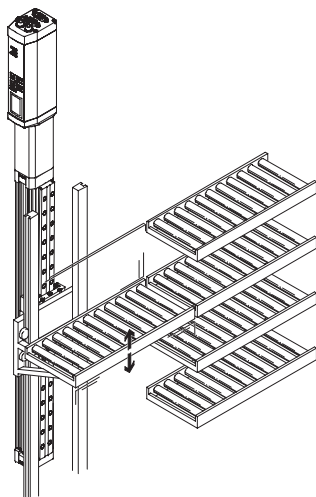


- 1 Control panel with integrated display (optional)
- 2 Input for reference limit switches
- 3 RS232 interface
- 4 Operator interface: I/O interface
- 5 Power supply
- 6 Gear unit

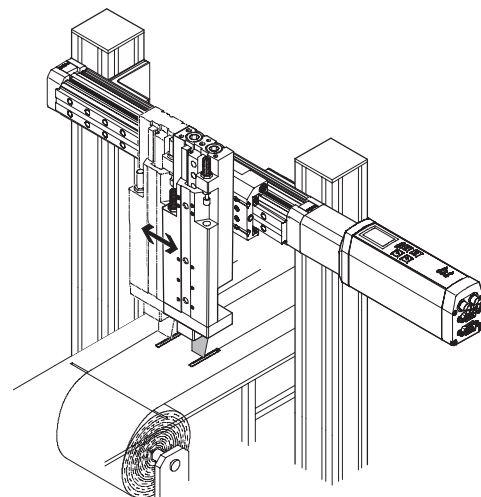


### Typical applications

Adjusting sorting conveyors



Programming formats for paper or foil cutting machines



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Type codes



		MTR	-	DCI	-	42		S	-	VC		SC	-	E		G7	-	H2		IO
<b>Type</b>																				
MTR	Motor																			
<b>Motor type</b>																				
<b>Size</b>																				
<b>Torque class</b>																				
S	Standard																			
<b>Nominal voltage</b>																				
VC	24 V DC																			
VD	48 V DC																			
<b>Plug design</b>																				
SC	Straight plug outlet																			
<b>Measuring system</b>																				
E	Encoder																			
<b>Gear unit ratio</b>																				
G7	7:1																			
G14	14:1																			
G22	22:1																			
<b>Parameterisation interface</b>																				
R2	RS232																			
H2	RS232 and control panel																			
<b>Electrical connection technology</b>																				
IO	I/O interface																			
CO	CANopen interface																			
PB	Profibus interface																			
DN	DeviceNet interface																			

**New**  
**Fieldbus CO, PB, DN**

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Technical data

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-  Size  
32 ... 62 mm
-  Voltage  
24, 48 V DC

Fieldbus interfaces



General technical data				
Size	32	42	52	62
Rotary position generator	Optical encoder			
No. of increments/revolution	300 (1,200) <sup>1)</sup>		500 (2,000) <sup>1)</sup>	
Controller operating mode	PWM MOSFET power amplifier			
Display resolution	128 x 64 pixels			
Type of mounting	Can be bolted on or clamped to gearing unit flange			
Gearing unit type	Planetary gearing			
Gear unit ratio	G7	6.75 (7:1); 1-stage		
	G14	13.73 (14:1); 2-stage		
	G22	–		

1) Internal 4-fold evaluation

Electrical data – Motor				
Size	32	42	52	62
Nominal voltage [V DC]	24 ±10%			48 –10%/+5%
Nominal current (motor) [A]	0.73	2	5	6.19
Peak current [A]	2.1	3.8	7.7	20
Motor constant [Ncm/A]	4.5	6.1	6.4	12.1
Nominal power (motor) [W]	17	48	122	316
Max. current (digital logic outputs) [mA]	200		60	
Parameterisation interface	RS232; 9,600 baud			

Mechanical data – Motor									
Size	32		42		52		62		
Gear unit ratio	G7	G14	G7	G14	G7	G14	G7	G14	G22
Gearing unit output speed [rpm]	481	237	444	218	444	218	504	248	153
Gearing unit torsional backlash [°]	≤ 1.9	≤ 1.55	≤ 1.3	≤ 0.95	≤ 1.1	≤ 0.75	≤ 1	≤ 1.5	≤ 1.5
Gearing unit output torque [Nm]	0.15	0.29	0.59	1.13	1.62	3.08	3.78	7.2	11.66
Gearing unit efficiency	0.75	0.7	0.8	0.75	0.8	0.75	0.8	0.75	0.75
Mass moment of inertia (rotor) [kg cm <sup>2</sup> ]	0.024		0.323		1.209		3.3		
Mass moment of inertia (gearing unit) [kg cm <sup>2</sup> ]	0.00089	0.00149	0.00235	0.00441	0.01132	0.01711	0.017	0.035	0.022
Radial shaft load [N]	40	70	160	230	200	320	240	360	360
Axial shaft load [N]	10	20	50	80	60	100	50	70	70
Product weight [kg]	0.72	0.74	1.72	1.83	3.1	3.3	7.6	8.0	8.0

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Technical data

Operating and environmental conditions				
Size	32	42	52	62
Digital logic outputs	Not electrically isolated		Electrically isolated	
Insulation protection class to VDE 60034	F			
Protection class	IP54			
Protective functions	I <sup>2</sup> T monitoring			
	Following error monitoring			
	Software end position detection			
	Voltage failure detection			
	Current monitoring			
	Temperature monitoring: Silicon absolute temperature sensor, switches off at temperatures >70 °C			
Ambient temperature [°C]	0 ... +50			
Storage temperature [°C]	-25 ... +60			
Relative air humidity [%]	0 ... 95 (non-condensing)			
CE mark (see declaration of conformity)	In accordance with EU EMC directive			
Certification	C-Tick			
Note on materials	Contains paint wetting impairment substances			

Materials	
Motor unit housing	Anodised aluminium
Motor unit cover	Aluminium, precision casting, coated (size 62 milled)

Technical data – I/O/fieldbus interface				
Type	MTR-DCI-...-IO	MTR-DCI-...-CO	MTR-DCI-...-PB	MTR-DCI-...-DN
Interface	I/O interface for 15 traversing records and homing	CANopen	Profibus DP	DeviceNet
Number of digital logic inputs	6	–	–	–
Number of digital logic outputs	2	–	–	–
Max. current of digital logic outputs (size)	32/42	200	–	–
	52/62	60	–	–
Bus terminating resistor <sup>1)</sup>	–	Not integrated in the device	Not integrated in the device	Not integrated in the device
Communication profile	–	DS301 / FHPP	DP-V0/V1 / FHPP	FHPP
	–	DS301; DSP402	Step7 functional modules	Device type 0C <sub>h</sub>
Max. fieldbus baud rate [kbps]	–	1,000	12,000	500

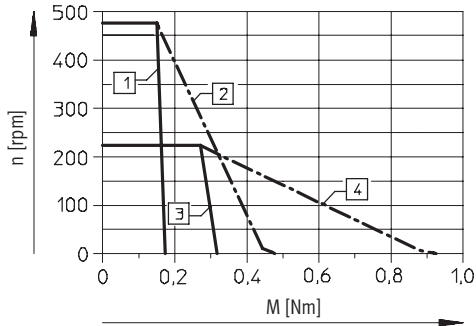
1) Details of bus terminating resistor → 10

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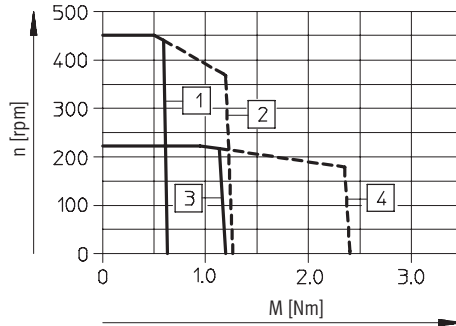
Technical data

### Torque M as a function of rotational speed n

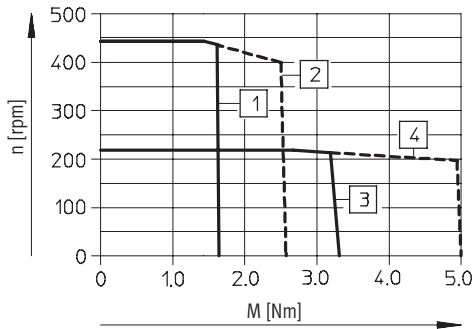
Size 32



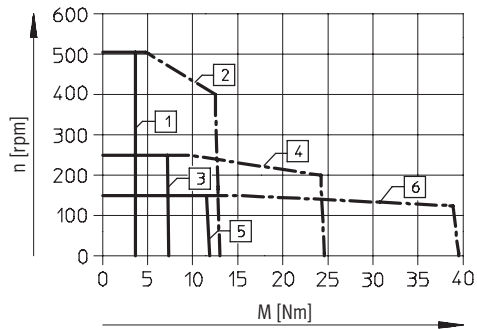
Size 42



Size 52



Size 62



Gear unit ratio 7:1

- 1 Torque, nom.
- 2 Torque, max.

Gear unit ratio 14:1

- 3 Torque, nom.
- 4 Torque, max.

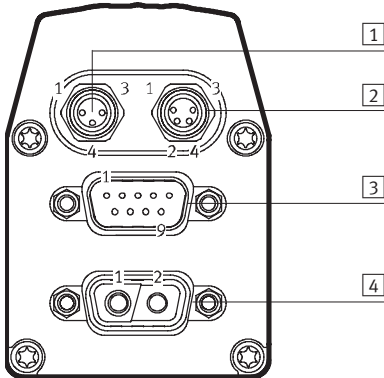
Gear unit ratio 22:1

- 5 Torque, nom.
- 6 Torque, max.

## Motor units MTR-DCI, intelligent servo motors

Technical data

### Pin allocation



#### 1 Reference switch, 3-pin M8 socket

Pin	Function
1	24 V
4	Reference input
3	0 V
-	

#### 2 RS 232 interface, 4-pin M8 socket

Pin	Function
1	0 V
2	Transmitted data (TxD)
3	Received data (RxD)
4	-

#### 3 I/O interface, 9-pin Sub-D plug

Pin	Function
1	Traversing record coding, bit 0
2	Traversing record coding, bit 1
3	Traversing record coding, bit 2
4	Traversing record coding, bit 3
5	Start bit
6	Enable bit
7	Ready signal output
8	MC signal output
9	0 V

#### 3 CANopen interface, 9-pin Sub-D plug

Pin	Function
1	-
2	CAN_L
3	CAN_GND
4	-
5	CAN_SHLD
6	CAN_V-
7	CAN_H
8	-
9	CAN_V+

#### 3 Profibus interface, 9-pin Sub-D socket

Pin	Function
1	-
2	Logic_GND
3	RxD/TxD-P
4	CNTR-P
5	DGND
6	VP
7	Logic_V (24 V DC)
8	RxD/TxD-N
9	-

#### 3 DeviceNet interface, 9-pin Sub-D plug

Pin	Function
1	-
2	CAN_L
3	CAN_GND
4	-
5	CAN_SHLD
6	CAN_V-
7	CAN_H
8	-
9	CAN_V+

#### 4 Power supply, 2-pin plug

Pin	Function
1	24 V DC (for MTR-DCI-32/42/52), 48 V DC (for MTR-DCI-62)
2	0 V
-	
-	
-	
-	
-	
-	
-	

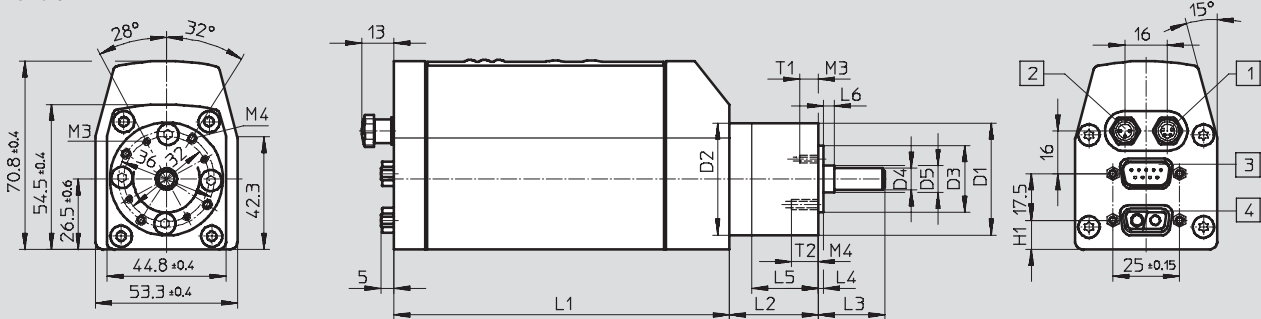
**Motor units MTR-DCI, intelligent servo motors**

Technical data

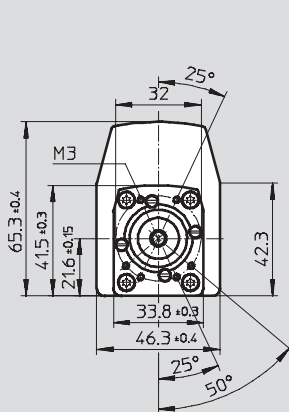
**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

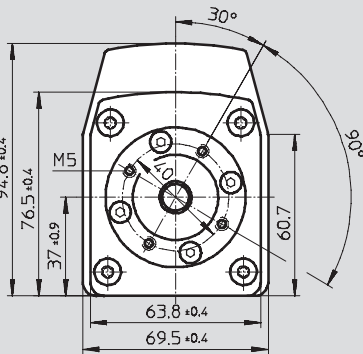
**Size 42**



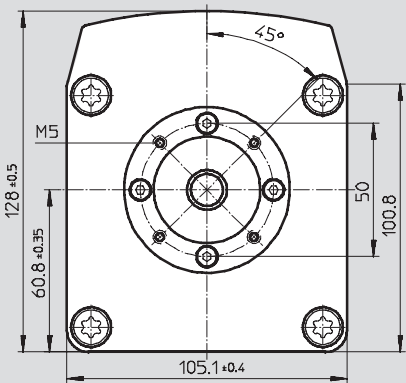
**Size 32**



**Size 52**



**Size 62**



- 1 M8x1, 4-pin
- 2 M8x1, 3-pin
- 3 Sub-D, 9-pin
- 4 Sub-D, 2-pin

Type	D1	D2	D3	D4	D5	H1	L1	L2	L3	L4	L5	L6	T1	T2
MTR-DCI-32S-...-G7	∅ g10	∅ ±0.1	∅ h8	∅ h7	∅		±1	±1						+2
MTR-DCI-32S-...-G14	-	-	21.5	6	-	13±0.2	175.5	-	18.7±0.6	2.5±0.3	-	-	6	-
MTR-DCI-42S-...-G7	42	42	25	8	-	11	176	33.3	25±1	2±0.1	25	-	7+2	10
MTR-DCI-42S-...-G14	42	42	25	8	-	11	176	46.3	25±1	2±0.1	25	-	7+2	10
MTR-DCI-52S-...-G7	52	52	32	12	-	17.3	194	39	33±1	3±0.3	31	-	10	-
MTR-DCI-52S-...-G14	52	52	32	12	-	17.3	194	53	33±1	3±0.3	31	-	10	-
MTR-DCI-62S-...-G7	62	62	40	14	15	61.3	270	47	39±1	5±0.3	31.3	9	10	-
MTR-DCI-62S-...-G14	62	62	40	14	15	61.3	270	47	39±1	5±0.3	31.3	9	10	-
MTR-DCI-62S-...-G22	62	62	40	14	15	61.3	270	47	39±1	5±0.3	31.3	9	10	-



## Motor units MTR-DCI, intelligent servo motors

Ordering data – Modular products

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M Mandatory data										
Module No.	Motor unit		Flange/size		Nominal voltage		Measuring system		Parameterisation interface	
	Motor type		Torque class		Plug design		Gearing unit		Electrical connection technology	
533 736	MTR	DCI	32	S	VC	SC	E	G7	R2	IO
533 742			42		VD			G14	H2	CO
533 748			52					G22		PB
533 754			62							DN
<b>Order example</b>										
<b>533 742</b>	<b>MTR</b>	<b>- DCI</b>	<b>- 42</b>	<b>S</b>	<b>- VC</b>	<b>SC</b>	<b>- E</b>	<b>G7</b>	<b>- R2</b>	<b>IO</b>

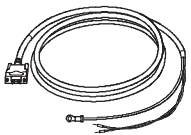

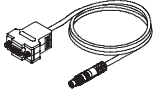
Ordering table							
Size	32	42	52	62	Condi- tions	Code	Enter code
M Module No.	<b>533 736</b>	<b>533 742</b>	<b>533 748</b>	<b>533 754</b>			
Motor unit	Motor unit					<b>MTR</b>	MTR
Motor type	DC servo motor with integrated position controller					<b>-DCI</b>	-DCI
Flange/size	32	42	52	62		<b>-...</b>	
Torque class	Standard torque class					<b>S</b>	S
Nominal voltage	24 DC		-			<b>-VC</b>	
	-		48 DC			<b>-VD</b>	
Plug design	Straight plug					<b>SC</b>	SC
Measuring system	Encoder					<b>-E</b>	-E
Gearing unit	Integrated planetary gearing i = 6.75					<b>G7</b>	
	Integrated planetary gearing i = 13.73					<b>G14</b>	
	-		Integrated planetary gearing i = 22.21			<b>G22</b>	
Parameterisation interface	RS232 interface					<b>-R2</b>	
	RS232 interface + control panel					<b>-H2</b>	
Electrical connection technology	I/O interface					<b>IO</b>	
	CANopen					<b>CO</b>	
	Profibus DP					<b>PB</b>	
	DeviceNet					<b>DN</b>	

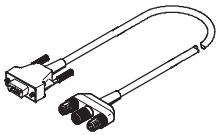
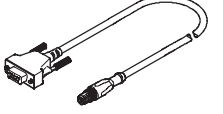
Transfer order code

	<b>MTR</b>	<b>- DCI</b>		<b>S</b>		<b>SC</b>	<b>- E</b>		<b>-</b>		<b>-</b>	
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# Motor units MTR-DCI, intelligent servo motors


Accessories


Ordering data – Cables				
	Brief description	Cable length	Part No.	Type
	Supply cable Allocation →7	2.5 m	537 931	KPWR-MC-1-SUB-9HC-2,5
		5 m	537 932	KPWR-MC-1-SUB-9HC-5
		10 m	537 933	KPWR-MC-1-SUB-9HC-10
	Control cable for I/O connection to any PLC controller Allocation →7	2.5 m	537 923	KES-MC-1-SUB-9-2,5
		5 m	537 924	KES-MC-1-SUB-9-5
		10 m	537 925	KES-MC-1-SUB-9-10
	Programming cable For parameterisation and commissioning via the RS232 interface using FCT software Allocation →7	2.5 m	537 926	KDI-MC-M8-SUB-9-2,5

Ordering data – Plugs				
	Brief description	Part No.	Type	
Fieldbus adapter for Profibus				
	– 9-pin Sub-D plug to 5-pin round M12 plug/socket, plus round M12 plug for logic voltage supply – Bus terminating resistor must be connected externally	537 934	FBA-PB-SUB-9-3XM12	
Fieldbus adapter for CANopen and DeviceNet				
	– 9-pin Sub-D plug to 5-pin round M12 plug – Bus terminating resistor must be connected externally	540 324	FBA-CO-SUB-9-M12	

# Motor units MTR-DCI, intelligent servo motors

Accessories

Ordering data – Software			
	Brief description	Part No.	Type
	Operator package contains: – CD-ROM – with user documentation for MTR-DCI, in the languages de, en, es, fr, it, sv – with FCT (Festo Configuration Tool) configuration software – Brief description This package is included in the scope of delivery.	550 905	P.BP-MTR-DCI

Ordering data – Documentation <sup>1)</sup>							
	Language	Part No.		Type	Part No.	Type	
		For I/O interface				For Profibus interface	
	DE	539 615	P.BE-MTR-DCI-IO-DE		539 623	P.BE-MTR-DCI-PB-DE	
	EN	539 616	P.BE-MTR-DCI-IO-EN		539 624	P.BE-MTR-DCI-PB-EN	
	ES	539 617	P.BE-MTR-DCI-IO-ES		539 625	P.BE-MTR-DCI-PB-ES	
	FR	539 618	P.BE-MTR-DCI-IO-FR		539 626	P.BE-MTR-DCI-PB-FR	
	IT	539 619	P.BE-MTR-DCI-IO-IT		539 627	P.BE-MTR-DCI-PB-IT	
	SV	539 620	P.BE-MTR-DCI-IO-SV		539 628	P.BE-MTR-DCI-PB-SV	
			For CANopen interface			For DeviceNet interface	
	DE	539 629	P.BE-MTR-DCI-CO-DE		553 530	P.BE-MTR-DCI-DN-DE	
	EN	539 630	P.BE-MTR-DCI-CO-EN		553 531	P.BE-MTR-DCI-DN-EN	
	ES	539 631	P.BE-MTR-DCI-CO-ES		553 532	P.BE-MTR-DCI-DN-ES	
	FR	539 632	P.BE-MTR-DCI-CO-FR		553 533	P.BE-MTR-DCI-DN-FR	
	IT	539 633	P.BE-MTR-DCI-CO-IT		553 534	P.BE-MTR-DCI-DN-IT	
	SV	539 634	P.BE-MTR-DCI-CO-SV		553 535	P.BE-MTR-DCI-DN-SV	

1) User documentation in paper form is not included in the scope of delivery