

Motor units MTR-DCI, intelligent servo motors

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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
- 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



CANopen

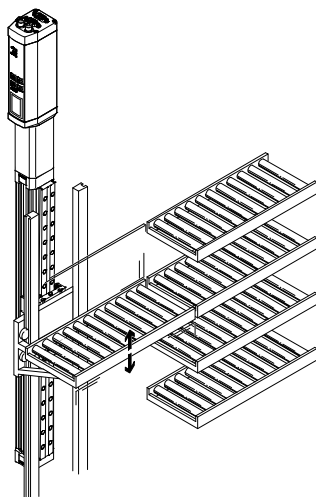
DeviceNet

- 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

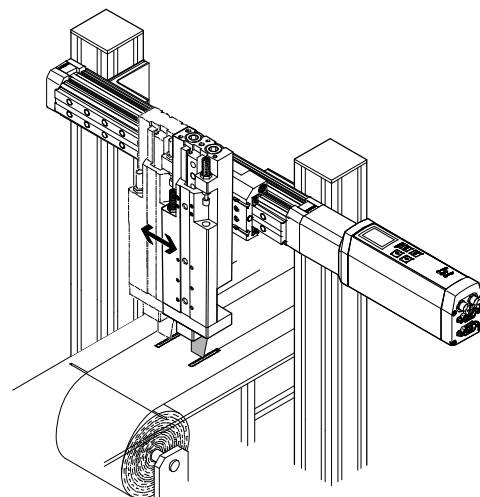


Typical applications

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

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Technical data

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- Ø - Size
32 ... 52 mm
- L - Voltage
24 V DC

Fieldbus interfaces



CANopen

DeviceNet



General technical data			
Size	32	42	52
Rotary position generator	Incremental encoder		
Rotary position encoder measuring principle	Optical		
No. of increments/revolution	300 (1200) ¹⁾	500 (2000) ¹⁾	
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	

1) Internal 4-fold evaluation

Electrical data – Motor				
Size		32	42	52
Nominal voltage	[V DC]	24 ±10%		
Nominal current (motor)	[A]	0.73	2	5
Peak current	[A]	2.1	3.8	7.7
Motor constant	[Ncm/A]	4.5	6.1	6.4
Nominal power (motor)	[W]	17	48	122
Max. current (digital logic outputs)	[mA]	200		60
Parameterisation interface		RS232; 9600 baud		

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

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Technical data

Operating and environmental conditions			
Size	32	42	52
Digital logic outputs	Not electrically isolated		Electrically isolated
Insulation protection class to VDE 60034	F		
Protection class	IP54		
Protective functions	I ² 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

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	60	–	–
Bus terminating resistor ¹⁾	–	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 _h
Max. fieldbus baud rate [kbps]	–	1000	12000	500

1) Details of bus terminating resistor → 10

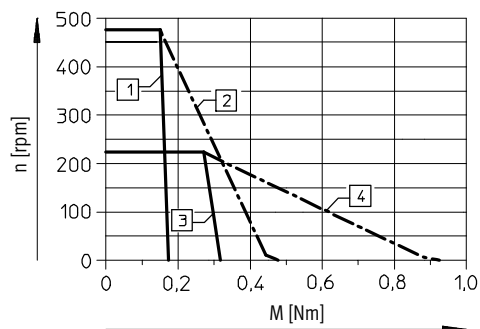
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Technical data

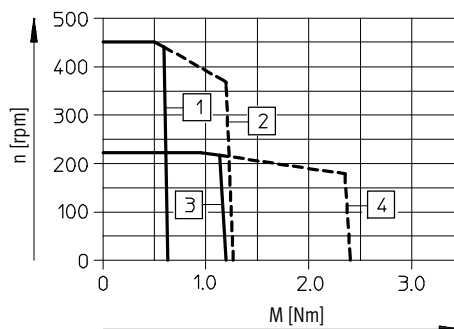
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Torque M as a function of rotational speed n

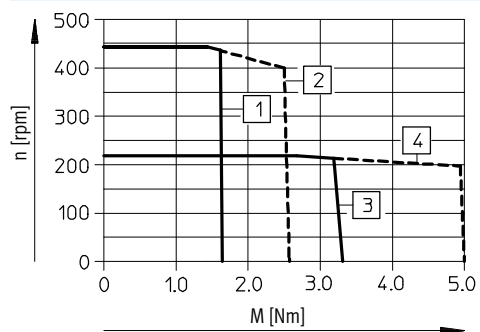
Size 32



Size 42



Size 52



Gear unit ratio 7:1

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

Gear unit ratio 14:1

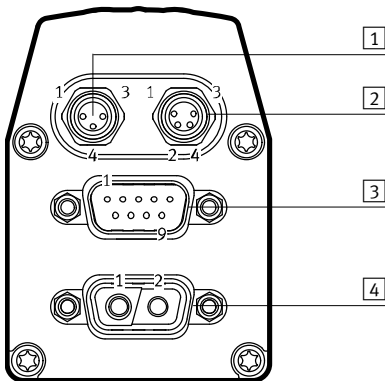
- 3 Torque, nom.
- 4 Torque, max.

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Technical data

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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
2	0 V
–	
–	
–	
–	
–	
–	
–	

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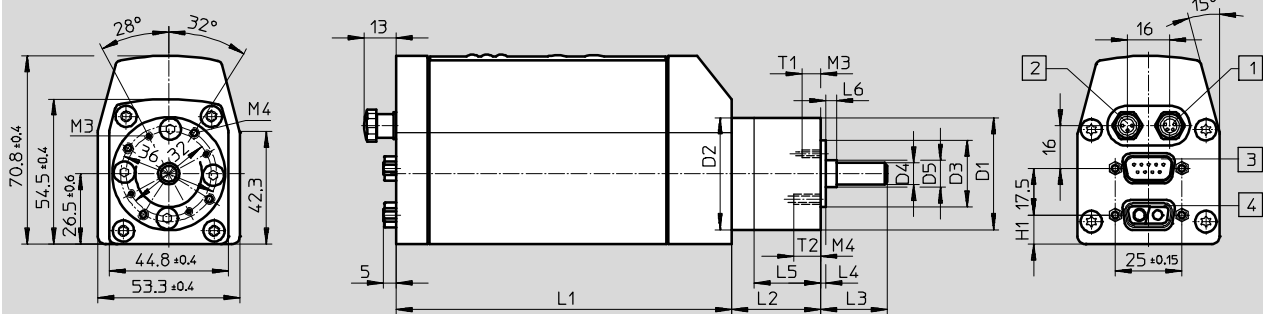
Technical data

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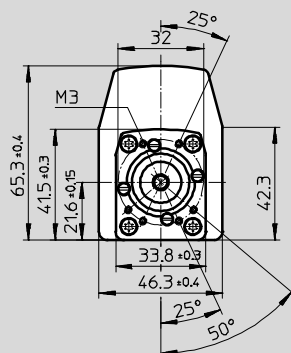
Dimensions

Download CAD data → www.festo.com

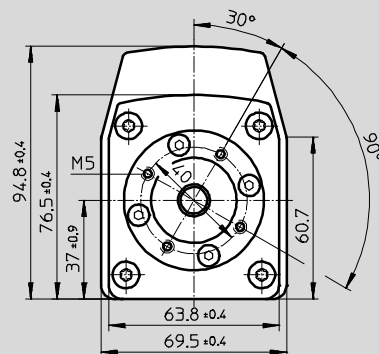
Size 42



Size 32



Size 52



- 1 M8x1, 4-pin
- 2 M8x1, 3-pin

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

Type	D1 ∅ g10	D2 ∅ ±0.1	D3 ∅ h8	D4 ∅ h7	H1	L1 ±1	L2 ±1	L3	L4	L5	T1	T2 +2
MTR-DCI-32S-...-G7	–	–	21.5	6	13±0.2	175.5	–	18.7±0.6	2.5±0.3	–	6	–
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	–

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Ordering data – Modular products

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	
533736	MTR	DCI	32	S	VC	SC	E	G7	R2	IO
533742			42					G14	H2	CO
533748			52							PB
										DN
Order example										
533742	MTR	- DCI	- 42	S	- VC	SC	- E	G7	- R2	IO

Ordering table						
Size	32	42	52	Condi- tions	Code	Enter code
M	Module No.	533736	533742	533748		
	Motor unit	Motor unit			MTR	MTR
	Motor type	DC servo motor with integrated position controller			-DCI	-DCI
	Flange/size	32	42	52	-...	
	Torque class	Standard torque class			S	S
	Nominal voltage [V]	24 DC			-VC	
	Plug design	Straight plug			SC	SC
	Measuring system	Encoder			-E	-E
	Gearing unit	Integrated planetary gearing i = 6.75			G7	
		Integrated planetary gearing i = 13.73			G14	
	Parameterisation interface	RS232 interface			-R2	
		RS232 interface + control panel			-H2	
	Electrical connection technology	I/O interface			IO	
		CANopen			CO	
		Profibus DP			PB	
		DeviceNet			DN	

Transfer order code

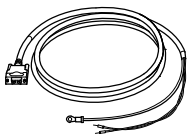
	MTR	-	DCI		S		SC	-	E		-		-	
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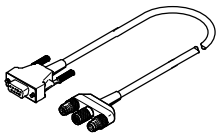
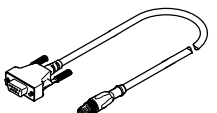
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Accessories

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Ordering data – Cables				
	Brief description	Cable length	Part No.	Type
	Supply cable Allocation → 7	2.5 m	537931	KPWR-MC-1-SUB-9HC-2,5
		5 m	537932	KPWR-MC-1-SUB-9HC-5
		10 m	537933	KPWR-MC-1-SUB-9HC-10
	Control cable for I/O connection to any PLC controller Allocation → 7	2.5 m	537923	KES-MC-1-SUB-9-2,5
		5 m	537924	KES-MC-1-SUB-9-5
		10 m	537925	KES-MC-1-SUB-9-10
	Programming cable For parameterisation and commissioning via the RS232 interface using FCT software Allocation → 7	2.5 m	537926	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	537934	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	540324	FBA-CO-SUB-9-M12

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Accessories

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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 – with FCT (Festo Configuration Tool) configuration software – Brief description This package is included in the scope of delivery.	550905	PBP-MTR-DCI

Ordering data – Documentation ¹⁾					
	Language	Part No.	Type	Part No.	Type
		For I/O interface		For Profibus interface	
	DE	539615	PBE-MTR-DCI-IO-DE	539623	PBE-MTR-DCI-PB-DE
	EN	539616	PBE-MTR-DCI-IO-EN	539624	PBE-MTR-DCI-PB-EN
	ES	539617	PBE-MTR-DCI-IO-ES	539625	PBE-MTR-DCI-PB-ES
	FR	539618	PBE-MTR-DCI-IO-FR	539626	PBE-MTR-DCI-PB-FR
	IT	539619	PBE-MTR-DCI-IO-IT	539627	PBE-MTR-DCI-PB-IT
		For CANopen interface		For DeviceNet interface	
	DE	539629	PBE-MTR-DCI-CO-DE	553530	PBE-MTR-DCI-DN-DE
	EN	539630	PBE-MTR-DCI-CO-EN	553531	PBE-MTR-DCI-DN-EN
	ES	539631	PBE-MTR-DCI-CO-ES	553532	PBE-MTR-DCI-DN-ES
	FR	539632	PBE-MTR-DCI-CO-FR	553533	PBE-MTR-DCI-DN-FR
	IT	539633	PBE-MTR-DCI-CO-IT	553534	PBE-MTR-DCI-DN-IT

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