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

PROFI

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
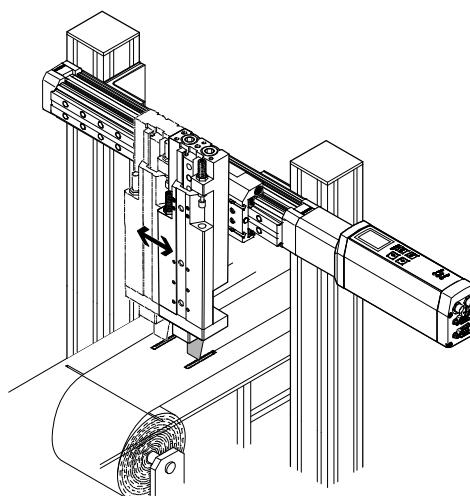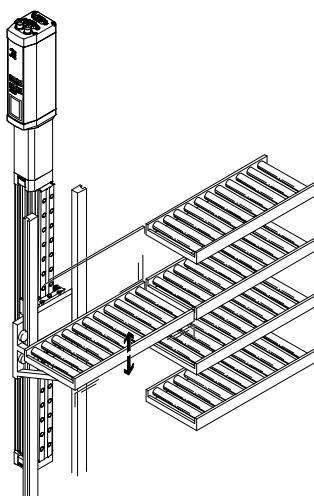
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Motor units MTR-DCI, intelligent servo motors

Type codes

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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

- ⬡ - Size
  32 … 52 mm

- ⌐ - Voltage
  24 V DC

Fieldbus interfaces

PROFIBUS

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

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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^2T 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 travers-ing 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 ➜ page 10

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Technical data

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Torque M as a function of rotational speed n

Size 32
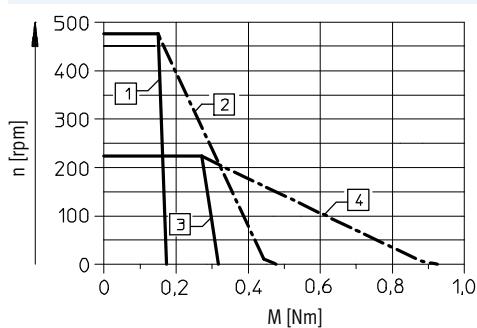
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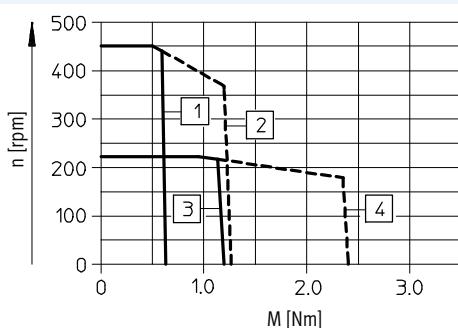
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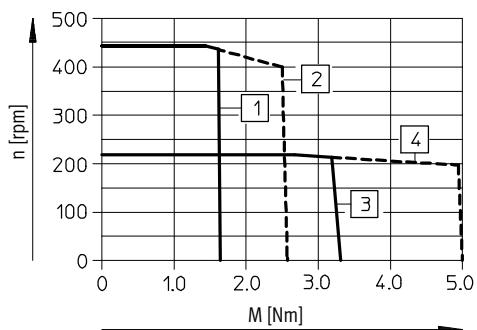
Gear unit ratio 7:1		Gear unit ratio 14:1	
1	Torque, nom.	3	Torque, nom.
2	Torque, max.	4	Torque, max.

➜ **Internet: www.festo.com/catalogue/...**

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Technical data

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Pin allocation
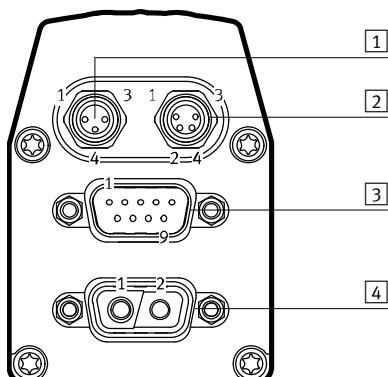
☐1 **Reference switch, 3-pin M8 socket**	
Pin	Function
1	24 V
4	Reference input
3	0 V
–	

☐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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Dimensions   Download CAD data ➔ www.festo.com

Size 42
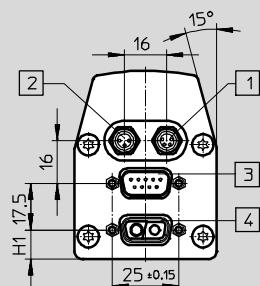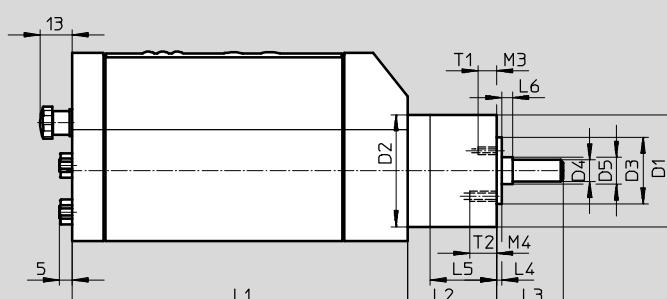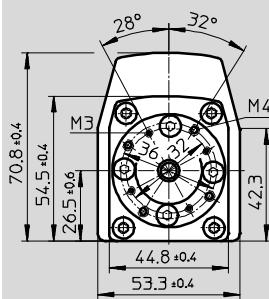
Size 32   **Size 52**
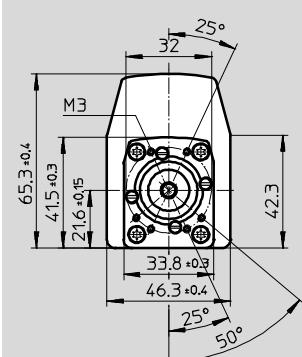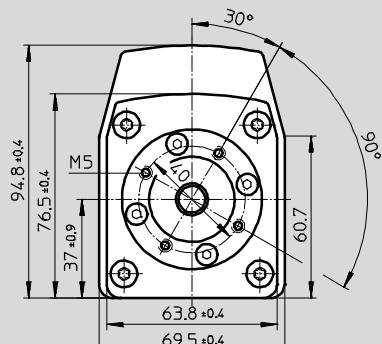
| 1 | M8x1, 4-pin | 3 | Sub-D, 9-pin |
| 2 | M8x1, 3-pin | 4 | Sub-D, 2-pin |

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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Accessories

Ordering data – Cables				
	Brief description	Cable length	Part No.	Type
	Supply cable Allocation ➜ page 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 ➜ page 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 ➜ page 7	2.5 m	**537926**	**KDI-MC-M8-SUB-9-2,5**
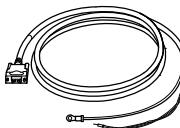
Ordering data – Plugs			
	Brief description	Part No.	Type
Fieldbus adapter for Profibus			
	– 9-pin Sub-D plug to 5-pin round M12 plug/socket, plus round M12 plug for logic voltage supply – Bus terminating resistor must be connected externally	**537934**	**FBA-PB-SUB-9-3XM12**
Fieldbus adapter for CANopen 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**
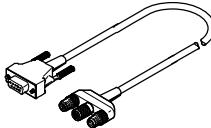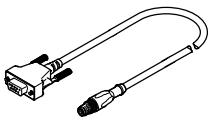
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Accessories

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**	**P.BP-MTR-DCI**

Ordering data – Documentation[1]					
	Language	Part No.	Type	Part No.	Type
		For I/O interface		For Profibus interface	
	DE	**539615**	**P.BE-MTR-DCI-IO-DE**	**539623**	**P.BE-MTR-DCI-PB-DE**
	EN	**539616**	**P.BE-MTR-DCI-IO-EN**	**539624**	**P.BE-MTR-DCI-PB-EN**
	ES	**539617**	**P.BE-MTR-DCI-IO-ES**	**539625**	**P.BE-MTR-DCI-PB-ES**
	FR	**539618**	**P.BE-MTR-DCI-IO-FR**	**539626**	**P.BE-MTR-DCI-PB-FR**
	IT	**539619**	**P.BE-MTR-DCI-IO-IT**	**539627**	**P.BE-MTR-DCI-PB-IT**
		For CANopen interface		For DeviceNet interface	
	DE	**539629**	**P.BE-MTR-DCI-CO-DE**	**553530**	**P.BE-MTR-DCI-DN-DE**
	EN	**539630**	**P.BE-MTR-DCI-CO-EN**	**553531**	**P.BE-MTR-DCI-DN-EN**
	ES	**539631**	**P.BE-MTR-DCI-CO-ES**	**553532**	**P.BE-MTR-DCI-DN-ES**
	FR	**539632**	**P.BE-MTR-DCI-CO-FR**	**553533**	**P.BE-MTR-DCI-DN-FR**
	IT	**539633**	**P.BE-MTR-DCI-CO-IT**	**553534**	**P.BE-MTR-DCI-DN-IT**
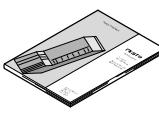
1) User documentation in paper form is not included in the scope of delivery