Motor units MTR-DCI

- **Servo motor with integrated gearing unit and positioning controller**

- **Compact design**

- **Actuation via I/O interface, CANopen, Profibus, DeviceNet**

- **Protection class IP54**

Motor units MTR-DCI, intelligent servo motors

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Key features

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 reduction 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
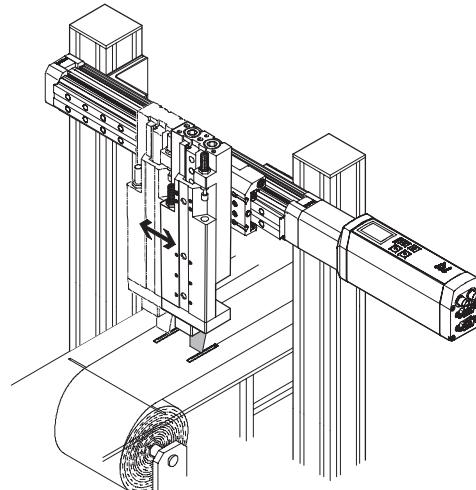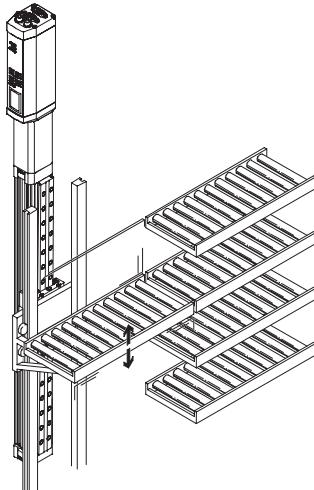
Motor units MTR-DCI, intelligent servo motors

Type codes

FESTO

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
VD	48 V DC

Plug design	
SC	Straight plug outlet

Measuring system	
E	Encoder

Gear reduction ratio	
G7	7:1
G14	14:1
G22	22:1

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

Electrical positioning systems
Motors and controllers

2.2

Motor units MTR-DCI, intelligent servo motors

Technical data

FESTO

- Size
  32 … 62 mm

- Voltage
  24, 48 V DC

Fieldbus interfaces

PROFI

CANopen

DeviceNet

General technical data

Size		32	42	52	62
Rotary position generator		Optical encoder			
No. of increments/revolution		300 (1,200)[1]	500 (2,000)[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 reduction ratio	G7	6.75 (7:1); 1-stage			
	G14	13.73 (14:1); 2-stage			
	G22	–			22.21 (22:1); 2-stage

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 reduction 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^2]	0.024		0.323		1.209		3.3		
Mass moment of inertia (gearing unit)	[kg cm^2]	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

Motor units MTR-DCI, intelligent servo motors

Technical data

FESTO

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^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				
CE mark (see declaration of conformity)	In accordance with EU EMC directive				
Ambient temperature [°C]	0 ... +50				
Storage temperature [°C]	−25 ... +60				
Relative air humidity [%]	0 ... 95 (non-condensing)				

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 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 32/42	200	–	–	–
outputs (size) 52/62	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]	–	1,000	12,000	500

1)   Details of bus terminating resistor ➔ 5 / 2.2-10

# Motor units MTR-DCI, intelligent servo motors

Technical data

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Torque M as a function of rotational speed n

Size 32
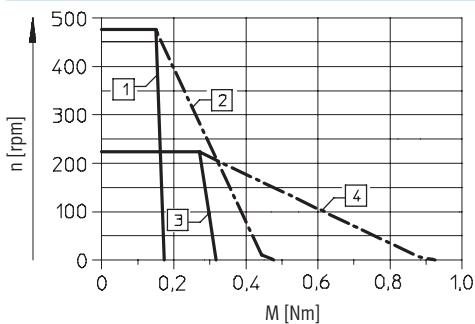
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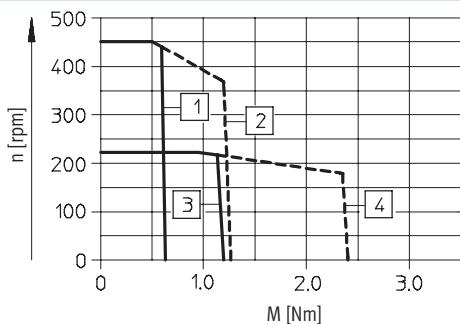
Size 52
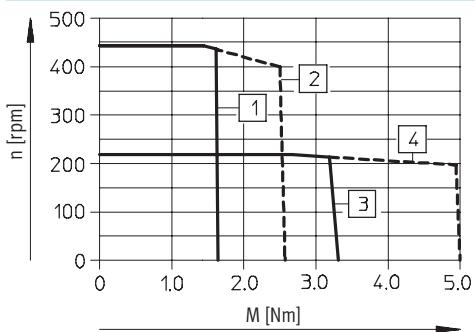
Size 62
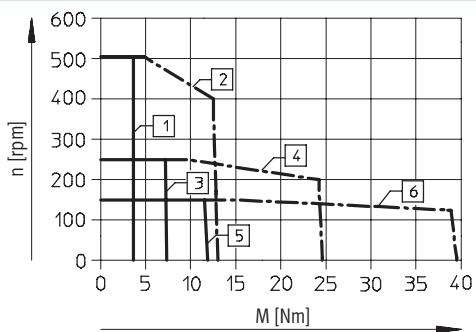
Gear reduction ratio 7:1	Gear reduction ratio 14:1	Gear reduction ratio 22:1
1 Torque, nom.	3 Torque, nom.	5 Torque, nom.
2 Torque, max.	4 Torque, max.	6 Torque, max.

Motor units MTR-DCI, intelligent servo motors

Technical data

FESTO

Pin allocation
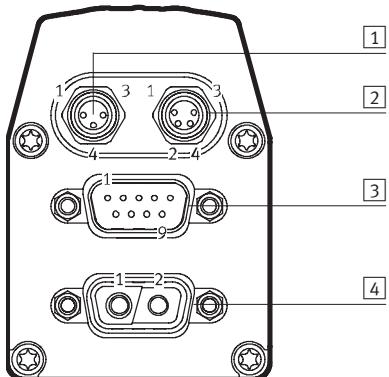
1 Reference switch, 3-pin M8 socket

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	GND
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	–
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

FESTO

**Dimensions**   Download CAD data → **www.festo.com/en/engineering**

Size 42
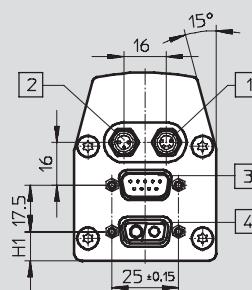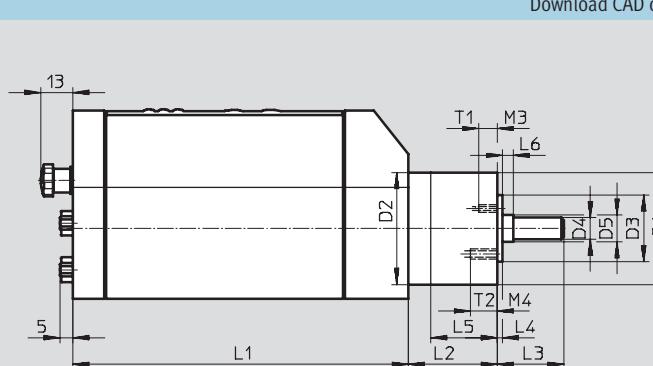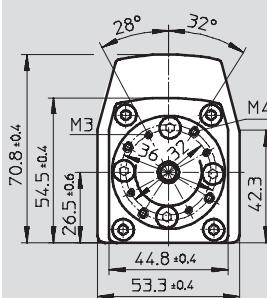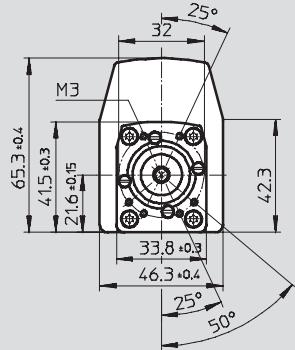
Size 32   **Size 52**   **Size 62**
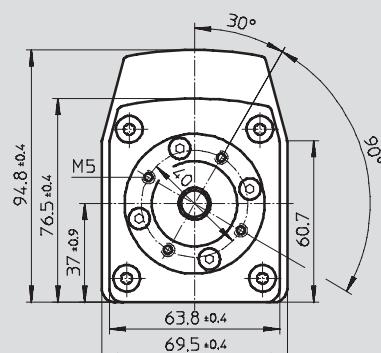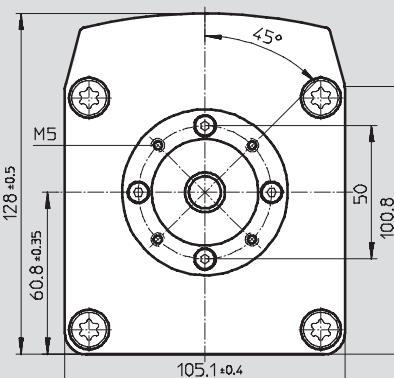
1	M8x1, 4-pin		3	Sub-D, 9-pin
2	M8x1, 3-pin		4	Sub-D, 2-pin

Type	D1 ⌀ g10	D2 ⌀ ±0.1	D3 ⌀ h8	D4 ⌀ h7	D5 ⌀	H1	L1 ±1	L2 ±1	L3	L4	L5	L6	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	–
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

FESTO

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
Order example										
533 742	**MTR** –	**DCI** –	**42**	**S** –	**VC**	**SC** –	**E**	**G7** –	**R2**	**IO**

Ordering table

Size		32	42	52	62	Conditions	Code	Enter code
M Module No.		**533 736**	**533 742**	**533 748**	**533 754**			
Motor unit		Motor unit					**MTR**	MTR
Motor type		DC servo motor with integrated position controller					**-DCI**	-DCI
Flange/size		32	42	52	62		**-...**	
Torque class		Standard torque class					**S**	S
Nominal voltage	[V]	24 DC			–		**-VC**	
	[V]	–			48 DC		**-VD**	
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**	
		–			Integrated planetary gearing i = 22.21		**G22**	
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** | – | – | |

Motor units MTR-DCI, intelligent servo motors

Accessories

Ordering data – Cables

|	Brief description	Cable length	Part No.	Type
	Supply cable Allocation ➜ 5 / 2.2-6	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 ➜ 5 / 2.2-6	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 ➜ 5 / 2.2-6	2.5 m	**537 926**	**KDI-MC-M8-SUB-9-2,5**
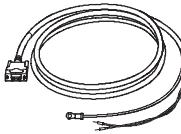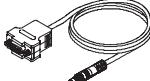
Ordering data – Plugs

	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**
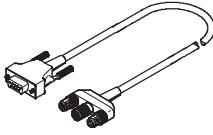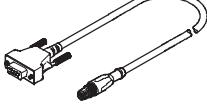
Motor units MTR-DCI, intelligent servo motors

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[1]					
	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