

Motor units MTR-DCI, intelligent servo motors



# Motor units MTR-DCI, intelligent servo motors

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 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

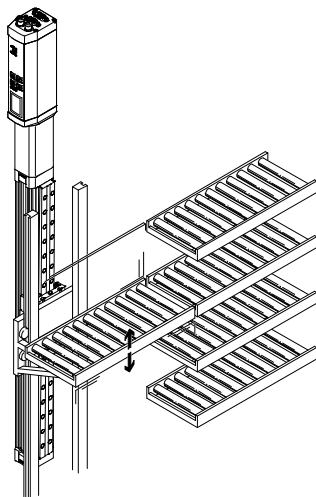


- 1 Control panel with integrated display (optional)
- 2 Input for reference limit switches
- 3 RS232 interface
- 4 Operator interface: I/O interface
- 5 Power supply
- 6 Gear unit

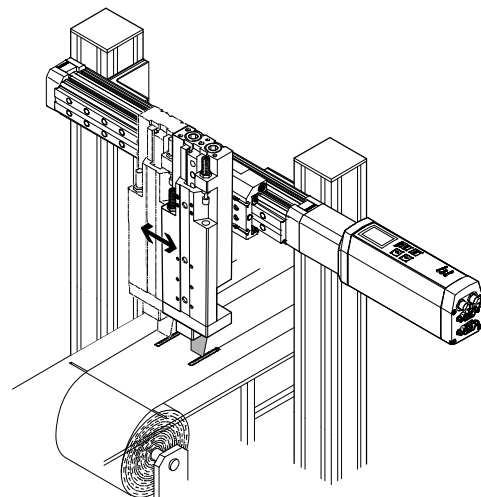


## Typical applications

Adjusting sorting conveyors



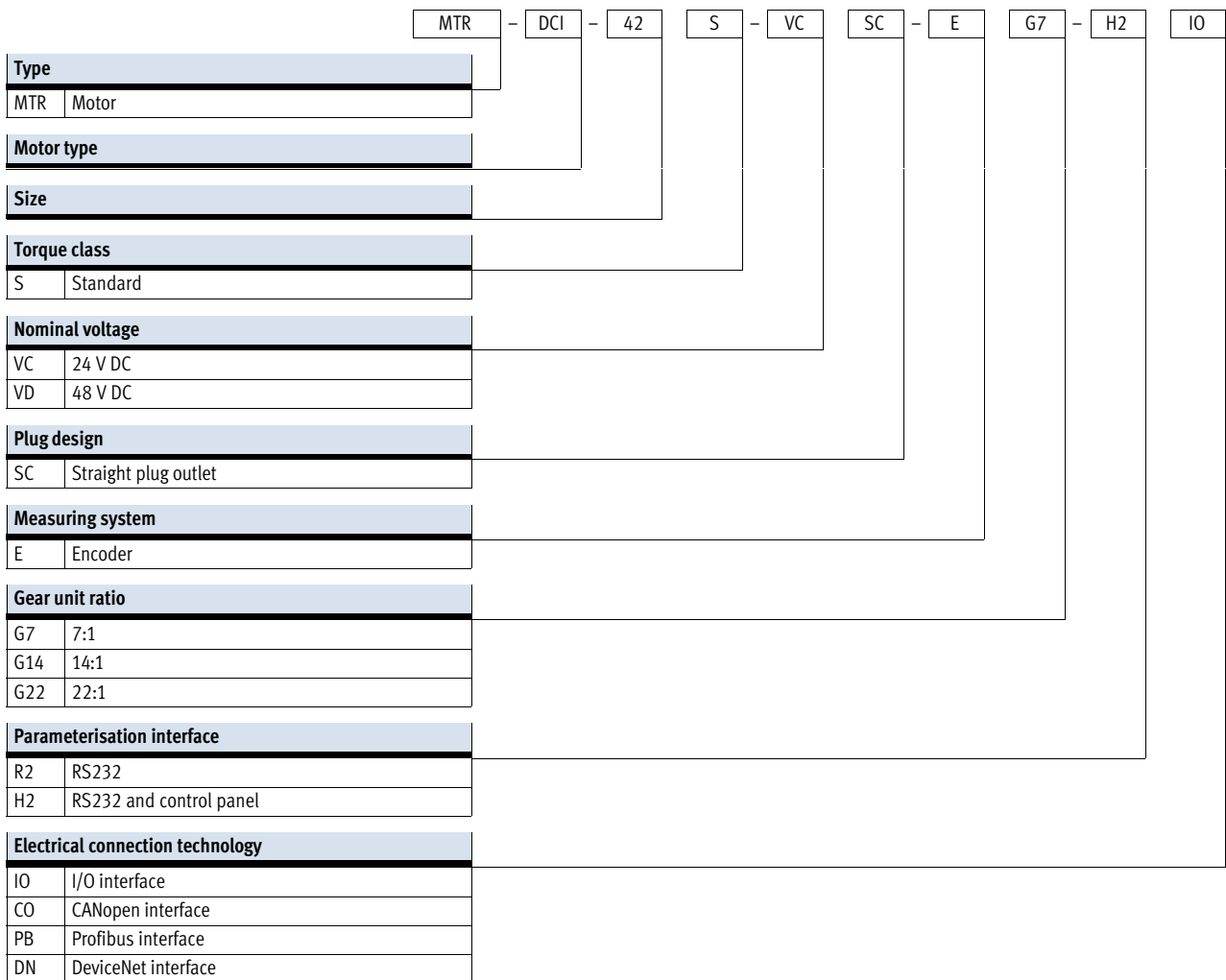
Programming formats for paper or foil cutting machines



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# Motor units MTR-DCI, intelligent servo motors



Type codes



# Motor units MTR-DCI, intelligent servo motors

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Technical data

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

Fieldbus interfaces



CANopen

DeviceNet



General technical data		32	42	52	62
Size		32	42	52	62
Rotary position generator		Incremental encoder			
Rotary position encoder measuring principle		Optical			
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	–			
					22.21 (22:1); 2-stage

1) Internal 4-fold evaluation

Electrical data – Motor		32	42	52	62
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		32		42		52		62		
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

# Motor units MTR-DCI, intelligent servo motors

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

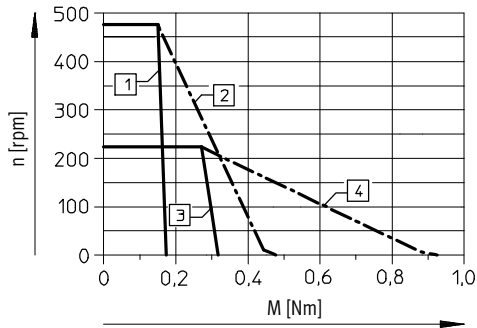
1) Details of bus terminating resistor → 10

# Motor units MTR-DCI, intelligent servo motors

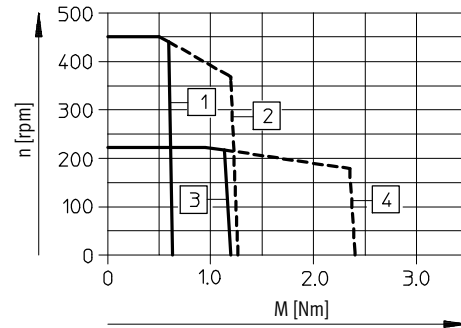
Technical data

## Torque M as a function of rotational speed n

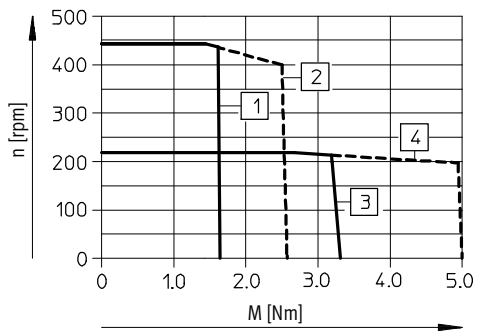
Size 32



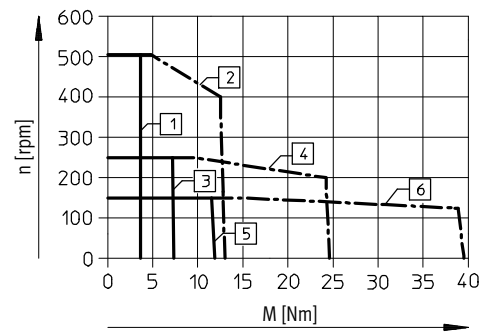
Size 42



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.

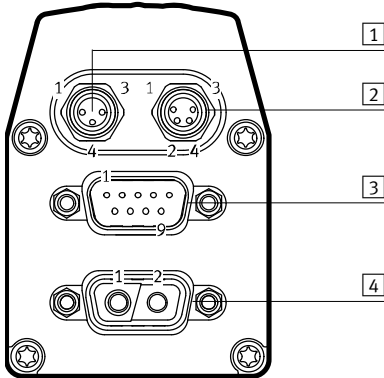
Gear unit ratio 22:1

- 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

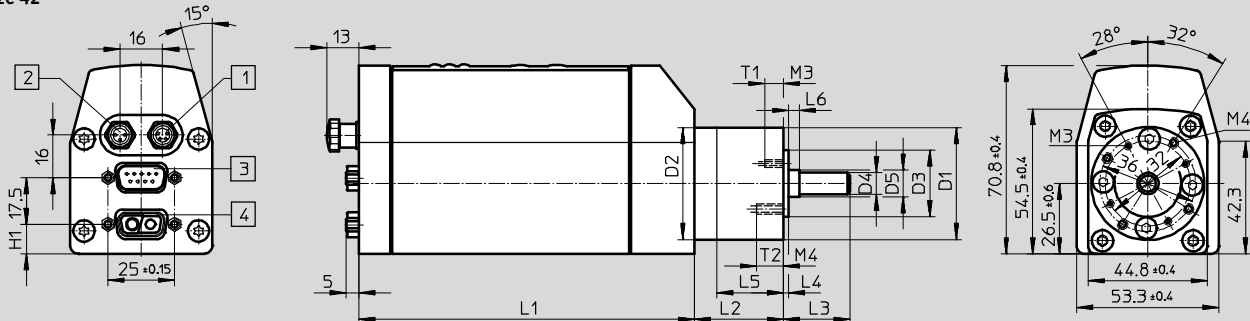
Technical data

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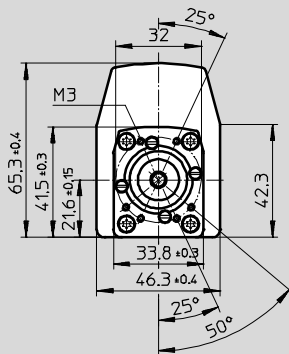
## Dimensions

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

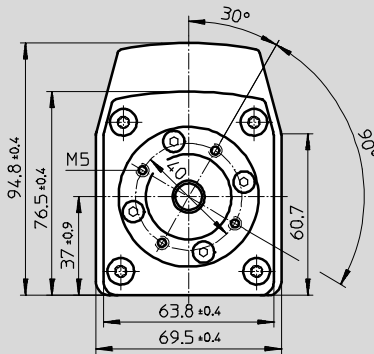
### Size 42



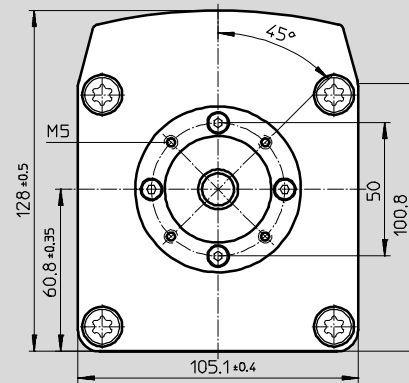
### Size 32



### Size 52



### Size 62



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

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

Type	D1 ∅ 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**

# Positioning axes DMES

Accessories – Motor units MTR-DCI



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>533742</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		-...				
Torque class	Standard torque class						<b>S</b>			S
Nominal voltage	[V] 24 DC					-	<b>-VC</b>			
	[V] -					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>			



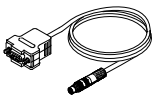
### Transfer order code

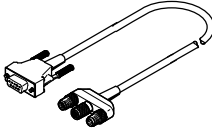
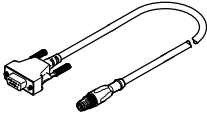
	<b>MTR</b>	-	<b>DCI</b>		<b>S</b>		<b>SC</b>	-	<b>E</b>		-		-	
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# Motor units MTR-DCI, intelligent servo motors


Accessories

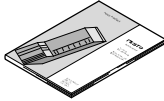
Ordering data – Cables				
	Brief description	Cable length	Part No.	Type
	Supply cable Allocation →7	2.5 m	537 931	KPWR-MC-1-SUB-9HC-2,5
		5 m	537 932	KPWR-MC-1-SUB-9HC-5
		10 m	537 933	KPWR-MC-1-SUB-9HC-10
	Control cable for I/O connection to any PLC controller Allocation →7	2.5 m	537 923	KES-MC-1-SUB-9-2,5
		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				
	<ul style="list-style-type: none"> <li>– 9-pin Sub-D plug to 5-pin round M12 plug/socket, plus round M12 plug for logic voltage supply</li> <li>– Bus terminating resistor must be connected externally</li> </ul>	537 934	FBA-PB-SUB-9-3XM12	
Fieldbus adapter for CANopen and DeviceNet				
	<ul style="list-style-type: none"> <li>– 9-pin Sub-D plug to 5-pin round M12 plug</li> <li>– Bus terminating resistor must be connected externally</li> </ul>	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.	<b>550 905</b>	<b>P.BP-MTR-DCI</b>

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

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

## Product Range and Company Overview

### A Complete Suite and Company Overview

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



**Custom Automation Components**  
Complete custom engineered solutions



**Custom Control Cabinets**  
Comprehensive engineering support and on-site services



**Complete Systems**  
Shipment, stocking and storage services

### The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



**Electromechanical**  
Electromechanical actuators, motors, controllers & drivers



**Pneumatics**  
Pneumatic linear and rotary actuators, valves, and air supply



**PLCs and I/O Devices**  
PLC's, operator interfaces, sensors and I/O devices

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Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 16,000 employees in 60 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

### Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.

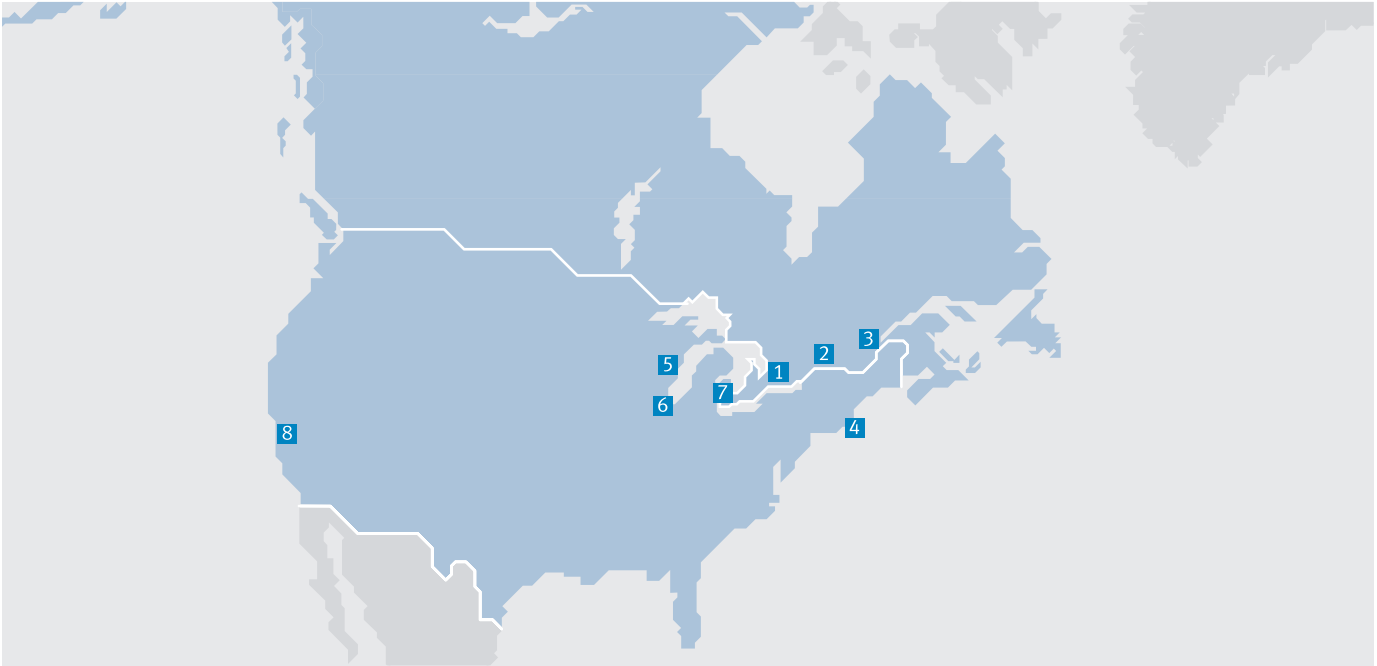


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