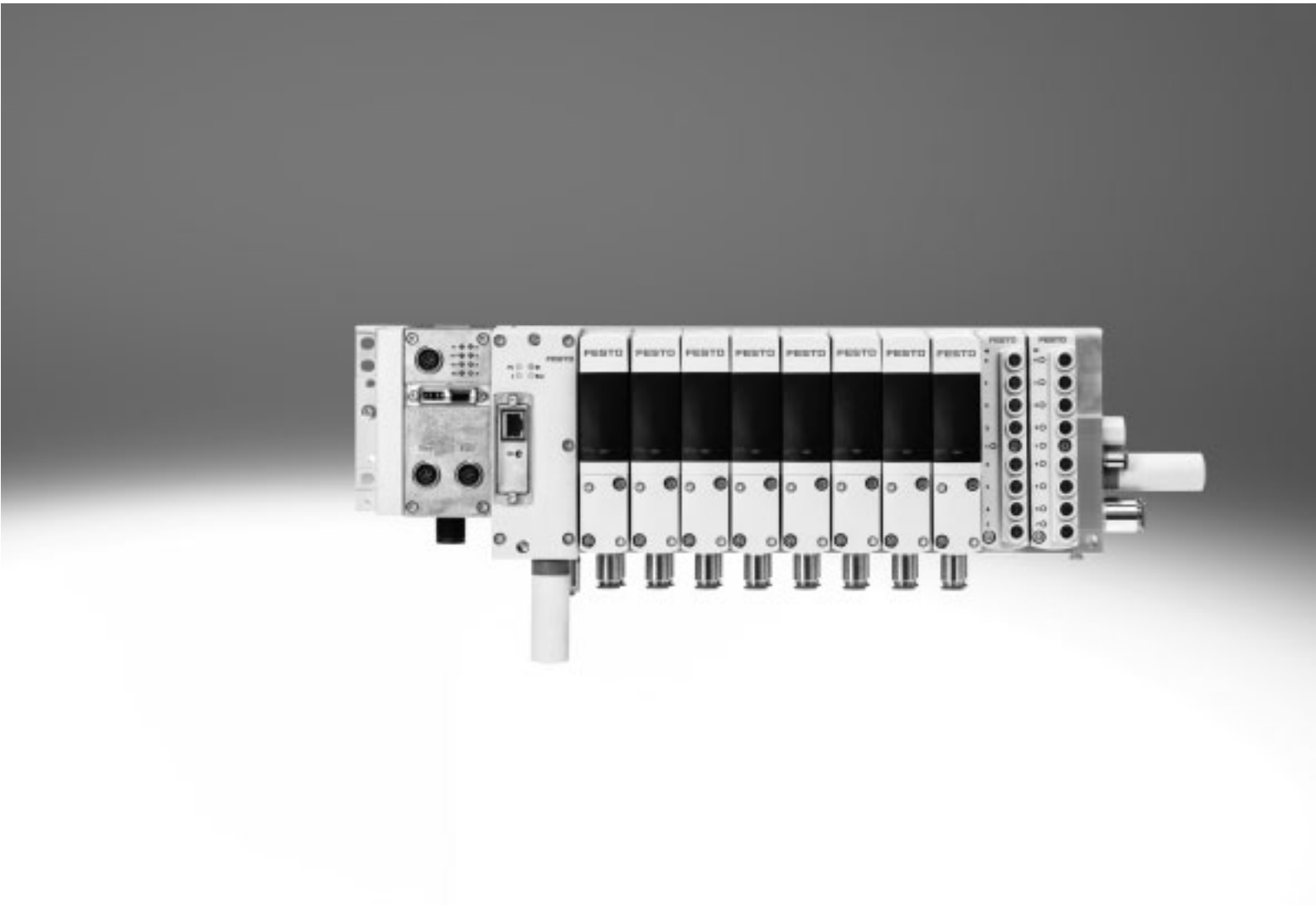
Motion Terminal VTEM



★/☆	Festo core product range Covers 80% of your automation tasks	★	Generally ready for shipping ex works in 24 hours Held in stock in 13 service centres worldwide More than 2200 product
Worldwide:	Always in stock	☆	Generally ready for shipping ex works in 5 days
Superb:	Festo quality at an attractive price		Assembled for you in 4 service centres worldwide
Easy:	Reduces procurement and storing complexity		Up to 6 x 10^{12} variants per product series

Look for the star!

Motion Terminal VTEM

Key features

Innovative

Benefits of piezo valves for pilot control:

- Pressure regulation function
- Maximum service life
- Minimum energy requirement
- Low leakage when acting as a proportional pressure regulator

Integrated controller permits:

- Cyclical changes to the valve function
- Function integration via Motion Apps

Versatile

The valves are connected to form a full bridge within the valve body, enabling a wide range of directional control valve functions to be realised at one valve position.
These functions are assigned to the valve by the connected controller and can be changed during operation.
The pressure regulator functionality of the valves in combination with the integrated pilot control enables the Motion Terminal VTEM to autonomously perform precision positioning tasks.

Reliable

Integrated sensors monitor the switching status of the valves and the pressure in duct 1, 3, 2 and 4.
Optional input modules enable the connected actuators to be monitored.
This information is evaluated in the Motion Terminal VTEM itself and also transferred to a higher-order controller.

Easy to install

- No need to change the valve, as the directional control valve function is assigned using software
- Less storage space required: one valve for all functions
- Integrated mounting points for wall and H-rail mounting
- Integrated flow control functionality, no manual adjustment required
- Functions of 50 individual components integrated via Motion Apps

Ordering data – Product options

Configurable product
This product and all its product options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

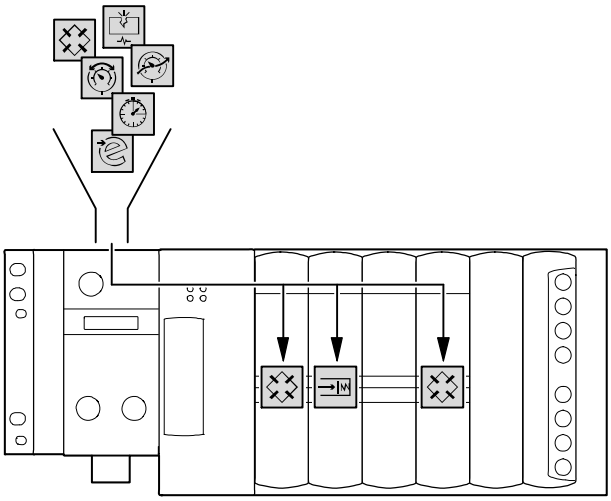
Part no. 8047502 Type code VTEM

Motion Terminal VTEM

Key features

Flexibility

Motion Apps



The valves of the Motion Terminal VTEM comprise four 2/2-way valves with piezo pilot control connected to form a full bridge, monitored by sensors.
This results in a series of special features compared with a valve terminal having conventional piston slide valves.
Depending on activation, the valves can perform the valve functions of:

- 2x 2/2-way valve
- 2x 3/2-way valve
- 4/2-way valve
- 4/3-way valve
- Proportional pressure regulator
- Proportional directional control valve

Functions usually associated with separate components, such as flow control or pressure regulation, can also be performed by the valves. Manual adjustment processes, procurement and maintenance are no longer needed as; all tasks are assigned and controlled centrally by means of software.

Which function a valve assumes and which tasks the controller can fulfil is determined by Motion Apps.

Licence packages

Each Motion Terminal VTEM is assigned a package of Motion App licences. This can be extended at any time; however, it is not possible to transfer licences from one Motion Terminal VTEM to another.

The valve functions that are available within the Motion Terminal can be freely assigned to each individual valve wherever and whenever necessary.

With the integrated sensors all valve functions can be comprehensively monitored.

The controller of the Motion Terminal can use this information to perform more complex pressure regulating tasks or switching of connected actuators.

Basic package

Directional control valve functions.

The Basic package is included with every Motion Terminal.

The Motion App “Directional control valve functions” can be used at the same time on all valve positions of the Motion Terminal.

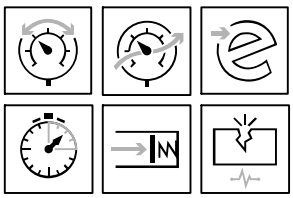
Start package

- Proportional directional control valve
- Supply and exhaust air flow control
- Selectable pressure level

The Start package can be ordered as an individual package for the Motion Terminal.

All Motion Apps in the Start package can be used at the same time on all valve positions of the Motion Terminal.

Additional apps



- Proportional pressure regulation
- Model-based proportional pressure regulation
- ECO drive
- Presetting of travel time
- Soft-Stop
- Leakage diagnostics

As well as the Basic and Start packages, other Motion Apps can be ordered individually for the Motion Terminal.

Depending on the Motion App, these can be used at the same time on all valve positions of the Motion Terminal, or must be ordered in the number required for simultaneous use on the Motion Terminal.

Motion Terminal VTEM

Key features

Integrated sensors

Monitoring functions

Integrated sensors monitor:
- Degree of opening of the valve (flow rate for supply air and exhaust air)
- Pressure

Monitoring is performed:
- For each individual valve
- For each individual valve connection

This produces the following diagnostic information:
- System leakage

Controlled movement

The ability to adapt pressure and flow rate, in combination with the integrated sensors, makes it possible to influence the cylinder movement directly.

This means that a wide range of requirements can be met:
- Independent, proportional regulation of the supply and exhaust air for each cylinder chamber

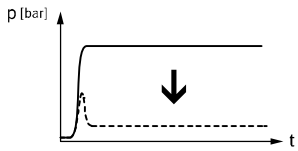
- Soft start
- Fast start
- Noise reduction
- Reduced vibrations

- No need for exhaust air flow control valves
- No need for shock absorbers

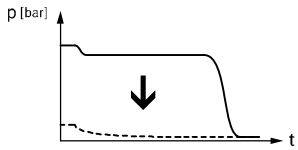
Energy efficiency

Energy-saving movement

Pressure at duct 2



Pressure at duct 4



Movement with reduced force

Advantages:
- High energy efficiency, particularly energy-saving return stroke
- Reduced number of components

Objective:
Reduction in total costs thanks to motion control using less compressed air than when the drive is fully pressurised. This reduces operating costs and improves overall economic efficiency.

Principle:
Pressure is built up on the pressurisation side purely to create the differential pressure required to maintain movement (pre-exhausted). This means that less compressed air is needed for each cycle.
When the movement ends, the Motion Terminal VTEM closes the valve so that only the minimum static pressure sufficient to hold the cylinder in position is applied. The sensor monitoring means that, if there is a drop, the position is readjusted automatically

Application:
- Typically for fast running production machines (e.g. packaging, assembly or processing machines)
- Linear or rotary movement with a medium-sized stroke and/or high number of cycles

Piezo technology

The Motion Terminal VTEM uses piezo technology, which is characterised by low energy consumption.
Advantages:
- Low-energy power supply unit
- Small cable diameters
- Minimal self-heating

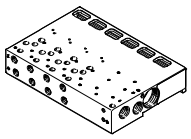
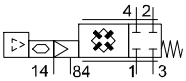
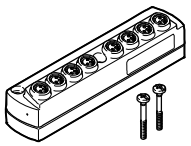
The degree of opening of the piezo valves can be freely controlled. This makes it possible to control the rate of flow through the valve:
- Without additional components
- Time-controlled
- Controlled by sensors
- For each individual valve
- For each individual valve connection

Control of the degree of opening together with the pressure sensors integrated in the Motion Terminal make it possible to adjust the pressure individually:
- For each individual cylinder chamber
- For each individual valve
- For each individual valve connection

Advantages:
- Lower air consumption owing to partial pressurisation
- Variable contact pressure in the end position or when clamping a workpiece
- Variable independent pressure for forward/return stroke

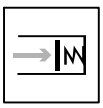
Motion Terminal VTEM

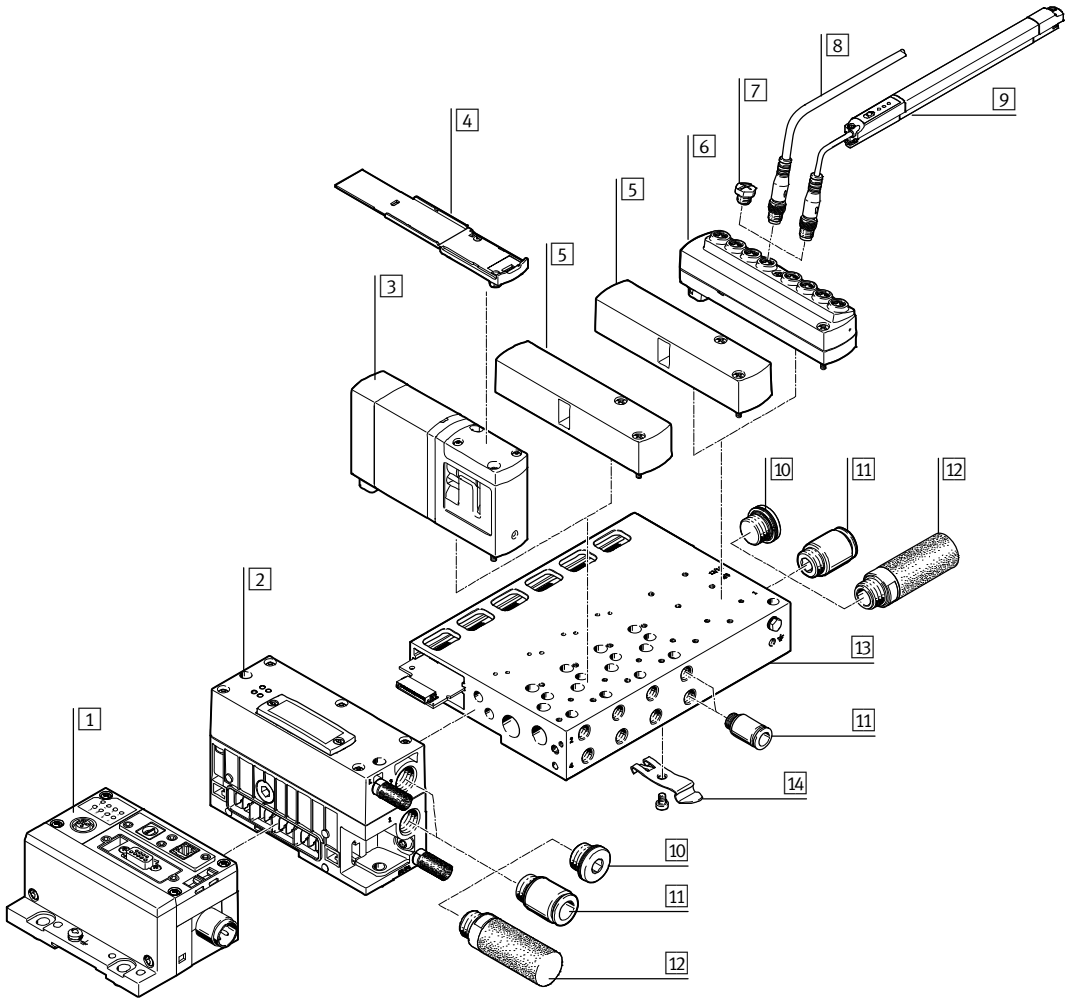
Product range overview

Function	Version		Type code	Description	➔ Page
Pneumatic/ mechanical	**Pneumatic linkage**				
		Fixed grid	VTEM	• 4 or 8 valve positions • 0 or 2 positions for input modules • With electrical interface for terminal CPX • Supply/exhaust ports and working ports for the mounted valves • Pilot air supply for the mounted valves • Electrical actuation for the mounted valves	14
	Valve				
		4x 2/2-way valve	VEVM	• Position if the power supply/signalling fails – all ducts closed • Connected in series to form a full bridge • Proportional pilot control by piezo valves • Degree of valve opening monitored by sensor • Pressure sensors in ports 2 and 4	18
Electronics	**Input module**				
		Analogue	CTMM-A	• 8 analogue inputs • M8, 4-pin • Exclusively for controlling the functions provided via the Motion Apps • Data can be transferred to a higher-order controller by the Motion Apps	20
		Digital	CTMM-D	• 8 digital inputs • M8, 3-pin • Exclusively for controlling the functions provided via the Motion Apps • Data can be transferred to a higher-order controller by the Motion Apps	20
Motion Apps	**Basic package**				
		Directional control valve functions	–	Valve type and switching status can be cyclically assigned to a valve: • 2x 2/2-way valve, normally closed • 2x 3/2-way valve, normally open • 2x 3/2-way valve, normally closed • 2x3/2-way valve, 1x normally closed, 1x normally open • 4/2-way valve, single solenoid • 4/2-way valve, double solenoid • 4/3-way valve, normally pressurised • 4/3-way valve, normally closed • 4/3-way valve, normally exhausted	23
	The Motion Apps in the Basic package can be used at the same time on all valve positions of the Motion Terminal.				

Motion Terminal VTEM

Product range overview

Function	Version		Type code	Description	➔ Page
Motion Apps	**Start package**				
		Proportional directional control valve	STP	Valve type, switching status and a continuous valve opening can be cyclically assigned to a valve: • 4/3-way valve, normally closed • 2x 3/3-way valve, normally closed	25
		Supply and exhaust air flow control	STP	Flow control function: • Supply air flow control • Exhaust air flow control • Comprises 4/4-way valve (corresponding to valve plus flow control)	28
		Selectable pressure level	STP	Energy-saving cylinder movement using a reduced pressure level: • Pressure regulation for supply air • Flow control function for exhaust air	31
	All Motion Apps in the Start package can be used at the same time on all valve positions of the Motion Terminal.				
	Additional apps				
		Proportional pressure regulation	PD	Regulation of the two valve outlet pressures independently of one another: • 2x proportional pressure regulator	26
		Model-based proportional pressure regulation	PF	Regulation of the two valve outlet pressures independently of one another: • 2x proportional pressure regulator • More dynamic control due to the consideration of the pressure drop in the tubing	27
		ECO drive	ED	For applications with low loads or slow travel movement: • Energy-saving cylinder movement through supply air flow control • Adjustable supply-air flow control value • Blocks the supply air on reaching the end position • Sensors and digital input module required	29
		Presetting of travel time	TT	Presetting the travel time for retracting and advancing: • Pre-calculation of the travel profile using set parameters • Teaching the system • Automatic readjustment of the system • Sensors and digital input module required	30
		Soft Stop	SP	Control of cylinder behaviour near the end positions: • Controlled acceleration • Gentle braking • Teaching the system • Automatic readjustment of the system • Sensors and analogue input module required	32
		Leakage diagnostics	DLP	Air consumption monitoring: • Teaching the system • Diagnostic message using specified parameters	33

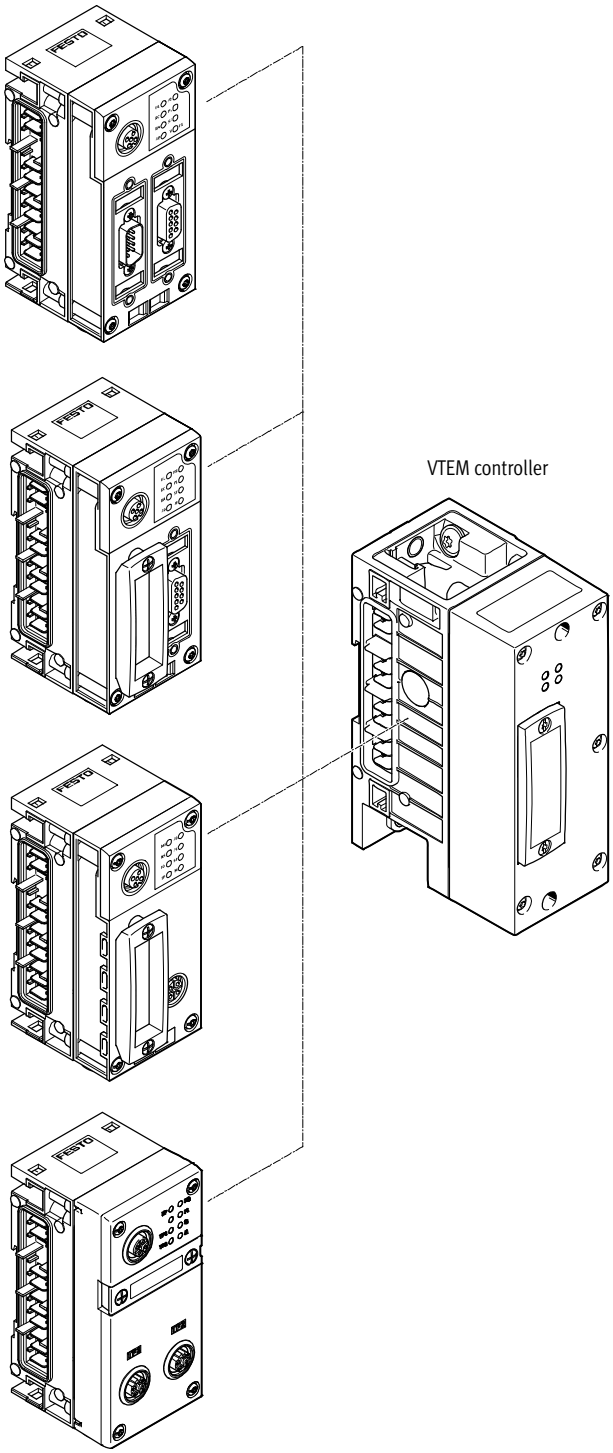


Designation			Brief description	➔ Page/Internet
1	CPX modules	CPX	Bus node, control block, input and output modules	cpx
2	Controller	CTMM	For VTEM and pneumatic interface to the terminal CPX	14
3	Valve body	VEVM	Contains 4 interconnected piston poppet valves with piezo pilot control	18
4	Identification holder	ASCF	For a valve	34
5	Cover plate	VABB	For unoccupied valve position (vacant position) or input module position	34
6	Input module	CTMM	For connecting sensors to the VTEM	20
7	Cover cap	ISK	For sealing unused ports	34
8	Connecting cable	NEBU	For connecting sensors	35
9	Position sensor	SDAP	Analogue position sensor for VTEM input module CTMM	34
10	Blanking plug	B	For sealing unused ports	36
11	Fittings	QS	For connecting compressed air tubing	35
12	Silencers	U	For exhaust ports	36
13	Manifold rail	VABM	Pneumatic and electrical linkage	34
14	H-rail mounting	VAME	For CPX and VTEM	34

Connection of the Motion Terminal VTEM to a higher-level controller

Overview

CPX bus node/control block



The precise technical data and specifications for CPS can be found online under:

➔ Internet: cpx

Bus protocol/bus node	Special features
CODESYS	
CPX-CEC-C1-V3 CPX-CEC-S1-V3 CPX-CEC-M1-V3	• Programming with CODESYS • Ethernet interface • Modbus/TCP • EasyIP • CANopen master • Up to 512 digital inputs/outputs • 32 analogue inputs • 18 analogue outputs
PROFIBUS DP	
CPX-FB13	• Up to 512 digital inputs/outputs • 32 analogue inputs • 18 analogue outputs
EtherNet/IP	
CPX-FB36	• Up to 512 digital inputs/outputs • 32 analogue inputs • 18 analogue outputs
PROFINET	
CPX-FB33 CPX-M-FB34	• Up to 512 digital inputs/outputs • 32 analogue inputs • 18 analogue outputs
EtherCAT®	
CPX-FB37	• Up to 512 digital inputs/outputs • 32 analogue inputs • 18 analogue outputs

Motion Terminal VTEM

Characteristics – Pneumatics

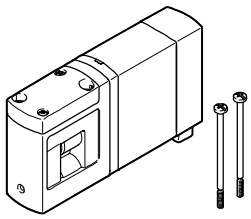
Pneumatics of the Motion Terminal

The Motion Terminal VTEM is operated exclusively with the electric terminal CPX. A Motion Terminal VTEM comprises 4 or 8 valve positions.

The pneumatic and electrical linkage takes place in a fixed grid. Subsequent extension is not possible.

Two positions for input modules with 8 digital or 8 analogue inputs can be integrated in the Motion Terminal.

Sub-base valve

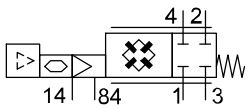


VTEM offers a comprehensive range of programmable valve functions. The valves comprise four 2/2-way proportional valves connected to form a full bridge.
Each 2/2-way proportional valve is pilot controlled by two piezo valves.

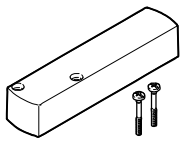
The pilot air for all valves is supplied jointly via duct 14 (branched internally from duct 1 or supplied externally).

Sensors monitor the degree of opening of the valves as well as the pressure in duct 2 and 4.

4x 2/2-way proportional valve

Circuit symbol	Code	Description	
	Position function 1-8: C	• Bridge circuit • Single solenoid • Reset via mechanical spring	• Operating pressure: 0 ... 8 bar • Vacuum operation at port 3 only

Cover plate



Vacant position (code L) without valve function, for reserving valve positions or unused input module positions (seal).

Compressed air supply and exhaust

The Motion Terminal is supplied with compressed air via:
- Manifold rail
- Controller/pneumatic interface

Exhausting (duct 3) takes place via:
- Manifold rail
- Controller/pneumatic interface

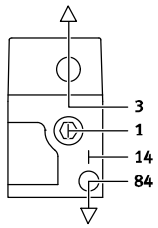
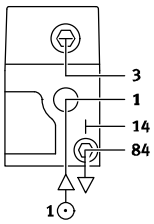
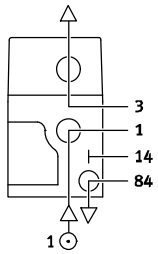
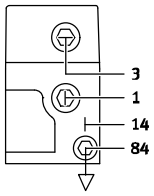
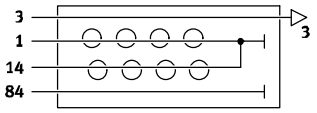
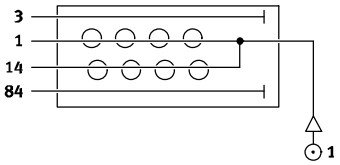
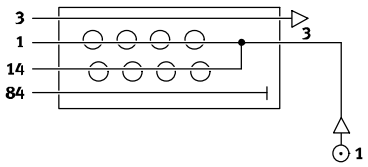
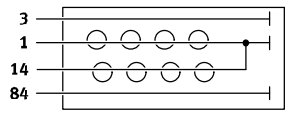
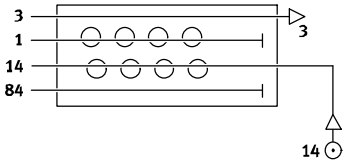
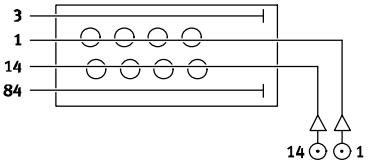
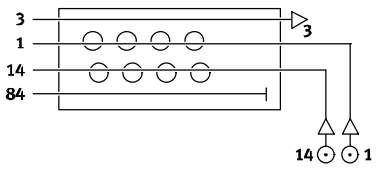
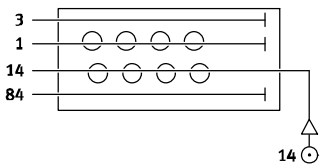
The pilot air exhaust (duct 84) is completely separate from duct 3. The connection is on the controller (pneumatic interface to CPX terminal) together with the connections for duct 1 and 3.

All valves on the Motion Terminal have a common pilot air supply. They can be supplied as follows:
- Internally (from duct 1 of the manifold rail) or
- External (from duct 14)

Pressure zone separation (duct 1) is not required, as each valve can control the outlet pressure separately. For vacuum applications, a vacuum is connected to port 3 and pressure for the ejector pulse is connected to port 1.

Note

A filter must be installed upstream of valves operated in vacuum mode. This prevents any foreign matter in the intake air getting into the valve (e.g. when operating a suction cup with connector).

Compressed air supply and pilot air supply			
Graphical illustration	Description	Graphical illustration	Description
Controller			
	• Exhaust via the controller • Compressed air is supplied via the manifold rail • Exhaust can also take place via the manifold rail		• Compressed air supply via the controller • Exhaust takes place via the manifold rail • Compressed air can also be supplied via the manifold rail
	• Exhaust and compressed air supply via the controller • Compressed air supply and exhaust alternatively possible via the manifold rail		• Ports on the controller sealed • Compressed air supply and exhaust via the manifold rail
Manifold rail with internal pilot air supply			
	• Exhaust via the manifold rail • Compressed air supply via the controller • Exhaust can also take place via the controller		• Compressed air supply via the manifold rail • Exhaust takes place via the controller • Compressed air can also be supplied via the controller
	• Exhaust and compressed air supply via the manifold rail • Compressed air supply and exhaust also possible via the controller		• Ports on the manifold rail sealed • Compressed air supply and exhaust via the controller
Manifold rail with external pilot air supply			
	• Exhaust via the manifold rail • Compressed air supply via the controller • Exhaust can also take place via the controller		• Compressed air supply via the manifold rail • Exhaust takes place via the controller • Compressed air can also be supplied via the controller
	• Exhaust and compressed air supply via the manifold rail • Compressed air supply and exhaust also possible via the controller		• Ports on the manifold rail sealed • Compressed air supply and exhaust via the controller

Vacuum operation

Basic principles

The Motion Terminal VTEM can be operated with vacuum.
For vacuum operation, the vacuum is connected to port 3. Pressure for an ejector pulse can be connected at port 1.

When using internal pilot air supply, the necessary minimum pressure (3 bar) in duct 1 must be maintained.
Internal pressure sensors in duct 2 and duct 4 detect the pressure/vacuum and enable the valve to control its degree of opening and the pressure level.
The sensors are designed so they are protected against contamination.

Note

A filter must be installed upstream of valves operated in vacuum mode. This prevents any foreign matter in the intake air getting into the valve (e.g. when operating a suction cup with connector).

Fittings

Port 1, 2, 3, 4, 14 and 84

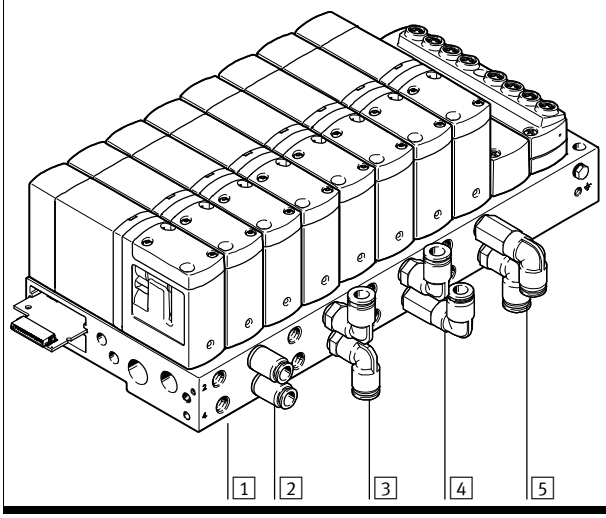
The outlet direction of the pneumatic connections in the manifold rail is specified.

The outlet direction of connected tubing can be varied widely by choosing appropriate fittings.

Connection type and outlet direction are selected:
- for all ports 2 and 4
- for all compressed air supply ports
- for all exhaust ports

- for each individual port 2, as a deviation from the general specification
- for each individual port 4, as a deviation from the general specification

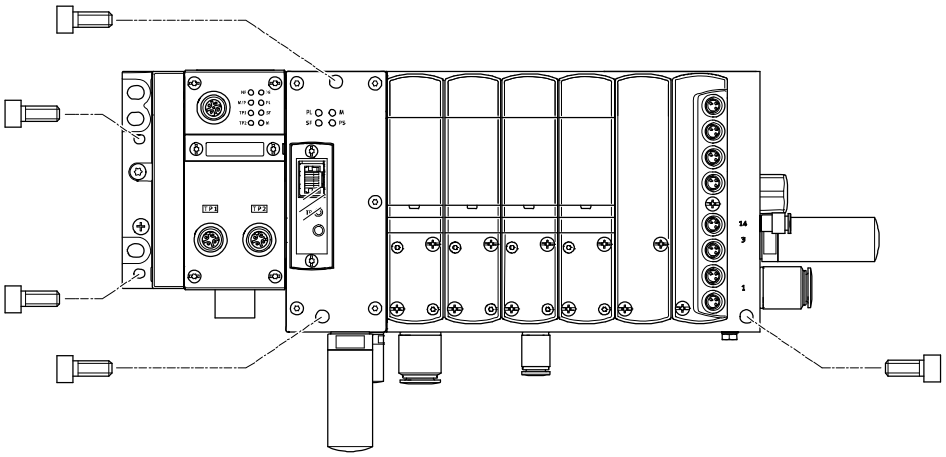
Connection on the valve (port 2/4)



	Code	Description
1	G18	Threaded connection G1/8
2	Q...	Valve connection: push-in connector ... Valve connection type: straight
3	Q... FB	Valve connection: push-in connector ... Valve connection type: angled upward and downward
4	Q... FA	Valve connection: push-in connector ... Valve connection type: angled upward
5	Q... FC	Valve connection: push-in connector ... Valve connection type: angled downward

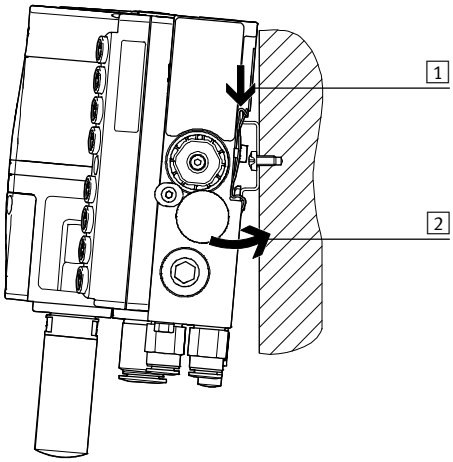
Motion Terminal assembly

Wall mounting



The Motion Terminal VTEM is screwed to the mounting surface using five M4 or M6 screws.
The mounting holes are located:
- On the left end plate (CPX)
- On the right-hand end of the manifold rail
- On the VTEM controller

H-rail mounting



1 The Motion Terminal is hung on the H-rail
2 The Motion Terminal is then pivoted onto the H-rail and latched in place

Display and operation

CPX terminal

The modules of the CPX terminal have a row of LEDs. These provide information about:
- Status of bus communication
- System status
- Module status

VTEM controller

The VTEM controller has LEDs for displaying:
- Operating voltages
- Status of communication to higher-order controller
- Ethernet data traffic

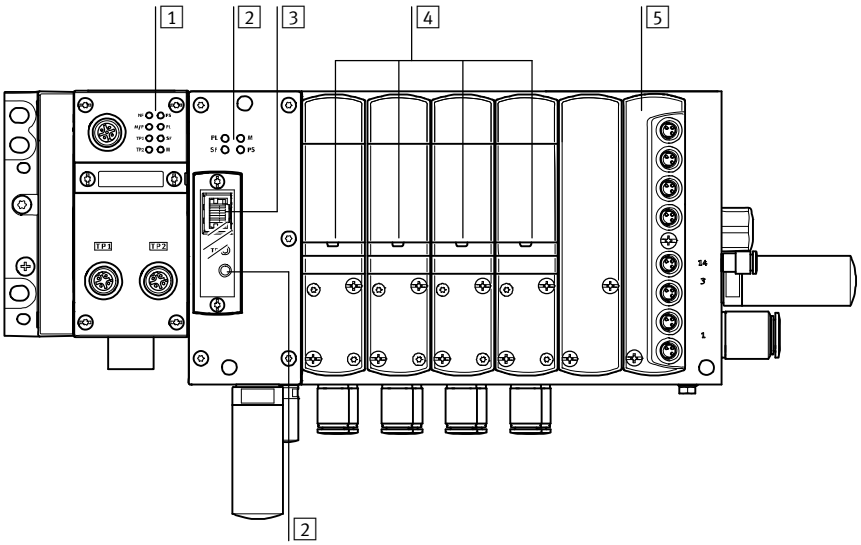
VTEM valve

Each VTEM valve has a display which indicates whether the valve is ready for operation or whether there is a malfunction.
The valves do not have a mechanical manual override.

VTEM input module

The input modules are equipped with one central ready status indication per module.
The digiital input module displays the input status for each channel.

Display and control components



1 LED indicators on the bus node of the CPX terminal
2 LED indicators on the VTEM controller
3 Ethernet interface to the VTEM controller
4 LED indicator on the VTEM valve
5 VTEM input module

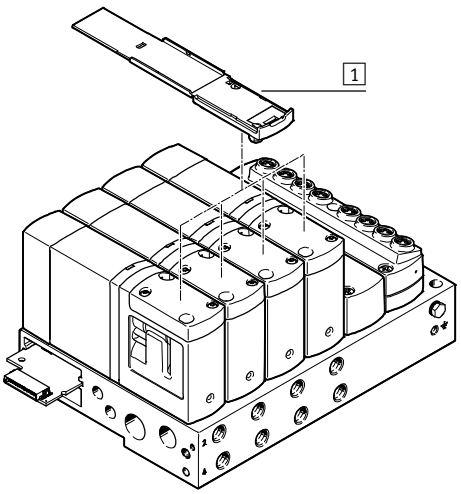
Diagnostics

Detailed support for diagnostic functions is needed in order to quickly locate the causes of errors in the electrical installation and therefore reduce downtimes in production plants.

A basic distinction is made between on-the-spot diagnostics using LEDs or an operator unit and diagnostics using a bus interface.

The Motion Terminal VTEM supports on-the-spot diagnostics using LEDs as well as diagnostics via bus interface and Ethernet interface.

Labelling



1 Identification holder

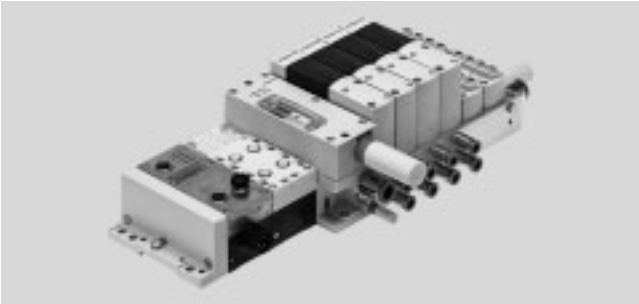
Identification holders are available for labelling the Motion Terminal.
These are clipped onto the valves.

Motion Terminal VTEM

Technical data – Motion Terminal VTEM

FESTO

- Flow rate
  Up to 480 l/min
- Valve width
  27 mm
- Voltage
  24 V DC



General technical data		
Design		Fixed grid
Electrical control		Fieldbus
Type of actuation		Electrical
Maximum number of valve positions		8
Valve size	[mm]	27
Grid dimension	[mm]	28
Suitable for vacuum		Yes
Exhaust function		Without flow control option
Pilot air supply		Internal or external
Electrical I/O system		Yes
Degree of protection		IP65

Operating and environmental conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4] and inert gases
Pilot medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Lubricated operation not possible
Operating pressure	[bar]	3 ... 8
Pilot pressure	[bar]	3 ... 8
Note on operating/pilot pressure		0 ... 8 bar for external pilot air supply
		Vacuum at port 3 only
Ambient temperature	[°C]	–5 ... +50
Temperature of medium	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +40
Relative humidity	[%]	0 ... 90 (non-condensing)
Corrosion resistance class CRC[1)]		2
CE marking (see declaration of conformity)		To EU EMC Directive[2)]
		To EU Low Voltage Directive
Material fire test		UL94 HB

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Electrical data		
Nominal operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	±25
Protection against direct and indirect contact		PELV

Safety data	
CE marking (see declaration of conformity)	To EU EMC Directive[1)]
	To EU Low Voltage Directive
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6
Note on vibration/shock resistance	Static installation only when mounting with H-rail

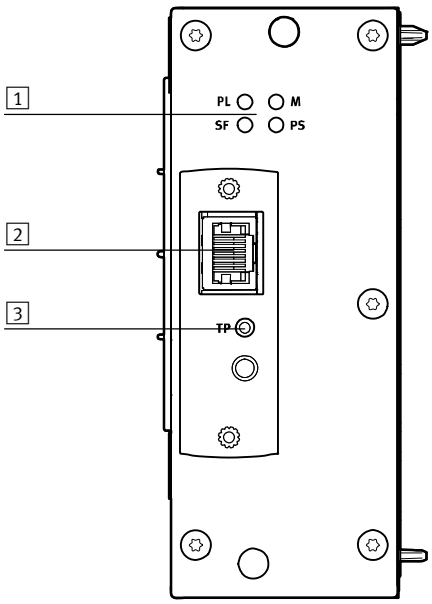
1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Pneumatic connections		
Supply	1	G3/8 thread
Exhaust port	3	G3/8 thread
Pilot air supply	14	M5 thread
Pilot exhaust air	84	M7 thread
Venting hole		M7 thread
Working ports	2	G1/8 thread
	4	G1/8 thread

Materials	
Seals	TPE-U(PU), NBR
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Product weight	
	Approx. weight [g]
Controller	290
Manifold rail, 4 valve positions	990
	1460 (with 2 vacant positions for input modules)
Manifold rail, 8 valve positions	1875
	2340 (with 2 vacant positions for input modules)
Cover plate	75
Valve body	200
Input module	75

Connection and display components

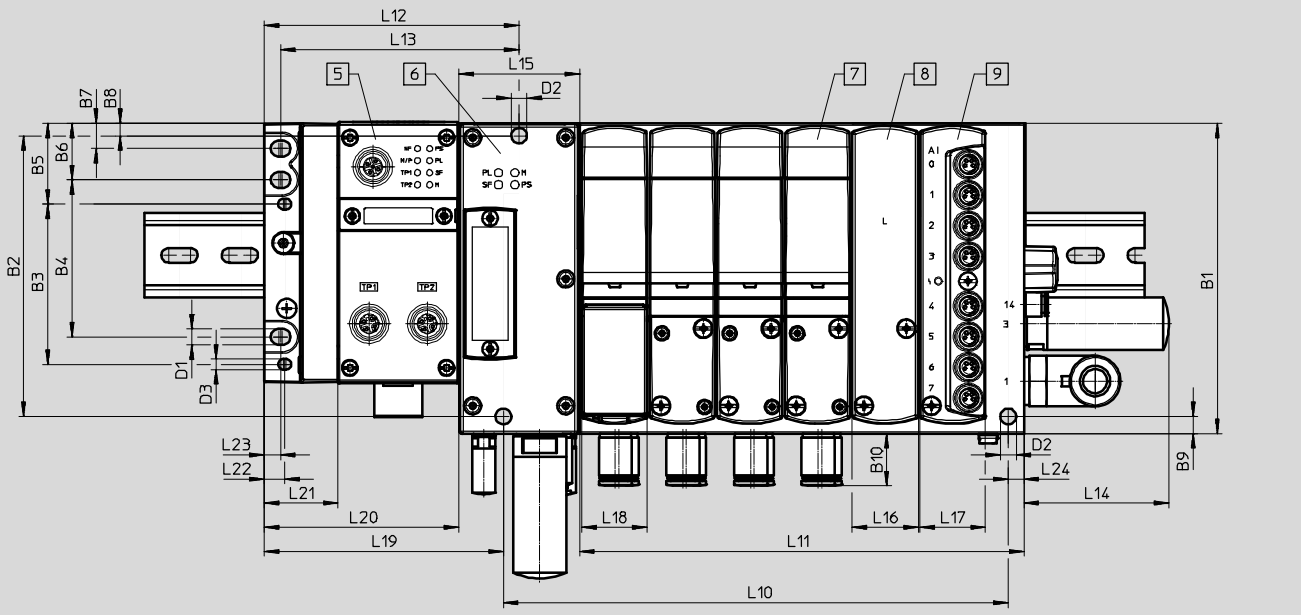


1 Diagnostics LED
2 Ethernet interface for system configuration
3 Status LED for Ethernet interface

Dimensions

Download CAD data ➔ **www.festo.com**

Front view



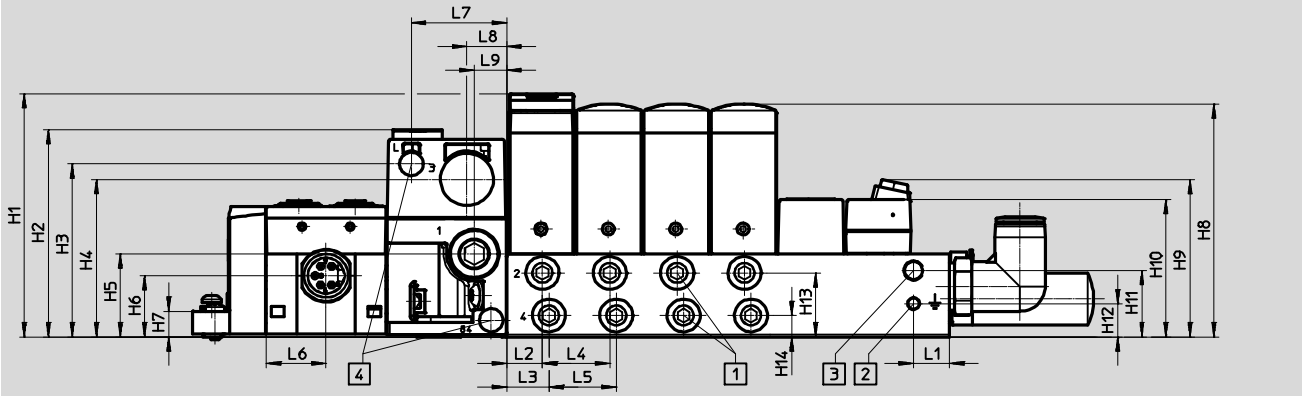
5 CPX bus node
6 Controller
7 Valve VEVM
8 Cover plate
9 Input module CTMM

Type code	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	D1	D2	D3
VTEM	128.5	116.2	66.3	65	33.5	23.5	10.5	5.2	7.1	21.6	6.6	6.6	4.4

Type code	Number of valve positions	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24
VTEM	4	153	128	105.5	98.8	60	50	27.5	27	27	99	80.5	30.6	8.5	6.8	6.5
	6	209	184													
	8	265	240													
	10	321	296													

Dimensions Download CAD data ➔ **www.festo.com**

Horizontal view



1 Port 2 and 4

2 Earth terminal

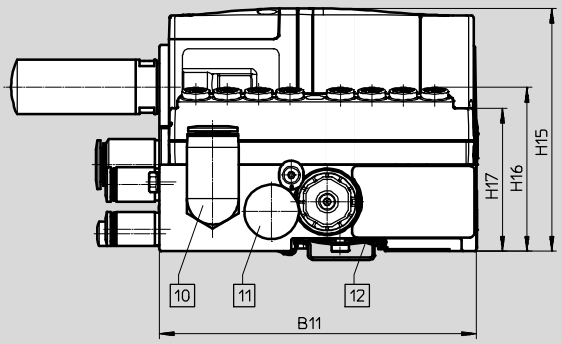
3 Port 14, external pilot air supply

4 Port L and 84

Type code	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14
VTEM	102.7	87.5	73	66.5	35	25.8	10.8	98.4	66.3	58	28	14	27	9

Type code	L1	L2	L3	L4	L5	L6	L7	L8	L9
VTEM	14.9	14.9	17.6	28	28	24.9	39.6	16.5	13.5

Side view



10 Port 1

11 Port 3

12 H-rail mounting

Type code	B11	H15	H16	H17
VTEM	128.5	98.4	66.3	58

Motion Terminal VTEM

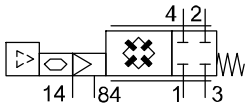
Technical data – Valves VEVM

FESTO

- Flow rate
  480 l/min

- Valve width
  27 mm

- Voltage
  24 V DC



General technical data			
Valve function			Can be assigned using Motion App
Motion Apps			Directional control valve functions
			Proportional directional control valve
			Proportional pressure regulation
			Model-based proportional pressure regulation
			Supply and exhaust air flow control
			ECO drive
			Presetting of travel time
			Selectable pressure level
			Soft-Stop
			Leakage diagnostics
Reset method			Mechanical spring
Design			Piston seat
Sealing principle			Soft
Type of actuation			Electrical
Type of control			Piloted
Pilot air supply			External
Flow direction			Not reversible; pressure at 1 and exhaust or vacuum at 3
Suitability for vacuum			Yes
Exhaust function			Without flow control option
Mounting position			Any
Nominal width		[mm]	4.2
Standard nominal flow rate		[l/min]	480
Valve size		[mm]	27
Grid dimension		[mm]	28
Ports on the sub-base	1, 3		G3/8
	2, 4		G1/8
	14		M5
	84		M7
Product weight		[g]	200
Degree of protection to EN 60529			IP65

Switching times			
Switching time	On	[ms]	8.5
	Off	[ms]	8.5
Response time		[ms]	max. 45

Operating and environmental conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
		Inert gases
Pilot medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Lubricated operation not possible
Operating pressure	[bar]	3 ... 8
Pilot pressure	[bar]	3 ... 8
Note on operating pressure		0 ... 8 bar for external pilot air supply
		Vacuum operation at port 3 only
Ambient temperature	[°C]	−5 ... +50
Temperature of medium	[°C]	−5 ... +50
Storage temperature	[°C]	−20 ... +40
Relative humidity	[%]	0 ... 90 (non-condensing)
Corrosion resistance class CRC[1)]		2
CE mark (see declaration of conformity)[3)]		To EU EMC Directive[2)]
		To EU Low Voltage Directive
Material fire test		UL94 HB

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Electrical data		
Electrical connection		Via sub-base
Nominal operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	±25
Power consumption	[W]	1.25
Status indication		Blue LED (valve in operation)
		Red LED (malfunction)
Duty cycle	[%]	100

Materials	
Housing	PA
Seals	TPE-U(PU), NBR
Note on materials	RoHS-compliant
	Contains paint-wetting impairment substances

Motion Terminal VTEM

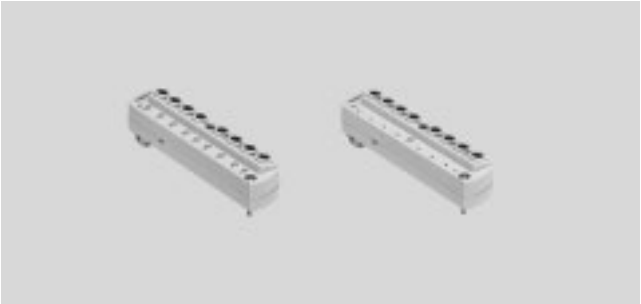
Technical data – Input module

Function

Input modules enable analogue and digital sensors to be connected to the Motion Terminal.
The input signals are used for motion tasks, but can also be looped through from a Motion App to the higher-order controller.

Area of application

- Input modules for 24 V DC sensor supply voltage
- Digital module with PNP logic
- Analogue module for 4 … 20 mA



General technical data				
			Digital input module	Analogue input module
Electrical connection	Function		Digital input	Analogue input
	Connection type		8x socket	8x socket
	Connection technology		M8x1, A-coded to EN 61076-2-104	M8x1, A-coded to EN 61076-2-104
	Number of pins/wires		3	4
Number of inputs			8	8
Number of outputs			0	0
Input characteristic curve			To IEC 61131-2, type 3	–
Signal input range			–	4 … 20 mA
Switching level			Signal 0: ≤ 5 V	–
			Signal 1: ≥ 11 V	–
Input debounce time		[ms]	0.1	–
Input switching logic			PNP (positive-switching)	–
Measured variable			–	Current
Fuse protection			Internal electronic fuse	Internal electronic fuse
Electrical isolation	Channel – internal bus		None	None
	Channel – channel		None	None
Diagnostics via LED			Fault per module	Fault per module
			Status per channel	–
Nominal operating voltage		[V DC]	24	
Permissible voltage fluctuations		[%]	±25	
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 12	
Dimensions	W x L x H	[mm]	27 x 123 x 40	
Grid dimension		[mm]	28	
Product weight		[g]	75	
Degree of protection			IP65/IP67	

Materials	
Housing	PA
Note on materials	RoHS-compliant

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Temperature of medium	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +40
Corrosion resistance class CRC[1)]		2
CE marking (see declaration of conformity)		To EU EMC Directive[2)]

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

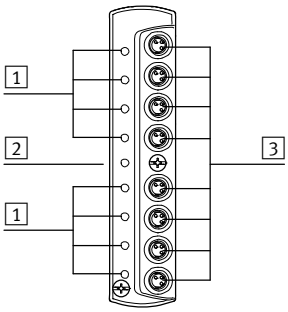
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

Safety data	
CE marking (see declaration of conformity)	To EU EMC Directive[1)]
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

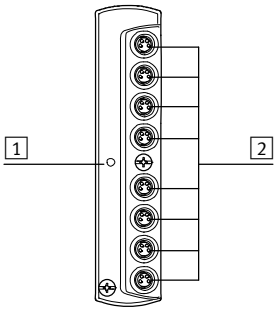
Connection and display components

Input module with digital inputs



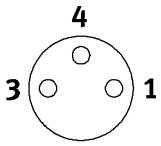
1 Status LEDs for inputs (status indicator, green)
2 Status LED (module) for short circuit/overload of sensor supply (red)
3 Sensor connections

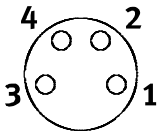
Input module with analogue inputs



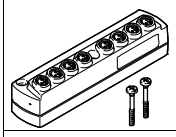
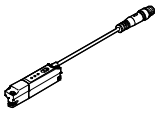
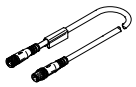
1 Status LED (module) for short circuit/overload of sensor supply (red)
2 Sensor connections

Pin allocation for sensor connections

Pin allocation	Pin	Signal	Designation
Input module with digital inputs			
	1	24 V	Operating voltage 24 V
	3	0V	Operating voltage 0 V
	4	Ix*	Sensor signal

Pin allocation	Pin	Signal	Designation
Input module with analogue inputs			
	1	24 V	Operating voltage 24 V
	2	Ix*	Sensor signal
	3	0V	Operating voltage 0 V
	4	n.c.	Not connected

* Ix = Input x

Ordering data					
			Part no.	Type code	PU[1]
Input module					
	Module with 8 inputs	Digital inputs	**8047505**	**CTMM-S1-D-8E-M8-3**	1
		Analogue inputs	**8047506**	**CTMM-S1-A-8E-A-M8-4**	1
Position sensor					
	Analogue sensor for VTEM input module	Sensing range 0 ... 50 mm	**8050120**	**SDAP-MHS-M50-1L-A-E-0.3-M8**	1
		Sensing range 0 ... 100 mm	**8050121**	**SDAP-MHS-M100-1L-A-E-0.3-M8**	1
		Sensing range 0 ... 160 mm	**8050122**	**SDAP-MHS-M160-1L-A-E-0.3-M8**	1
Connecting cable				Technical data ➔ Internet: nebu	
	Modular system for any connecting cable	Cable length 0.1 ... 30 m	**539052**	**NEBU-...** ➔ Internet: nebu	–
	• Straight plug, 4-pin • Straight socket, M8x1, 4-pin	Cable length 2.5 m	**554035**	**NEBU-M8G4-K-2.5-M8G4**	1
Cover cap					
	Cover cap for sealing unused ports	For M8 connections	**177672**	**ISK-M8**	10

1) Packaging unit.

Festo core product range

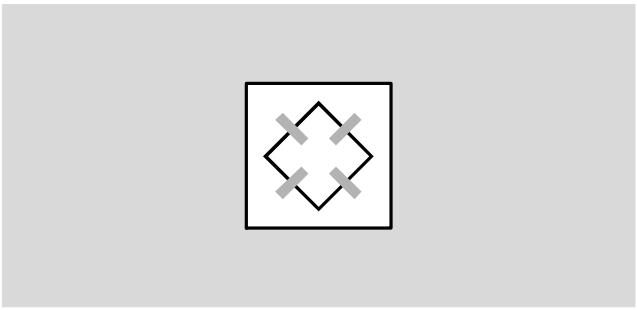
★ Generally ready for shipping ex works in 24 hours

☆ Generally ready for shipping ex works in 5 days

Motion Terminal VTEM

Technical data – Motion App "Directional control valve functions"

- 2x 2/2-way valve
- 2x 3/2-way valve
- 4/2-way valve
- 4/3-way valve
- Included in the Basic package



Description

Mode of operation

The directional control valve function allows the characteristics of a conventional pneumatic valve to be assigned to a valve position.
The integrated sensors enable the switching position to be monitored.
All ducts are blocked if the pilot pressure or power supply is interrupted.

Benefits

The ability to assign the directional control valve function significantly reduces component variety. This in turn reduces the initial design costs.
If a replacement is required, it is no longer necessary to identify the specific valve; the controller assigns the function to the new valve.
Thanks to the cyclical assignment, a series of valve functions can be realised on one valve position at different times.

During maintenance and commissioning, the valves can be stopped as required via the controller and can exhaust the system.

- One valve position with nine valve functions
- No need to change the valve for a different valve function
- Virtual manual override via software, access via Ethernet interface

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment

Data

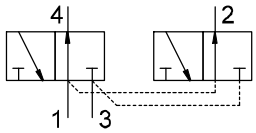
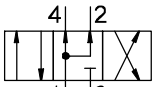
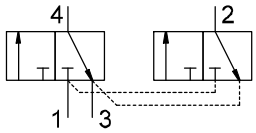
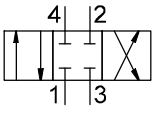
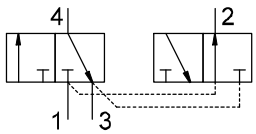
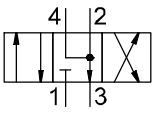
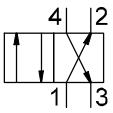
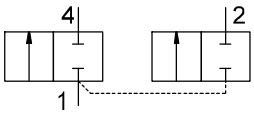
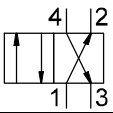
Controller to the valve

- Directional control valve function
- Switching position to be assumed

Valve to the controller

- Switching position
- Pressure in duct 2
- Pressure in duct 4

Valve functions

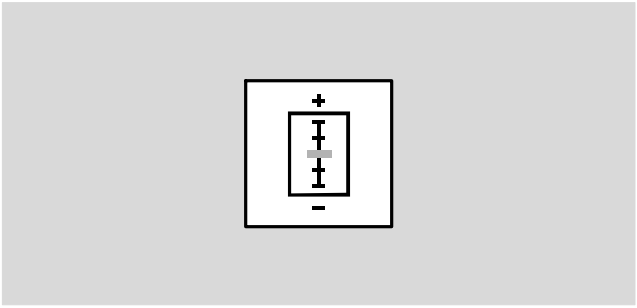
Circuit symbol	Description	Circuit symbol	Description
2x 3/2-way valve		4/3-way valve	
	• Bistable • Normally open • Non-reversible		• Mid-position pressurised • Non-reversible
	• Bistable • Normally closed • Non-reversible		• Mid-position closed • Non-reversible
	• Bistable • Normal position – 1x closed – 1x open • Non-reversible		• Mid-position exhausted • Non-reversible
4/2-way valve		2x 2/2-way valve	
	• Monostable • Pneumatic reset • Non-reversible		• Bistable • Normally closed • Non-reversible
	• Bistable • Non-reversible		

Technical data			
Switching time	On	[ms]	8.5
	Off	[ms]	8.5
Standard nominal flow rate pressurisation		[l/min]	450
Standard nominal flow rate exhaust		[l/min]	480

Motion Terminal VTEM

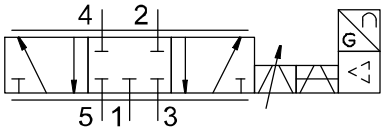
Technical data – Motion App “Proportional directional control valve”

- 4/3-way proportional valve
- 2x 3/3-way proportional valve
- Included in the Start package



Description

Mode of operation



The proportional directional control valve function is assigned to a valve position in the same way as the directional control valve function.

The integrated sensors enable the switching position and degree of opening of the valves to be monitored.

Benefits

- Minimal leakage (poppet valves)
- Low current consumption
- Two independently controlled ports at one valve position
- Different control characteristics can be set

Scope

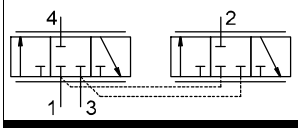
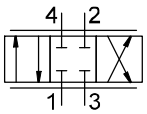
- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment

Data

Controller to the valve
- Directional control valve function
- Switching position to be assumed
- Control characteristics
- Valve position (–100 … +100%)
- Duct blocking

Valve to the controller
- Measured valve position (–100 … +100%)

Valve functions

Circuit symbol	Description	Circuit symbol	Description
2x 3/3-way proportional valve		4/3-way proportional valve	
	• Mid-position closed • Non-reversible		• Mid-position closed • Non-reversible

Technical data

Linearity error	[%]	±2 FS, relative to the ideal characteristic curve
Repetition accuracy ±% FS	[%]	±1.5 FS
Maximum hysteresis	[%]	1.5
Response sensitivity	[%]	1.5 FS

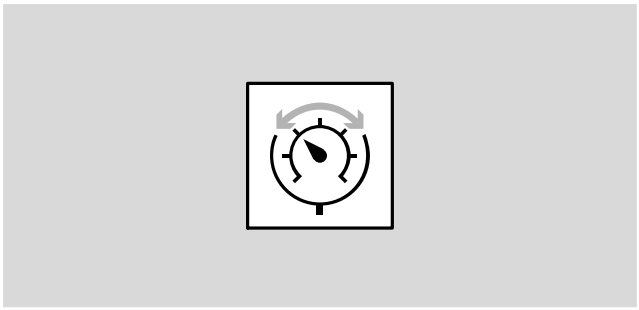
Motion Terminal VTEM

Technical data – Motion App “Proportional pressure regulation”

FESTO

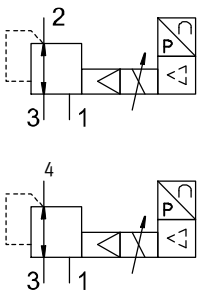
Pressure –0.9 … +7 bar

- Pressure regulation in c2
- Pressure regulation in duct 4
- Licences for the number of simultaneous usages required



Description

Mode of operation



The proportional pressure regulation function enables the pressure at ducts 2 and 4 to be regulated independently
Thanks to the integrated sensors, the pressure can be precisely monitored.

The following control characteristics are available:
- Small volume
- Medium volume
- Large volume
- Self-configured setting

For vacuum applications, a vacuum is connected at duct 3. Pressure, for an ejector pulse for example, can be connected at duct 1 at the same time.

Benefits

- Two pressure regulators per valve position
- Easy parameterisation
- Vacuum regulation

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment

Data

Controller to the valve
- Pressure at duct 2 (setpoint value)
- Pressure at duct 4 (setpoint value)

Valve to the controller
- Pressure at duct 2 (actual value)
- Pressure at duct 4 (actual value)

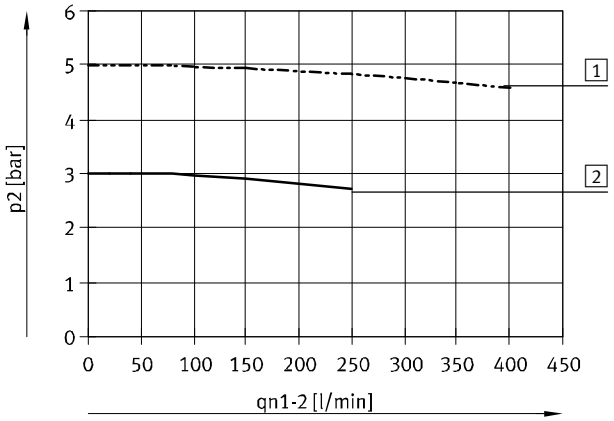
Range of application

- Control of force with known effective area
- Control of contact pressure
- Actuating process valves
- Vacuum control with ejector pulse

Technical data

Linearity error	[mbar]	Typically 60	Conditions: • Valid in the range 5 … 95% of the setpoint value • Supply pressure: 8 bar • Volume 0.1 l • Control characteristics: C1 • Only one pressure regulator active within the valve terminal • Based on the ideal characteristic curve in the range –0.9 … 7 bar
Repetition accuracy	[mbar]	Typically 25	
Maximum hysteresis	[mbar]	Typically 25	
Overall accuracy	[mbar]	Typically 80	

Pressure as a function of flow rate



1 Characteristic pressure curve with a specified setpoint value of 5 bar

2 Characteristic pressure curve with a specified setpoint value of 3 bar

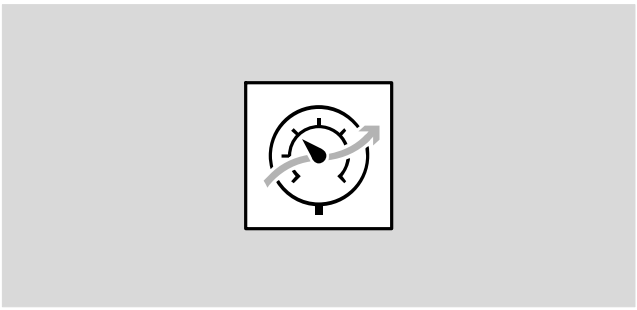
Motion Terminal VTEM

Technical data – Motion App “Model-based proportional pressure regulation”

FESTO

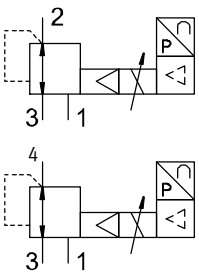
Pressure –0.9 … +7 bar

- Pressure regulation in duct 2
- Pressure regulation in duct 4
- Pressure drop compensation
- Licences required for the number of parallel usages



Description

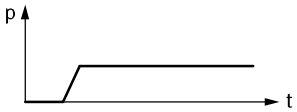
Mode of operation



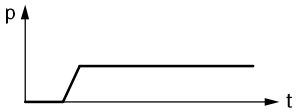
The model-based proportional pressure regulation function enables the pressure at ducts 2 and 4 to be regulated independently
Thanks to the integrated sensors, the pressure can be precisely monitored.
With the model-based proportional pressure regulation, any pressure drop caused by a change in the pressure in the tubing and connected actuator, is calculated and compensated.
As a result, filling times and following errors are reduced and there is no need for an external pressure sensor on the consuming device.
For vacuum applications, a vacuum is connected at duct 3. Pressure, for an ejector pulse for example, can be connected at duct 1 at the same time.

Characteristic pressure curve of simple pressure regulators

Setpoint pressure



Pressure at the valve

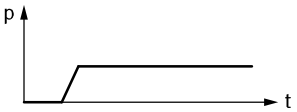


Pressure in the system

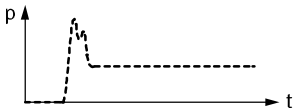
Slow pressure rise in the system.

Pressure curve of the Motion Terminal with model-based proportional pressure regulation

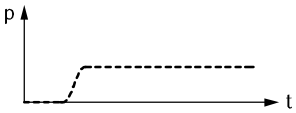
Setpoint pressure



Pressure at the valve



Pressure in the system



Fast rise in pressure in the system due to intermittently increased pressure at the valve.

Benefits

- Two pressure regulators per valve position
- Reduced filling time
- Vacuum regulation
- No external pressure sensor is required

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment

Data

Controller to the valve
- Pressure at duct 2
- Pressure at duct 4

Valve to the controller
- Pressure at duct 2
- Pressure at duct 4

Range of application

- Control of force with known effective area
- Control of contact pressure
- Actuating process valves
- Vacuum control with ejector pulse

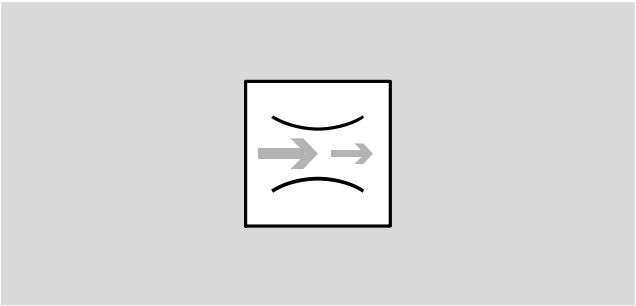
Technical data

Linearity error	[mbar]	Typically 170	Conditions: • Valid in the range 5 … 95% of the setpoint value • Supply pressure: 8 bar • Volume 0.1 l • Only one pressure regulator active within the valve terminal • Based on the ideal characteristic curve in the range –0.9 … 7 bar
Repeat accuracy	[mbar]	Typically 80	
Maximum hysteresis	[mbar]	Typically 80	

Motion Terminal VTEM

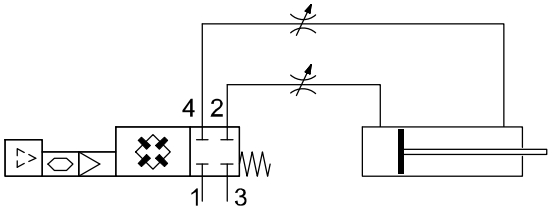
Technical data – Motion App “Supply and exhaust air flow control”

- Supply air flow control
- Exhaust air flow control
- Included in the Start package



Description

Mode of operation



The flow rate can be individually adjusted for each duct; the supply air and exhaust air flow control are adjusted independently one another.

It is no longer necessary to have a technician on site to change the flow control.

Benefits

- Flow control remotely adjustable during operation (adjustment via controller)
- Reproducible flow control cross sections adjustable via controller
- Reduced component variety since there is no mechanical flow control valve
- Flow control setting can be called up during operation
- Tamper-proof

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment
- Control precision ±3%

Data

Controller to the valve

- Supply air flow control setting
  0 … 100%
  (recommended values: 5 … 100%)
- Exhaust air flow control setting
  0 … 100%
  (recommended values: 5 … 100%)
- Increments 0.01%

Valve to the controller

- Supply air flow control setting
- Exhaust air flow control setting

Pressure build-up function

If, on starting the Motion App, the pressure at port 2 and 4 is more than 50% below the current pressure in duct 1, it is steadily increased until the specified value has been reached. The actual motion task then starts.

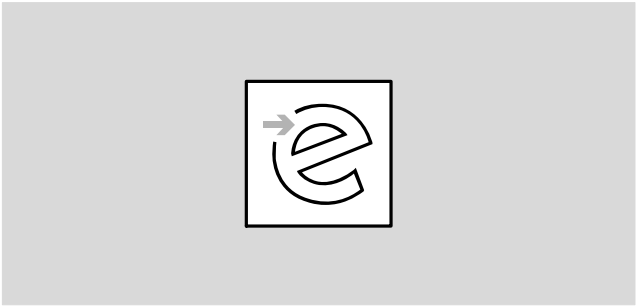
This function prevents advancing to the end position in an uncontrolled manner.

Motion Terminal VTEM

Technical data – Motion App “ECO drive”

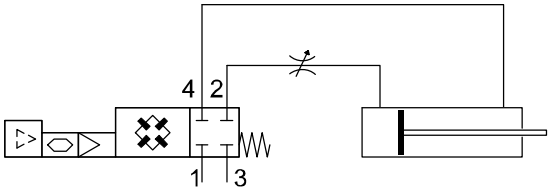
- Supply air flow control with end-position switch-off
- Can be used for advancing and retracting the cylinder in an energy-saving manner

Additionally required:
- A digital input module CTMM
- Two digital sensors (PNP, N/O contact) for determining the end position of the drive



Description

Mode of operation

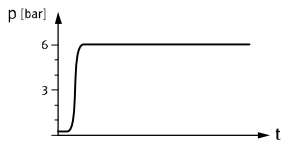


To save energy during cylinder movement, the supply air flow is controlled when advancing the cylinder while the exhaust air is not subject to flow control.
The supply air side is shut off when the end position is reached so the pressure level and cylinder position can be maintained.

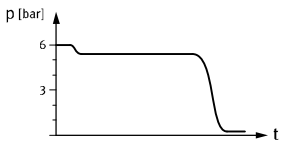
For this function, the cylinder position is sensed via two end-position switches.
For safe functioning, a horizontal travel movement/mounting position is recommended. The acceleration and speed of the movement are significantly increased by a force acting in the same direction.

Pressure curve without ECO drive

Pressure at duct 2



Pressure at duct 4

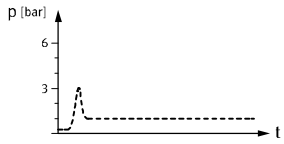


- High pressure at duct 2
- High pressure at duct 4
- Supply air not subject to flow control
- Exhaust air flow control

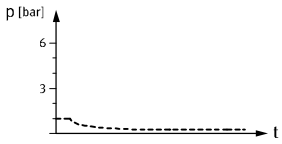
- Differential pressure in line with the amount of force required for the movement
- High force in the end position
- High energy consumption

Pressure curve with ECO drive

Pressure at duct 2



Pressure at duct 4



- Low pressure at duct 2
- Low pressure at duct 4
- Supply air flow control
- Exhaust air not subject to flow control

- Differential pressure in line with the amount of force required for the movement
- Low force in the end position
- Low energy consumption

Benefits

- Supply air flow control and pressure switch-off in the end position considerably increase energy efficiency
- Energy/pressure consumption is automatically adapted to the load
- Readjustment in case of deviation from the end position
- Suitable for moving low loads at low speed

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment

Data

Controller to the valve
- Supply air flow control setting 5 ... 100%

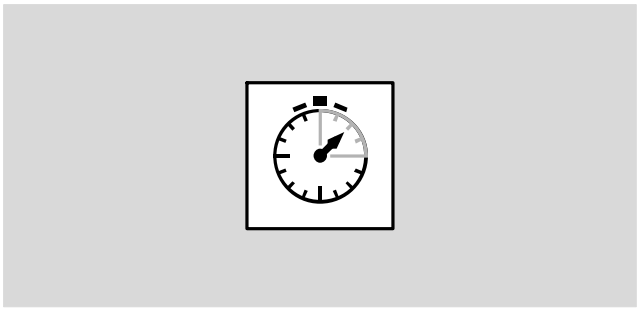
Valve to the controller
- Pressure at duct 2
- Pressure at duct 4
- End position reached

Motion Terminal VTEM

Technical data – Motion App “Presetting of travel time”

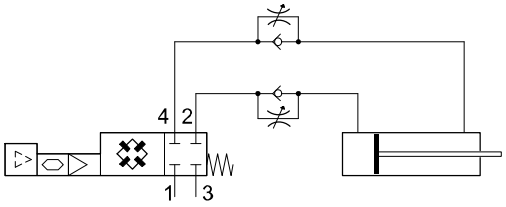
- Self-learning exhaust air flow control for regulating the travel time

Also required:
- A digital input module CTMM
- Two digital sensors (PNP, N/O contact) for determining the end position of the drive



Description

Mode of operation



The travel time for retracting and advancing is preset in the Motion Terminal VTEM.
The real travel time is autonomously determined using the sensor data from the end-position switches and the exhaust air flow control is adapted until the specified travel time is achieved.

Continuous monitoring and adaptation compensate for changes to the system.
Significant deviations in the parameters (deviating idle times, rapid change in external forces/friction forces) can cause deviations in travel time.
End-position cushioning must be implemented separately.

Benefits

- Adaptive and self-adjusting
- Constant cycle times
- Travel time can be changed via the controller
- Variations in the supply or exhaust air pressure are automatically sensed and taken into consideration
- Password-protected access
- A simple proximity sensor is used

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment
- In combination with end-position switches

Data

Controller to the valve
- Advancing
- Retracting
- Exhausting both chambers
- Shutting off both chambers

Valve to the controller
- Measured travel time
- End position reached

Pressure build-up function

If, on starting the Motion App, the pressure at port 2 and 4 is more than 20% below the current pressure in duct 1, it is steadily increased until the specified value has been reached. The actual motion task then starts.

This function prevents advancing to the end position in an uncontrolled manner.

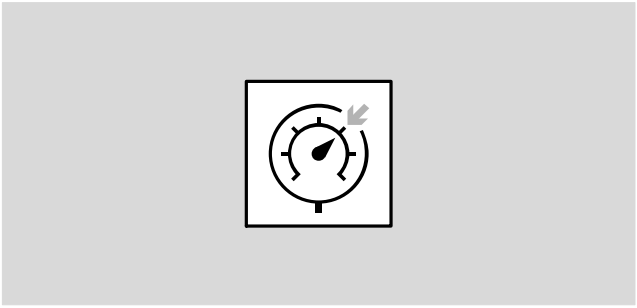
Technical data

Repetition accuracy	Standard deviation: ±3%, but in any case not more accurate than ±20 ms

Motion Terminal VTEM

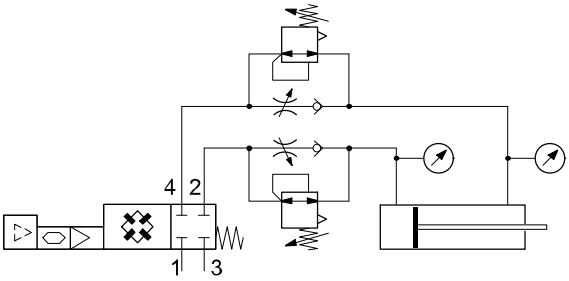
Technical data – Motion App “Selectable pressure level”

- Pressure regulation at duct 2 and flow rate at duct 4
- Pressure regulation at duct 4 and flow rate at duct 2
- Included in the Start package



Description

Mode of operation



A desired setpoint value can be specified for ducts 2 and 4 independently of each other.
The Motion Terminal VTEM autonomously regulates the pressure and signals the actual pressure in ducts 2 and 4 and to the higher-order controller.

Pressure regulation takes place in the pressurised duct, while the preset exhaust air flow is controlled in the other duct.
Variably adjustable pressures in the end position enable a defined force (e.g. press-fitting) to be reproduced in the application.

Benefits

- Energy-saving movement with reduced pressure
- Pressure regulation in the end position
- Pressure can be changed remotely and individually preset for each drive and direction of movement

Scope

- For the entire Motion Terminal
- For each individual valve position in a Motion Terminal, depending on the assignment
- Cyclical assignment
- For cylinders with pneumatic cushioning

Data

Controller to the valve
- Pressure at duct 2 and flow control opening at duct 4
- Pressure at duct 4 and flow control opening at duct 2
- Stopping
- Advancing
- Retracting
- Exhausting both chambers

Valve to the controller
- Press at duct 2 and duct 4

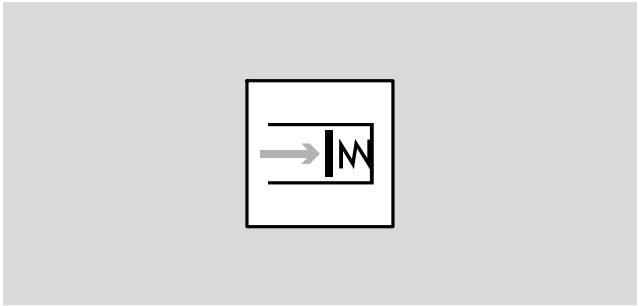
Pressure build-up function

If, on starting the Motion App, the pressure at port 2 and 4 is below 2 bar, it is increased steadily until the specified value has been reached. The actual motion task then starts.

This function prevents advancing to the end position in an uncontrolled manner.

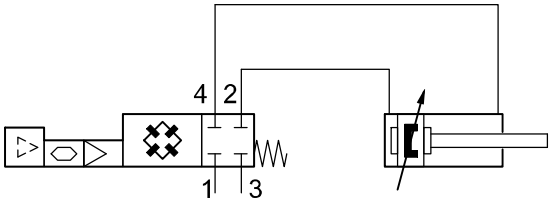
- The algorithm moves the piston from one cylinder end position to the other in an optimum amount of time
- Licences required for the number of parallel usages

Additionally required:
- An analogue input module CTMM
- Two sensors SDAP for determining the position of the drive



Description

Mode of operation



During a teach-in process, the Motion Terminal VTEM automatically determines the necessary parameters for accelerating the connected drive in a controlled manner and decelerating it gently.

Gradual changes over the course of continuous operation are automatically compensated for.

Benefits

- Optimised cycle times (typical travel time 0.5 s for a piston rod cylinder with a 32 mm piston rod diameter, 500 mm stroke and 11 kg moving mass)
- Automatic cushioning resulting in considerably less wear, vibrations or impacts
- Optimal for heavy moving masses and long travel paths
- Selectable contact pressure in end position

Scope

- For the first 4 valve positions of a Motion Terminal depending on their assignment
- Cyclical assignment
- In combination with partial stroke sensor
- For drives with self-adjusting pneumatic cushioning (PPS) on both sides

Data

Controller to the valve
- Advancing
- Retracting
- Exhausting
- Blocking

Valve to the controller
- End position reached
- Contact pressure reached

Soft-start function

When the Motion App is started, the piston position and pressure conditions are checked.
If the piston is in the end position:
- The pressure of the connection to be exhausted will be adjusted to the preset contact pressure
- The connection to be pressurised will be completely exhausted

If the piston is not in the end position, the cylinder will be moved gently into the end position of the specified direction.
The actual motion task then starts.
This function prevents advancing to the end position in an uncontrolled manner.

Technical data

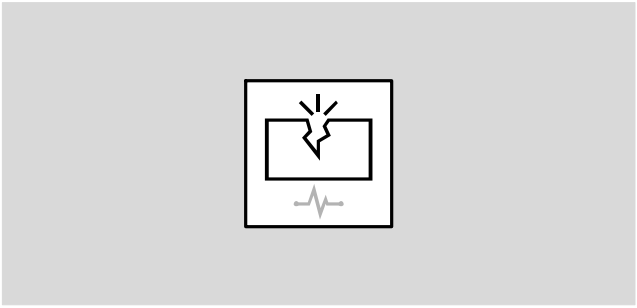
Repetition accuracy	[ms]	Typically expanded measurement uncertainty (95%) ‹70 ms with periodic advancing and retracting

Motion Terminal VTEM

Technical data – Motion App “Leakage diagnostics”

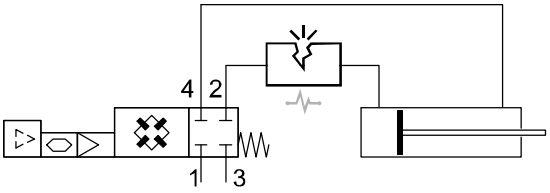
FESTO

- Flow rate
  Measuring range 2 … 50 l/h



Description

Mode of operation



To calculate the leaks, the pressure drop will be determined at a valve (drive in end position).
To be able to evaluate this value, a reference value is determined using a measurement taken at the start of the observation period.
The Motion Terminal VTEM compares the value of further measurements against this reference value.
This comparison provides the basis for an evaluation using adjustable limits. The evaluation and the difference between the currently measured value and the reference value are fed back.
During the diagnostics, the motion task independently advances and retracts the cylinder.
Leakage testing is not performed during operation; it is started separately as a test cycle.

Benefits

Increased leakage can be caused by a critical fault (damaged tubing) or by wear and aging of the connected components.

Regular leakage testing can therefore:
- Determine a sudden leak
- Detect wear to cylinders and valves in good time

Scope

- For all valve positions of a Motion Terminal
- Requires a measurement run
- Not for vacuum applications
- For all types of pneumatic consumers

Data

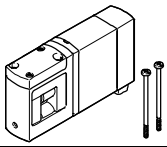
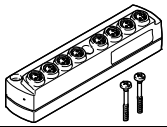
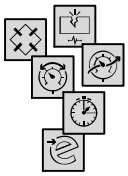
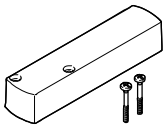
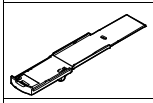
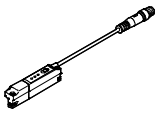
Controller to the valve
- Starting diagnostics
- Terminating diagnostics
- Starting reference measurement
- Terminating reference measurement
- Exhausting

Valve to the controller
- Detecting the status
- Change in leakage for duct 2
- Change in leakage for duct 4
- Evaluating leakage for duct 2
- Evaluating leakage for duct 4

Technical data

Repetition accuracy	[l/h]	±(2+0.15xleakage)	Conditions: • Temperature 10 … 30 °C • Supply pressure: 3 … 8 bar • A force acting on the connected drive should amount to max. 75% of the effective pneumatic force • Tube length 2000 mm

Ordering data

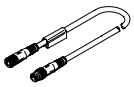
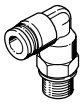
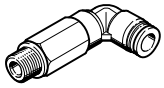
			Part no.	Type code	PU[1)]
Valve					
	Valve for one valve position		**8047503**	**VEVM-S1-27-B-C-F-1T1L**	1
Input module					
	Module with 8 inputs	Digital inputs	**8047505**	**CTMM-S1-D-8E-M8-3**	1
		Analogue inputs	**8047506**	**CTMM-S1-A-8E-A-M8-4**	1
	Cover cap for sealing unused ports	For M8 connections	**177672**	**ISK-M8**	10
Motion App					
	Start package	Motion Apps included: • Proportional directional control valve • Supply and exhaust air flow control • Selectable pressure level	**8073515**	**GAMM-A0**	1
	Directional control valve functions		**8070377**	**GAMM-A1**	1
	Proportional directional control valve		**8070378**	**GAMM-A2**	1
	Proportional pressure regulation		**8072609**	**GAMM-A3**	1
	Model-based proportional pressure regulation		**8087394**	**GAMM-A4**	1
	Supply and exhaust air flow control		**8072611**	**GAMM-A5**	1
	ECO drive		**8072612**	**GAMM-A6**	1
	Presetting of travel time		**8072613**	**GAMM-A7**	1
	Selectable pressure level		**8072614**	**GAMM-A8**	1
	Soft-Stop		**8072615**	**GAMM-A11**	1
	Leakage diagnostics		**8072616**	**GAMM-A12**	1
Accessories					
	Cover plate for a valve position or input module position		**8047504**	**VABB-P11-27-T**	1
	Identification holder for one valve		**8047501**	**ASCF-H-P11**	4
	H-rail mounting		**8047542**	**VAME-P11-MK**	1
Position sensor					
	Analogue sensor for VTEM input module	Sensing range 0 ... 50 mm	**8050120**	**SDAP-MHS-M50-1L-A-E-0.3-M8**	1
		Sensing range 0 ... 100 mm	**8050121**	**SDAP-MHS-M100-1L-A-E-0.3-M8**	1
		Sensing range 0 ... 160 mm	**8050122**	**SDAP-MHS-M160-1L-A-E-0.3-M8**	1

Festo core product range

★ Generally ready for shipping ex works in 24 hours

☆ Generally ready for shipping ex works in 5 days

Ordering data

			Part no.	Type code	PU[1]
Connecting cable				Technical data ➔ Internet: nebu	
	Modular system for any connecting cable	Cable length 0.1 ... 30 m	539052	NEBU-... ➔ Internet: nebu	–
	• Straight plug, 4-pin • Straight socket, M8x1, 4-pin	Cable length 2.5 m	554035	NEBU-M8G4-K-2.5-M8G4	1
Push-in fitting, straight				Technical data ➔ Internet: qsm	
	Connecting thread M5 for tubing O.D.	4 mm	★ 153315	QSM-M5-4-I	10
	Connecting thread M7 for tubing O.D.	6 mm	★ 153321	QSM-M7-6-I	10
	Connecting thread G1/8 for tubing O.D.	4 mm	★ 186095	QS-G1/8-4	10
			132036	QS-G1/8-4-100	100
		6 mm	★ 186096	QS-G1/8-6	10
			132037	QS-G1/8-6-100	100
		8 mm	★ 186098	QS-G1/8-8	10
			132038	QS-G1/8-8-50	50
		10 mm	★ 132999	QS-G1/8-10-I	10
	Connecting thread G3/8 for tubing O.D.	8 mm	★ 186111	QS-G3/8-8-I	10
		10 mm	★ 186113	QS-G3/8-10-I	10
		12 mm	★ 186114	QS-G3/8-12-I	10
		16 mm	★ 186347	QS-G3/8-16	1
Push-in fitting, angled				Technical data ➔ Internet: qsl	
	Connecting thread M5 for tubing O.D.	4 mm	130831	QSMLV-M5-4-I	10
	Connecting thread G1/8 for tubing O.D.	4 mm	★ 186116	QSL-G1/8-4	10
			132048	QSL-G1/8-4-100	100
		6 mm	★ 186117	QSL-G1/8-6	10
			132049	QSL-G1/8-6-100	100
		8 mm	★ 186119	QSL-G1/8-8	10
			132050	QSL-G1/8-8-50	50
	Connecting thread G3/8 for tubing O.D.	8 mm	★ 186121	QSL-G3/8-8	10
		10 mm	★ 186123	QSL-G3/8-10	10
		12 mm	★ 186124	QSL-G3/8-12	10
Push-in fitting, angled, long				Technical data ➔ Internet: qsll	
	Connecting thread G1/8 for tubing O.D.	4 mm	186127	QSLL-G1/8-4	10
			133015	QSLL-G1/8-4-100	100
		6 mm	186128	QSLL-G1/8-6	10
			133016	QSLL-G1/8-6-100	100
		8 mm	186130	QSLL-G1/8-8	10
			133017	QSLL-G1/8-8-100	100
	Connecting thread G3/8 for tubing O.D.	8 mm	186132	QSLL-G3/8-8	10
		10 mm	186134	QSLL-G3/8-10	10
		12 mm	186135	QSLL-G3/8-12	10

1) Packaging unit.

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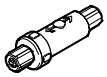
Ordering data			Part no.	Type code	PU[1]
Vacuum filters					
	Inline filter inserted in tubing line for tubing O.D.	4 mm	**535883**	**VAF-PK-3**	1
		6 mm	**15889**	**VAF-PK-4**	1
		8 mm	**160239**	**VAF-PK-6**	1
Blanking plug				Technical data ➔ Internet: b	
	For sealing unused ports	M5 thread	★ **3843**	**B-M5**	10
		G1/8 thread	★ **3568**	**B-1/8**	10
		G3/8 thread	★ **3570**	**B-3/8**	10
Silencer				Technical data ➔ Internet: amte	
	For M7 thread		**161418**	**UC-M7**	1
	For G3/8 thread		★ **6843**	**U-3/8-B**	1

1) Packaging unit.

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