

# Modicon TSX Quantum Controllers

## Motion Modules for Multi-Axis Drives

### General Description

Modules 140 MMB 102 00 and 140 MMD 102 00 provide controlled positioning of two separate single axes or two common axes with linear interpolation, circular interpolation, or point-to-point processes.

Modules 140 MMB 104 00 and 140 MMD 104 00 can be used for two types of control (three axes and single axis), or with four-axis interpolation. Circular interpolation is possible in two selected axes.

The actual values of the position sensor, incremental or absolute, are recorded in cycles, and the speed setpoint is continuously output to drive amplifiers based on the position to be moved to.

#### Major Application Areas

- Feed systems of transfer lines and assembly lines
- Handling and Charging Systems
- Paper Processing and Textile Machines
- Wood and Metal Processing Machines

The motion modules may also be operated in remote I/O drops using a S908 coupler. Up to 16 modules may be used for each automation device.

#### Motion Module Parameterization

The MMB/MMD requires the following data for calculating speed setpoints:

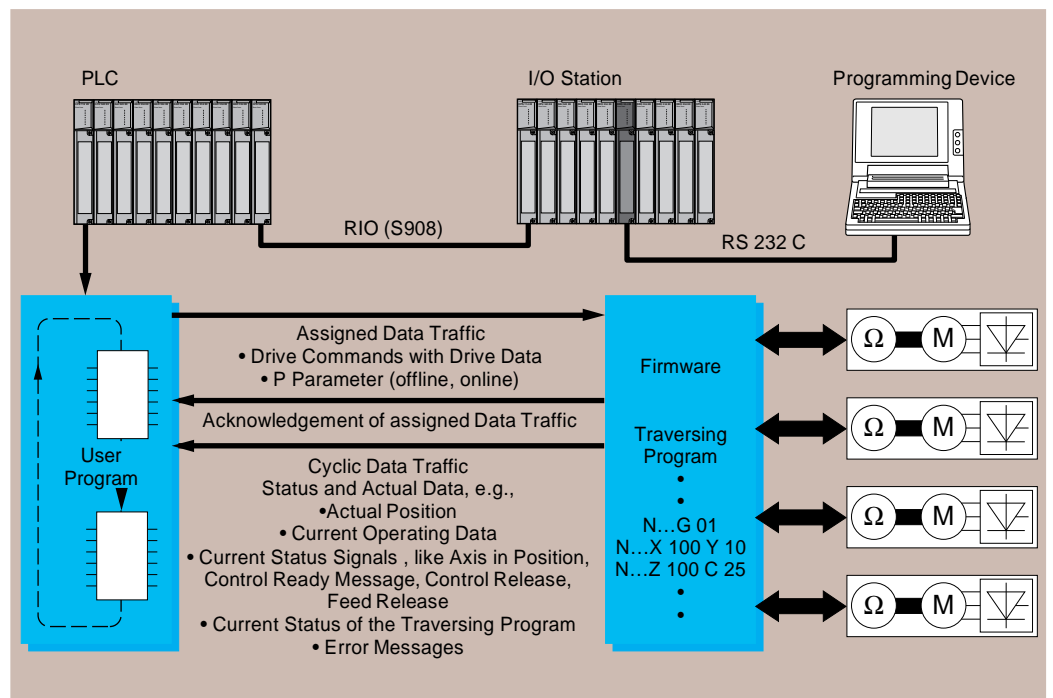
- specifications of the driven axis, associated machine data,
- the target position, and the traversing speed.

The machine data is registered during system startup by the POS10S software package and then stored in the RAM buffer of the module.

Target defaults and traversing speeds can be preset as follows:

- by the PLC via registers,
- by a program stored in the MMB/MMD,
- via the programming device during test operation.

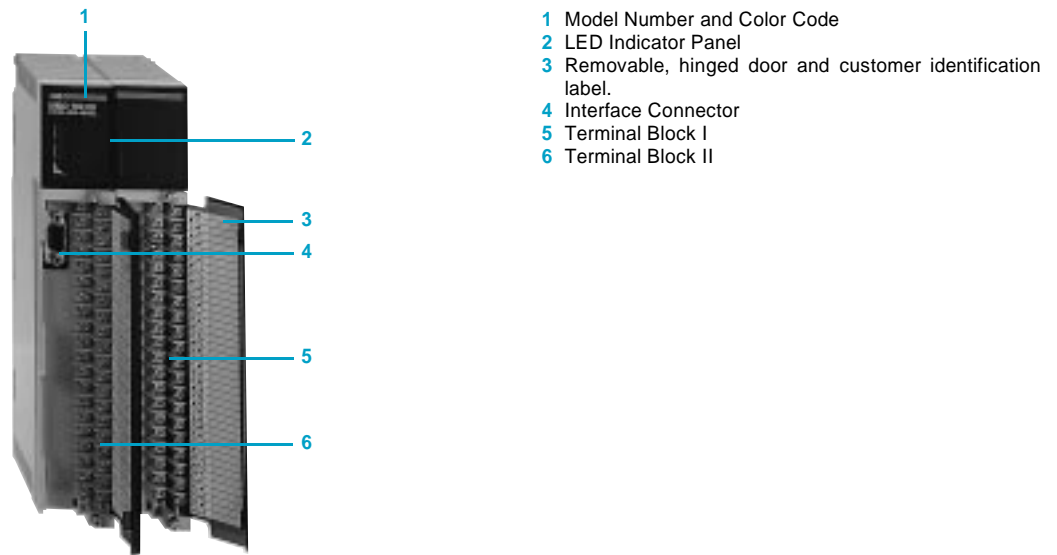
The MMB/MMD and its traversing axes can be configured and tested independently of the PLC, i.e., it can operate self-sufficiently with a power supply module and a backplane.



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### Description



### Accessories

The POS10S software package allows the input, testing, and modification of

- Module parameters
- Position control parameters
- Axis parameters
- Traversing programs
- Tool data
- Program parameters (P Parameter)

Parameter entry is very simple. Basic settings and limits are displayed in plain text, and entry is cursor-controlled. Upon startup completion, these values can be printed and saved.

In compliance with DIN 66025, an editor is used to input traversing programs. Input error checking is carried out automatically. The approach and brake ramps can be set as default linear or  $\sin^2$  functions (to protect the mechanical parts). Depending on the program, 2 values (high, low) can be toggled.

In addition to common DIN 66025 instructions, P parameters (i.e., program parameters) can be defined within the program, and instructions can be assigned, for example, to the x coordinate.

Program development is simplified significantly by the use of the 4 basic arithmetic functions for parameter calculations. Recurring program sections, e.g., palleting programs, can be established using only few dimensional data.

These parameters enable online assignment of program parameters and modifications without defining a new traversing program. Additionally, the resulting values can be assigned to the 2 additional analog outputs.

In online mode, automatic operation, single-step operation, manual operation, manual input as well as test operation simulation, teach-in, and automatic control startup are available. "Taught programs" can be traversed ("looped") without delay at the input points. The MMB/MMD modules are tied into the application program through DFBs in Concept, or through standard function blocks in Modsoft.

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### Performance Overview

Module Type	140 MMB 102 00	140 MMB 104 00	140 MMD 102 00	140 MMD 104 00
<b>Control Configuration/Application</b>				
Axes	2	4	2	4
Spindles	–	1	–	1
<b>Measuring Systems Connectivity</b>				
Incremental Measuring Systems	x	x		
SSI Absolute Value Transducer			x	x
<b>Channels</b>				
(individually programmable axis groups)	x	x	x	x
Axes	x		x	
Rotary Axis/Continuous Axis (optional)	2	–	2	–
Floating Actual Value Synchronization	x		x	
<b>Traversing Ranges</b>				
1 µm Resolution	±8 m	±8 m	±8 m	±8 m
10 µm Resolution	±80 m	±80 m	±80 m	±80 m
0.1 mm Resolution	±800 m	±800 m	±800 m	±800 m
<b>Traversing Speed</b>				
1 µm Resolution	48 m/min	48 m/min	48 m/min	48 m/min
10 µm Resolution	8 m/s	8 m/s	8 m/s	8 m/s
0.1 mm Resolution	80 m/s	80 m/s	80 m/s	80 m/s
<b>Acceleration Types</b>				
Constant Acceleration	x	x	x	x
Sinus Square Acceleration (jolt-free)	x	x	x	x
Single axis knee characteristic	x	x	x	x
<b>Interpolation</b>				
Linear interpolated axes	2	4	2	4
Circular interpolation in n/ from axes	2/2	2/3	2/2	2/3
2 1/2 D (3rd axis vertical on plane)		x		x
Interpolation pulse	6 ms	6 ms	6 ms	6 ms
Position control pulse	6 ms	6 ms	6 ms	6 ms
Position control with forward feed	x	x	x	x
<b>Looping</b>				
G61 > 2 sets of coordinates	x	x	x	x
G62 > tangential transfer, multiple sets	x	x	x	x
Look ahead	x	x	x	x
<b>Dimensions</b>				
mm/inch	x	x	x	x
<b>Traversing programs</b>				
Quantity	64	64	64	64
Memory	256 KB	256 KB	256 KB	256 KB
Subroutines	255	255	255	255
Subroutine depth	5	5	5	5

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### Performance Overview

Module Type	140 MMB 102 00	140 MMB 104 00	140 MMD 102 00	140 MMD 104 00
<b>Operation</b>				
of Programming units and PLC	x	x	x	x
Overriding analog input, programming unit and PLC	x	x	x	x
<b>Programming</b>				
DIN 66 025	x	x	x	x
Floating M outputs	4	4	4	4
Quantity On	2	2	2	2
Quantity Off	2	2	2	2
2 acceleration values toggled by G function	x	x	x	x
Acceleration override	x	x	x	x
P parameter can be modified in PLC program	108	108	108	108
Tool correction length/radius	20 / 20	20 / 20	20 / 20	20 / 20
Reference dimension	x	x	x	x
Incremental dimension	x	x	x	x
Programmable zero offset (G92)	x	x	x	x
Tracer	optional	optional	optional	optional
Teach-In operation (with programming unit)	x	x	x	x
Analog inputs, e.g. feed override	2 [0 - 10 V]	2 [0 - 10 V]	2 [0 - 10 V]	2 [0 - 10 V]
Additional analog outputs	2 [±10 V]	2 [±10 V]	2 [±10 V]	2 [±10 V]
Synchronizing with PLC through M functions	x	x	x	x
<b>Direct I/O</b>				
Number of inputs	8	8	8	8
Number of outputs	8	8	8	8
Feed release	x	x	x	x
Control release	x	x	x	x
Quick stop	x	x	x	x
Synchronizing signals	x	x	x	x
<b>Data traffic</b>				
Serial port RS 232	x	x	x	x
Data exchange through Quantum backplane and system bus	x	x	x	x
Selectable resolution 1 µm, 10 µm, 100 µm	x	x	x	x
<b>Startup and service tool</b>				
POS 10S usable	x	x	x	x
Traversing and operating axes	x	x	x	x
Automatic definition of axis parameters	x	x	x	x
Machine parameters with max. and default indication	x	x	x	x
Program input, testing, and teaching	x	x	x	x
DIN 66 025 Editor	x	x	x	x
Program archiving and printout	x	x	x	x
Machine and tool data archiving and printout	x	x	x	x
P parameter archiving and printout	x	x	x	x
Testing and monitoring during operation	x	x	x	x
<b>Monitoring</b>				
Hardware and software limit switches	x	x	x	x
Loop distance and standstill monitoring	x	x	x	x
Cable and double impulse error monitoring	x	x	x	x

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## Motion Modules for Multi-Axis Drives

### Specifications

Module Type		140 MMB 102 00	140 MMB 104 00	140 MMD 102 00	140 MMD 104 00
Number of Axes		2	4	2	4
Number of discrete inputs		8 semi-conductor with display			
Input voltage	VDC	24			
Input current	mA	3.5			
Number of discrete outputs		8 semi-conductor with display			
Output switching voltage	VDC	24			
Output current	A	0.5			
Supply voltage through bus		5 V <1.2 A			
Overload protection		short-circuit proof and overload proof			
Analog input		2 channels in Multiplex operation			
Measurement range	V	±10			
Resolution		11 bit + prefix			
Analog output		2 channels			
Resolution		11 bit + prefix			
Output range	V	±10			
Setpoint outputs					
Resolution		13 bit + prefix			
Output range	V	±10			
Absolute value transducer		-	-	2	4
Type		per axis SSI interface			
Configuration		RS 422/485			
Transmitting level		RS 422, non-isolated from Backplane			
SSI pulse					
Receiving level		RS 422, with level of >3VDC			
SSI data		isolated from backplane			
Maximum cable length	m	100 typ.			
Clock frequency	kHz	250			
Maximum cable length	m	100 typ.			
Incremental value transducer		2	4	-	-
Type		Evaluation logic for 3 track transducer (differential inputs)			
Configuration		per RS 422/485			
Signalling level		RS 422, with level of >3VDC, Non-isolated from backplane			
Maximum cable length	m	50 typ.			
Max. Counting frequency	kHz	200	200	500	500
Maximum cable length	m	50	50	100	100
Ambient temperature	°C	0 ... 55			

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## Motion Modules for Multi-Axis Drives

### Ordering Information

Description	Order No.	Weight kg
Positioning Module with 2 Controlled Axes, Incremental value transducer, 256 KB Traversing program storage	<b>140 MMB 102 00</b>	–
Positioning Module with 4 Controlled Axes, Incremental value transducer, 256 KB Traversing program storage	<b>140 MMB 104 00</b>	–
Positioning Module with 2 Controlled Axes, Absolute value transducer, 256 KB Traversing program storage	<b>140 MMD 102 00</b>	–
Positioning Module with 4 Controlled Axes, Absolute value transducer, 256 KB Traversing program storage	<b>140 MMD 104 00</b>	–

### Accessories for Positioning Modules

Description	Order No.	Weight kg
Programming cable, 3 m, 9-pin, male/female connector Cable routing downward	<b>YDL 052</b>	–
Configuration Software for Positioning Modules MMB and MMD and A250 POS 10x 0x	<b>POS 10S-02</b>	–
Battery Module for MMB and MMD in connection with 140 CPU x13 0x	<b>140 XCP 900 00</b>	–
Battery for Battery Module	<b>990 XCP 990 00</b>	–