

Motor controller **ORPHEUS**



The Orpheus motor controller controls sensorless brushless synchronous motors or BLDC motors. The sensorless control of the Orpheus ensures the full holding torque of the motor even at standstill and at low speeds.

The speed is either infinitely variable via an analogue 0-10V input or via three digital inputs (eight speed levels). Furthermore, there are 2x digital inputs for the wire-break-proof cabling of the direction of rotation of the motor and an input for the controller enable.

In addition, there are each 1x brake chopper, which dissipates the energy generated during braking in the DC bus and 1x error output. As a accessory option, a version via CAN bus is available.

Technical data

Technical data Orpheus		Basic24	Basic48	Advanced24	Advanced48
Nominal voltage	VDC	24	48	24	48
Nominal current	A	6	6	6	6
Maximum current	A (2sec)	10	8	10	8
Motor connection*		Terminal optional M8 (6A)			
CAN field bus		No	No	yes	yes
Digital inputs		6 x 24VDC	6 x 24VDC	No	No
Analogue inputs		1 x 0 to 10VDC	1 x 0 to 10VDC	No	No
Digital outputs		1 x 24VDC	No	No	No
Brake chopper		Onboard	Onboard	Onboard	Onboard
Connection brake resistor	Ω	4.7	12	4.7	12
Protection type		IP20			
Temperature range	$^{\circ}\text{C}$	- 30 ... + 45			
Functions		Speed control		Speed control, positioning	
Dimensions (LxWxH):	mm	135x49x20			



* For motor connection version with M8 circular connector, the maximum motor current is limited to 6 A.

Terminal configuration



The connector pinout for the power connection, the I / O terminals, and the motor connection with terminal execution, starting with 1, is from left to right.

Pin assignment	Pin	Basic24	Basic48	Advanced24	Advanced48
Power connection					
Supply +	1		V _{DC1}		
Power supply GND	2		GND2		
Supply +	3		V _{DC3}		
Power supply GND	4		GND4		

Pin description	Pin	Basic24	Basic48	Advanced24	Advanced48
I/O connections					
GND (Brake chopper)	1	BRCH-	BRCH-	BRCH-	BRCH-
Brake chopper output	2	BRCH+	BRCH+	BRCH+	BRCH+
D01	3	Error	n.c.	n.c.	n.c.
DI5	4	RFG	RFG - DI5		
DI4	5	Clockwise rotation	R / Hi / A - DI4	CAN High	CAN High
DI3	6	Anticlockwise rotation	L / Low / B - DI3	CAN-Low	CAN-Low
GND	7	GND	GND		
AIO / DIO *	8	Analogue setpoint / digital setpoint	Analogue setpoint / digital setpoint		
DI1 *	9	Digital setpoint	Digital setpoint		
DI2 *	10	Digital setpoint	Digital setpoint		



* Via parameter is preset (factory setting) whether the speed setpoint is analogue (0-10V) or digital (8 speed levels via three digital inputs).

Pin description	Pin	Basic24	Basic48	Advanced24	Advanced48
Motor connection version terminal					
PE connection (grey)	1			PE	
Motor phase (brown)	2			U	
Motor phase (white)	3			V	
Motor phase (black)	4			W	
zero point (blue)	5			NP	

Connector assignment, version M8 for motor connection

For version with M8 connector for the motor connection, the pin assignment is carried out as follows.

Pin	Wire colour	Function
1	Grey	PE
2	Brown	U
3	White	V
4	Black	W
5	Blue	Neutral point

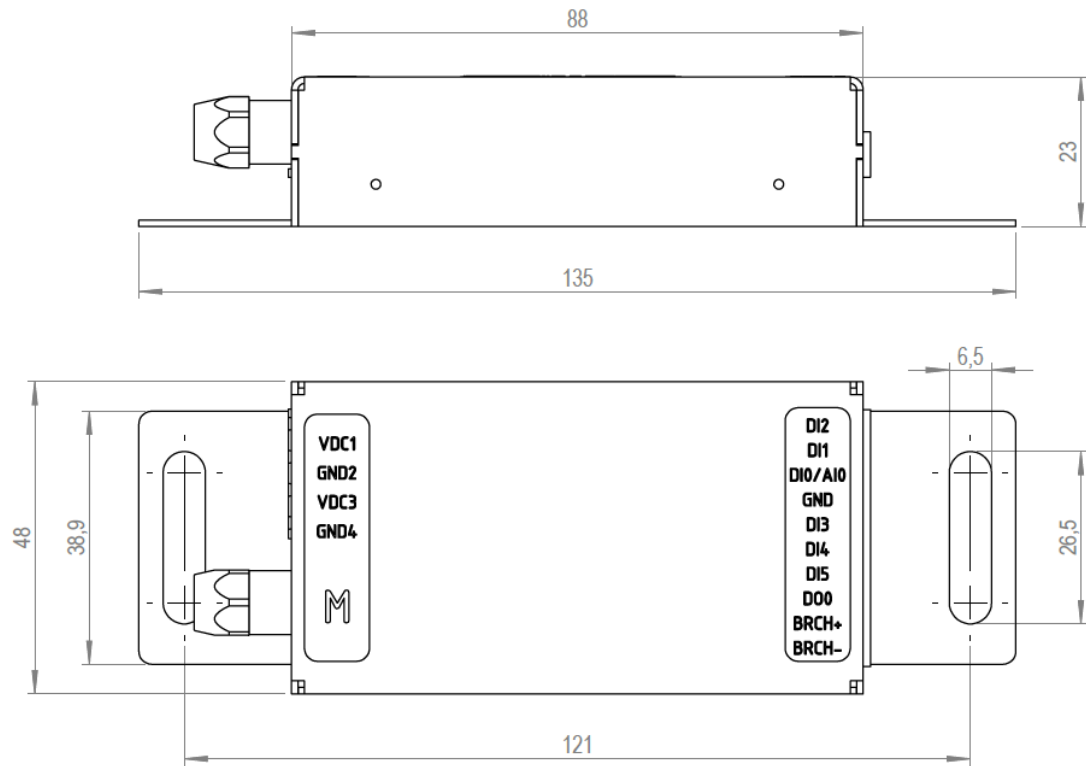
The Orpheus can be combined with the following motor types from MTA:

	Hermes60	Herkules60	Herkules60	Herkules80	Pegasos26	Pegasos42	Pegasos53	Pegasos66	Pegasos72	Pegasos75
Basic24, Advanced24	✓	✓	✓		✓	✓	✓	✓		
Basic48, Advanced48	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



* Combination also applies to the version with CAN

Dimensions



Mating connector	Version
Power supply connector	4-pin, RM5.08mm
Motor connection	5-pin, RM3.81mm or M8 circular connector
I/O connection	10-pin, RM3.81mm

Motor controller **ORPHEUS** *Logistik*



The Orpheus Logistik motor controller is designed for use in different conveyor systems. The controller controls the speed of three-phase synchronous motors without sensors. By means of predefined I/O functions and the direct connection of light barrier signals, it is possible to carry out logical processes directly, such as: "Logistics function for zero-pressure operation in conveyor technology" can be performed. The sensorless control ensures the full holding torque of the motor even at standstill. The input of the speed parameter is possible either via the 3 digital inputs or via the DIP switch with 8 speed levels. In addition, there are further inputs and outputs for logistic functions such as single inlet, block inlet, single outlet and block deduction.

Technical data

Technical data Orpheus Logistik		
Nominal voltage	VDC	24
Nominal current	A	6
Maximum current	A (2sec)	10
Motor connection		Terminal optional M8 (6A)
Digital inputs		6 x 24VDC for 8 speed levels
further digital inputs		1 x in/output for single inlet/single outlet 1 x 24VDC for logistics function block deduction 1 x 24VDC for clockwise rotation 1 x 24VDC for clockwise/anticlockwise rotation
Digital outputs		7 x 24VDC
Light barrier inputs		2 x 24VDC incl. Light barrier supply
Brake chopper		Onboard
Brake resistance	Ω	4.7
Dip switch		Onboard, for operation without I/Os (Stand alone)
Protection type		IP20
Temperature range	$^{\circ}\text{C}$	0 ... +40
Functions		Speed control, logistics function zero-pressure conveying operation
Sleep and awake mode		Yes
Coupling to a higher-level control e.g. SPS		Yes
Dimensions (LxWxH):	mm	135x49x20



Pin assignment



The connector pinout for the power connection, the I / O terminals, and the motor connection with terminal execution, starting with 1, is from left to right.

Pin description	Connector	Pin	Orpheus Logistik
Power connection input			
Supply +	X1	1	V _{DC1}
Power supply GND		2	GND1
Power connection output			
Supply +	X2	1	V _{DC2}
I/O input			
DI0	X3	1	G1 setpoint speed
DI1		2	G2 setpoint speed
DI2		3	G3 setpoint speed
GND		4	Ground
DI3		5	Clockwise/anticlockwise direction of rotation:
DI4		6	VT Block deduction
DI5		7	E Single deduction
D00		8	Error output
n.c.		9	Reserve
n.c.		10	Reserve
I/O output			
D01	X4	1	G1 setpoint speed
D02		2	G2 setpoint speed
D03		3	G3 setpoint speed
GND		4	Ground
D04		5	Clockwise/anticlockwise direction of rotation:
D05		6	VT Block deduction
D06		7	E Single deduction
D07		8	Error output
n.c.		9	Reserve
n.c.		10	Reserve
Motor			
Motor phase	X5	1	W
Motor phase		2	V
Motor phase		3	U
Ground		4	PE
Ground		5	PE
Neutral point		6	Neutral point



* For motor connection version with M8 circular connector, the maximum motor current is limited to 6 A.

Pin description	Connector	Pin	Orpheus Logistik
Light barrier			
D08	X6	1	Light barrier signal 1
GND		2	Supply light barrier 1
24VDC		3	Supply light barrier 1
D09		4	Light barrier signal 2
GND		5	Supply light barrier 2
24VDC		6	Supply light barrier 2
Brake chopper / brake resistor			
BR-	X7	1	Brake chopper output
BR+		2	Brake chopper output



*The motor controller is fitted with an internal brake chopper. The brake chopper threshold is preset.

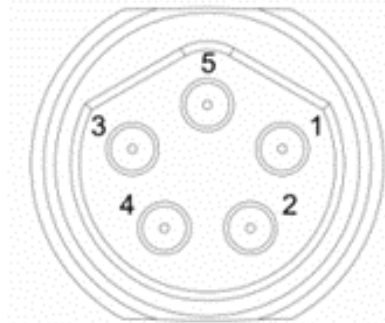
Assignments / Settings / Functions

Dip switch	Switch		
Dip switch setting			
Direction of rotation change in stand-alone mode	1	Right	0 ... Dip switch position OFF
		Left	1 ... Dip switch position ON
Switching between stand-alone and I/O operation	2	I/O operation	0 ... Dip switch position OFF
		Stand alone	1 ... Dip switch position ON
Setpoint speed	3	G3	0 ... Dip switch position OFF 1 ... Dip switch position ON
	4	G4	
	5	G5	
Delay time block deduction	6	VZ3	0 ... Dip switch position OFF 1 ... Dip switch position ON
	7	VZ2	
	8	VZ1	
Reserve	9	n.c.	
Reserve	10	n.c.	

Connector assignment, version M8 for motor connection

For version with M8 connector for the motor connection, the pin assignment is carried out as follows.

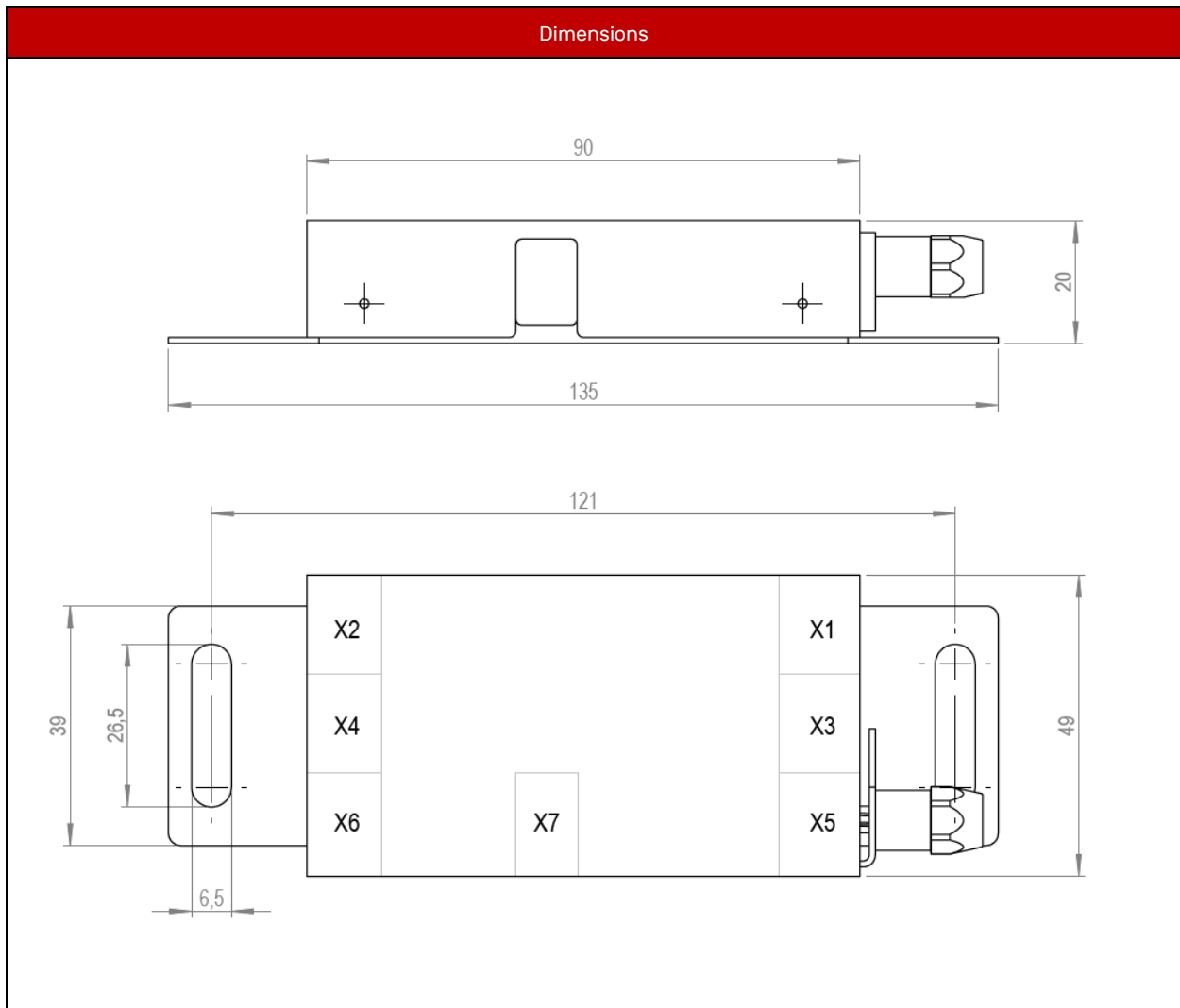
Pin	Wire colour	Function
1	Grey	PE
2	Brown	U
3	White	V
4	Black	W
5	Blue	Neutral point



Logistics functions	Orpheus Logistik
Single inlet	The conveyed material is stopped only at the end of the lane (stowage space 1). The subsequent conveyed material is stopped at stowage space 2. In this order, the lane is filled with conveyed material. The sensor (light barrier or light sensor) of stowage area 1 gives the information to the associated MCL1, which in turn gives the information to the next subsequent MCL2. The MCL2 stops the motor roller and therefore the conveyed material
Block inlet	A block of conveyed goods passes through the entire conveyor line and can occupy 2 or more stowage locations (2 or more sensors are occupied), without this leading to the stop of individual conveyed goods. The block is only stopped at the last sensor. At the last sensor, the information "occupied" is forwarded via the MCL to the preceding MCL. The preceding sensor thus detects the conveyed material and stops the conveyed goods in the preceding segment (so that the conveyed goods can not be pushed together within a stowage space)
Single deduction	The removal of material to be conveyed (= start of the motor roller) is performed by a positive signal (+ 24VDC) to the input "E". The motor roller is then started and the transported material is transported away. The sensor is released (unoccupied), this information is output at output "A" and forwarded to the following MCL (= input E at the following MCL), which in turn starts the associated motor roller for the removal of the conveyed material. With this function, the conveyed goods are transported "individually" from one stowage space to the next
Block deduction	To increase the throughput, it is possible to deduct all goods of a lane at the same time. For this purpose, the "VT" input on the MCL1 is controlled with + 24VDC. This signal is passed on to all following MCLs. With the signal "VT" the motor roller is started
"Sleep" and "awake" mode	If a conveyed material is transported via a stowage route, the conveyed goods are transported to the free stowage area nearest the front. If the light barriers of a stowage space are actuated by the conveyed material, the motor of the subsequent stowage space is thereby switched on. (Awake mode) As a result, only the motor is active on which the container to be transported is located. If a conveyed material leaves the light barriers of a stowage space, the motor roller of this stowage space turns for a period of up to 10 seconds. After this time has elapsed, the motor roller will stop unless new material is transferred from the previous stowage area. (Sleep mode) This keeps energy consumption to a minimum

The Orpheus can be combined with the following motor types from MTA:

	Hermes50	Herkules50	Herkules60	Herkules80	Pegasos26	Pegasos42	Pegasos53	Pegasos55	Pegasos72	Pegasos75
Orpheus Logistik*	✓	✓	✓		✓	✓	✓	✓		



Mating connector	Version	
Power supply connector	X1 / X2	2-pin, RM5.08mm
Motor connection	X5	6-pin, double row, RM3.81mm or M8 circular connector
In/outlets	X3 / X4	10-pin, double row, RM3.81mm
Light barrier	X6	6-pin, double row, RM3.81mm
Brake resistance	X7	2-pin, RM3.81mm