

# 4500

## Electronic control

Electronic control systems Series 4500 combine mechatronic solutions and digital communication technologies which permit to build modular systems, flexible, reliable and easy to install



Just a few devices create a complete electronic control system. The electronic system fundamentally consists of 4 elements which vary in amount and type, depending on installation requirements:

- control stations
- actuators
- data transmission cables to connect together actuators and control stations
- cables between actuator and motor and between

The link between the various devices is via a simple 4-pin cable that carries all the information thru digital CANBus communication.

In case of motors with mechanical interface, push-pull cables transfer the motion from the actuators to the throttle on the motor and on the gearbox.

In the case of motors and gearboxes with electronic interface, a simple electrical wire performs their connection to the actuator. On all Flexball electronic control systems can be mounted lever Series 4500.

The systems are configured to interface to different types

## MOTORS COMPATIBILITY

- Voltage: Cummins, Detroit Diesel, Scania, FNM, Lombardini, Deutz Vetus
- 4-20 mA current: MAN, MTU, Isotta Fraschini
- PWM: Caterpillar, Scania.

## KEY FEATURES

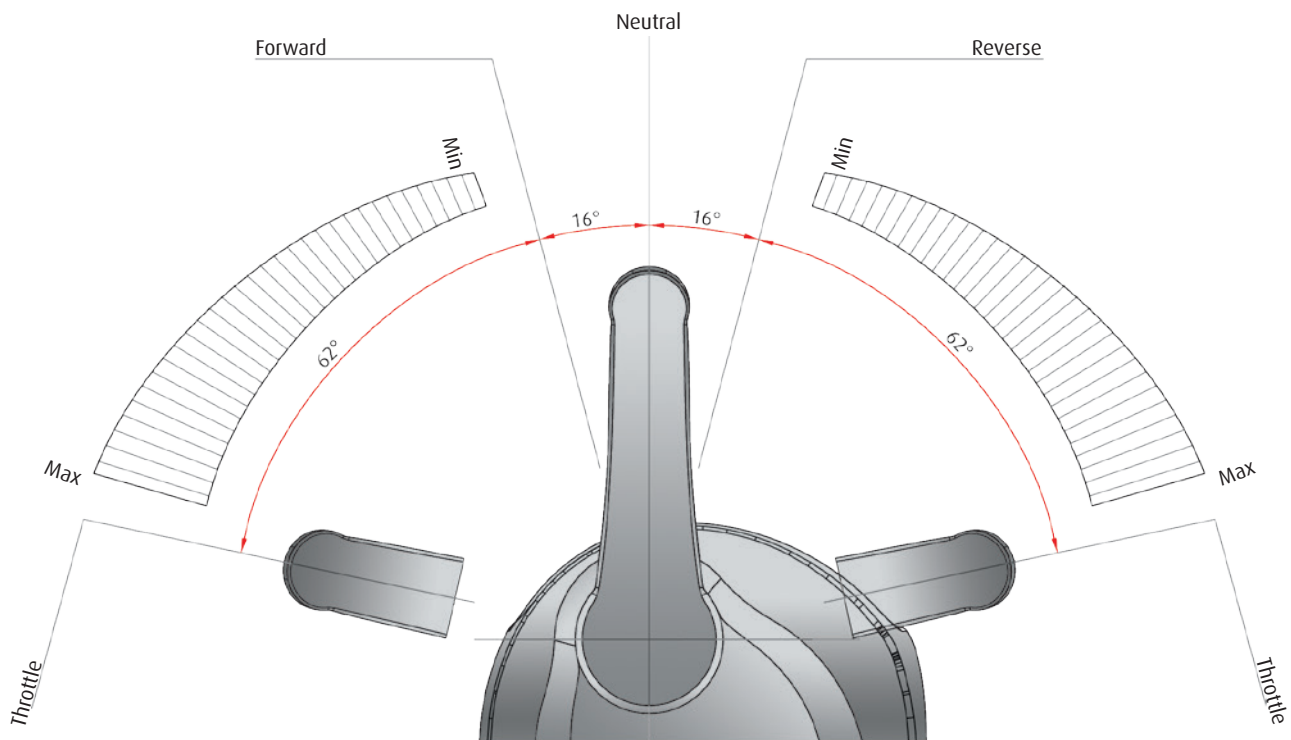
- With up to 3 control stations in the basic version, the system can be extended up to 7 control stations
- Fast Start-up Mode Function
- Synchro function that can be activated either in neutral or when sailing
- Trolling control
- Trim/Flap and Synchro Trim/Flap function
- Starting inhibition if the gear isn't in neutral
- Advanced functions for fast and safe commissioning
- Interface to frequency converters in hybrid propulsion systems
- Programmable delays at clutch in or clutch out
- Emergency safety devices directly on the actuator, in the case of systems with mechanical interface.

## MAIN FEATURES

- Electronic control system in drive by wire technology
- Maximum distance between deck and engine room can be more than 60 meters
- Fast and easy installation
- EMC and CE Certified
- Operation with instant plug and play
- Limited number of components
- Digital Data Transmission
- Setting of operating parameters either via keypad or via PC.

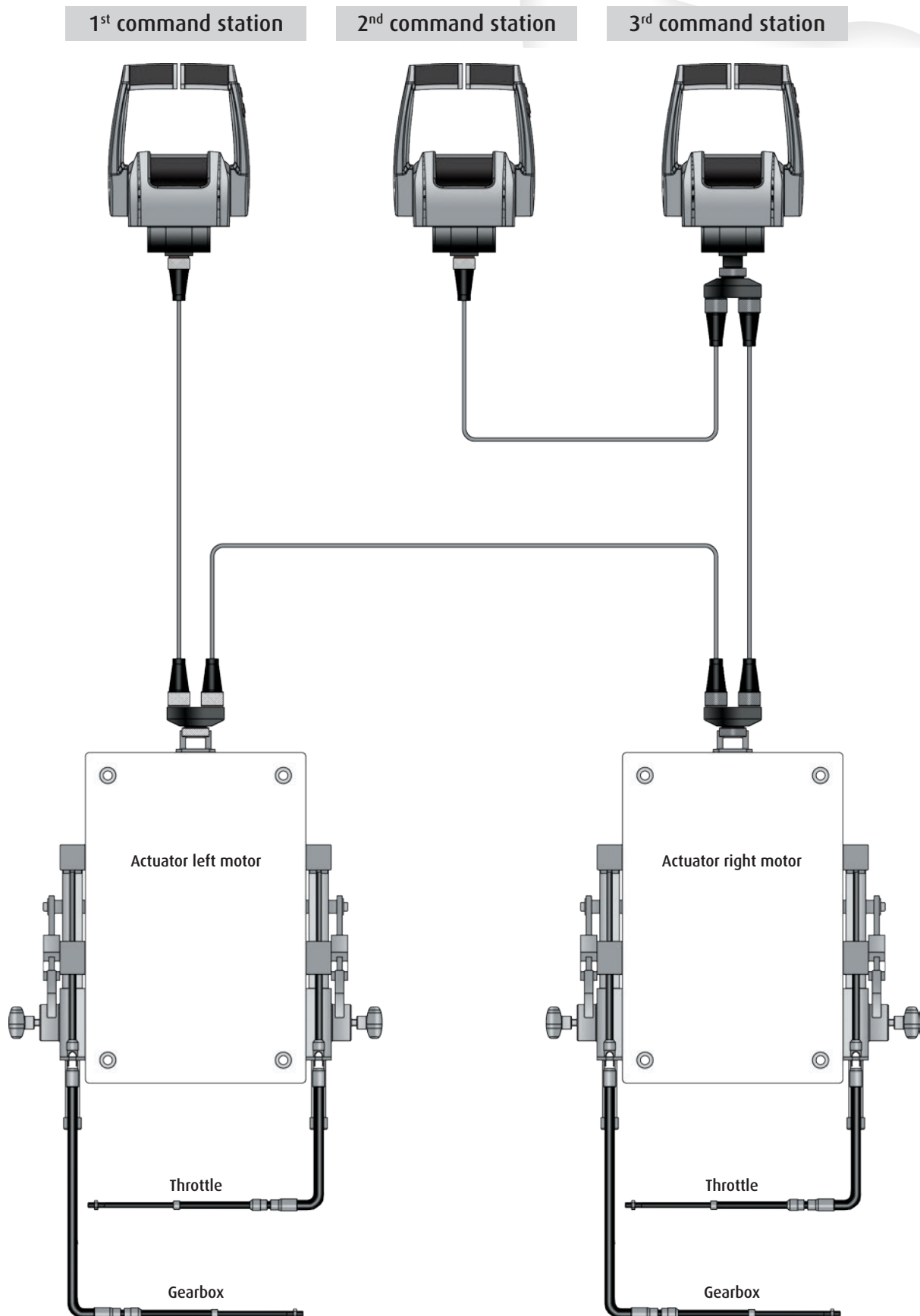
## TECHNICAL FEATURES

- Supply voltage from 9.0 to 32 Vdc (multi-voltage supply)
- Max input current: 5 A
- Current at idle: 0.5 A
- Operating temperature: -10 to + 85 °C
- Mechanical generated force at nominal conditions: 250 N (25 kg) with absorption of 1.5 A
- Maximum generated force: 450 N (45 kg) with absorption of 5 A and for a time less than 1 second
- Gearbox stroke – forward: it can be set between 5 and 40 mm
- Gearbox stroke – reverse: it can be set between 5 and 40 mm
- Maximum throttle stroke: 80 mm.



The diagram below represents a system configured with:

- n. 2 actuators • n. 3 control stations
- data transmission cables between levers, lever and actuator and between actuators
- motor and gearbox connection cables which, depending on the type of motor and gearbox, can be mechanical or electronic.



## SYSTEM CONFIGURATIONS

The system types listed below always refer to the diagram on the previous page and are based on the following conditions:

- The distance between the various devices and specifically the distance between levers, lever and actuator or between actuators is = 7.5 m; in case you need longer cables (especially between the deck and the engine room) they must be defined when ordering.
- All electrical wirings to connect the actuator to the motor and the actuator to the gearbox, are as standard 3 meters. If longer cables were required, it must be communicated when ordering. There are specific cablings for mo-

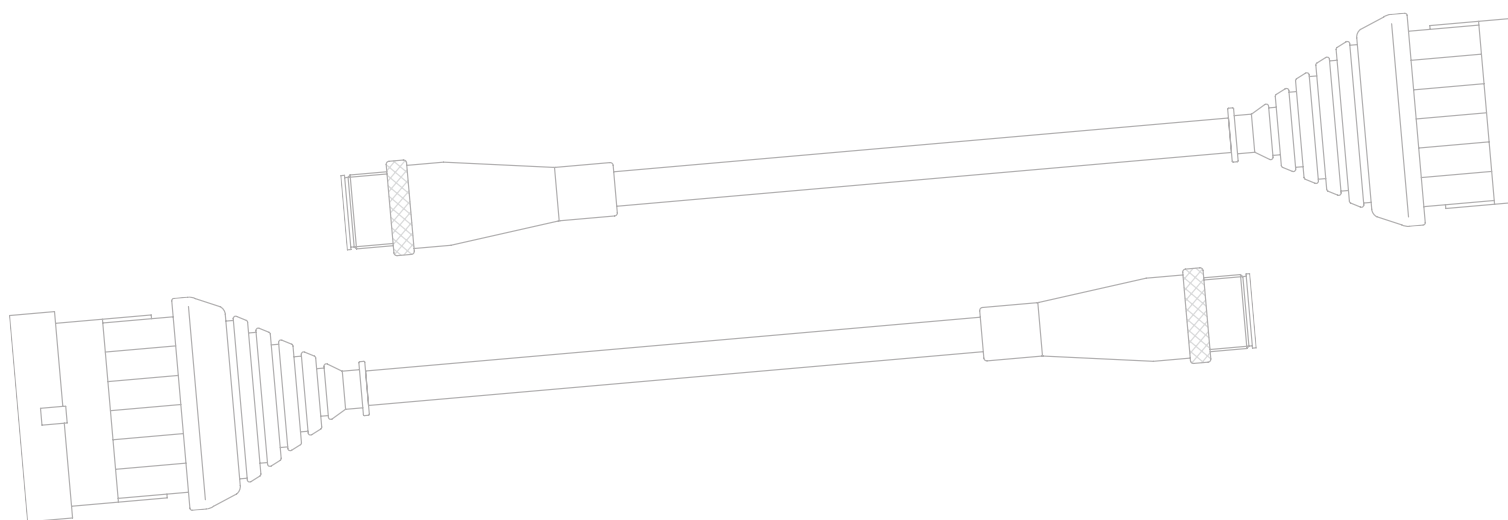
tors like FNM, FPT, Nanni Diesel, Vetus, etc. In this case you must communicate the specific type of motor you need to command.

The system configurations are classified according to the possible combinations of:

- motor types
- gearbox types
- number of engines
- number of levers
- options.

The following table lists all the types of electronic systems. The most common ones are highlighted in gray.

SYSTEM TYPE	ID
• Mechanical throttle and mechanical gearbox	MM
• Electronic voltage throttle and mechanical gearbox	VM
• CANBus throttle and mechanical gearbox	CM
• Electronic PWM throttle and mechanical gearbox	WM
• Electronic current throttle and mechanical gearbox	IM
• Mechanical throttle and electronic gearbox	ME
• Electronic voltage throttle and electronic gearbox	VE
• CANBus throttle and electronic gearbox	CE
• Electronic PWM throttle and electronic gearbox	WE
• Electronic current throttle and electronic gearbox	IE
• Electronic voltage throttle and trolling gearbox	VT
• CANBus throttle and trolling gearbox	CT
• Trim/Flap option	F
• Interface towards frequency converter on hybrid propulsion systems	T



Now it follows a list of complete system configurations. The prefix 4500 defines the type of control lever to be mounted on the boat. For example, the 4500-MM22F indicates a system with two mechanical motors, two mechanical gearboxes, trim/flaps option and two control stations 4500 Series.

### **COD. MM** Electronic control systems compatible with mechanical motors and mechanical gearboxes

<b>TROTTLER MECHANICAL – GEARBOX MECHANICAL</b>			
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP	WITH HYBRID MOTOR OPTION
• 1 motor, 1 command station	4500-MM11	4500-MM11F	4500-MM11H
• 1 motor, 2 command stations	4500-MM12	4500-MM12F	4500-MM12H
• 2 motors, 1 command station	4500-MM21	4500-MM21F	4500-MM21H
• 2 motors, 2 command stations	4500-MM22	4500-MM22F	4500-MM22H
• 2 motors, 3 command stations	4500-MM23	4500-MM23F	4500-MM23H

### **COD. VM** Electronic control systems compatible with electronic voltage motors Hyundai, Deutz, FNM, Vetus, Nanni Diesel, Lombardini, Cummins, etc. and mechanical gearboxes

<b>TROTTLER ELECTRONIC (V) – GEARBOX MECHANICAL</b>			
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP	WITH HYBRID MOTOR OPTION
• 1 motor, 1 command station	4500-VM11	4500-VM11F	4500-VM11H
• 1 motor, 2 command stations	4500-VM12	4500-VM12F	4500-VM12H
• 2 motors, 1 command station	4500-VM21	4500-VM21F	4500-VM21H
• 2 motors, 2 command stations	4500-VM22	4500-VM22F	4500-VM22H
• 2 motors, 3 command stations	4500-VM23	4500-VM23F	4500-VM23H

### **COD. CM** Electronic control systems compatible with CANBus motors FPT, Nanni Diesel, Toyota, VM, etc. and mechanical gearboxes

<b>TROTTLER CANBUS – GEARBOX MECHANICAL</b>		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-CM11	4500-CM11F
• 1 motor, 2 command stations	4500-CM12	4500-CM12F
• 2 motors, 1 command station	4500-CM21	4500-CM21F
• 2 motors, 2 command stations	4500-CM22	4500-CM22F
• 2 motors, 3 command station	4500-CM23	4500-CM23F

**COD. WM** Electronic control systems compatible with electronic PWM motors Caterpillar, Deutz, Scania, etc. and mechanical gearboxes

TROTTLER PWM – GEARBOX MECHANICAL		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-WM11	4500-WM11F
• 1 motor, 2 command stations	4500-WM12	4500-WM12F
• 2 motors, 1 command station	4500-WM21	4500-WM21F
• 2 motors, 2 command stations	4500-WM22	4500-WM22F
• 2 motors, 3 command stations	4500-WM23	4500-WM23F

**COD. IM** Electronic control systems compatible with electronic current motors Caterpillar, Deutz, Isotta Fraschini, etc. and mechanical gearboxes

TROTTLER CURRENT (I) – GEARBOX MECHANICAL		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-IM11	4500-IM11F
• 1 motor, 2 command stations	4500-IM12	4500-IM12F
• 2 motors, 1 command station	4500-IM21	4500-IM21F
• 2 motors, 2 command stations	4500-IM22	4500-IM22F
• 2 motors, 3 command stations	4500-IM23	4500-IM23F

**COD. ME** Electronic control systems compatible with mechanical motors and electronic solenoid gearboxes

TROTTLER MECHANICAL – GEARBOX ELECTRONIC			
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP	WITH HYBRID MOTOR OPTION
• 1 motor, 1 command station	4500-ME11	4500-ME11F	4500-ME11H
• 1 motor, 2 command stations	4500-ME12	4500-ME12F	4500-ME12H
• 2 motors, 1 command station	4500-ME21	4500-ME21F	4500-ME21H
• 2 motors, 2 command stations	4500-ME22	4500-ME22F	4500-ME22H
• 2 motors, 3 command stations	4500-VM23	4500-VM23F	4500-VM23H



**COD. VE** Electronic control systems compatible with electronic voltage motors Hyundai, Deutz, FNM, Vetus, Nanni Diesel, Lombardini, Cummins, etc. and electronic solenoid gearboxes

TROTTLER ELECTRONIC (V) – GEARBOX ELECTRONIC			
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP	WITH HYBRID MOTOR OPTION
• 1 motor, 1 command station	4500-VE11	4500-VE11F	4500-VE11H
• 1 motor, 2 command stations	4500-VE12	4500-VE12F	4500-VE12H
• 2 motors, 1 command station	4500-VE21	4500-VE21F	4500-VE21H
• 2 motors, 2 command stations	4500-VE22	4500-VE22F	4500-VE22H
• 2 motors, 3 command stations	4500-VE23	4500-VE23F	4500-VE23H

**COD. CE** Electronic control systems compatible with CANBus motors FPT, Nanni Diesel, Toyota, VM, etc. and electronic solenoid gearboxes

TROTTLER CANBUS – GEARBOX ELECTRONIC			
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP	WITH HYBRID MOTOR OPTION
• 1 motor, 1 command station	4500-CE11	4500-CE11F	4500-CE11H
• 1 motor, 2 command stations	4500-CE12	4500-CE12F	4500-CE12H
• 2 motors, 1 command station	4500-CE21	4500-CE21F	4500-CE21H
• 2 motors, 2 command stations	4500-CE22	4500-CE22F	4500-CE22H
• 2 motors, 3 command stations	4500-CE23	4500-CE23F	4500-CE23H

**COD. WE** Electronic control systems compatible with electronic PWM motors Caterpillar, Deutz, Scania, etc. and electronic solenoid gearboxes

TROTTLER PWM – GEARBOX ELECTRONIC		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-WE11	4500-WE11F
• 1 motor, 2 command stations	4500-WE12	4500-WE12F
• 2 motors, 1 command station	4500-WE21	4500-WE21F
• 2 motors, 2 command stations	4500-WE22	4500-WE22F
• 2 motors, 3 command stations	4500-WE23	4500-WE23F

**COD. IE** Electronic control systems compatible with electronic current motors Caterpillar, Deutz, Isotta Fraschini, etc. and electronic solenoid gearboxes

TROTTLER CURRENT (I) – GEARBOX ELECTRONIC		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-IE11	4500-IE11F
• 1 motor, 2 command stations	4500-IE12	4500-IE12F
• 2 motors, 1 command station	4500-IE21	4500-IE21F
• 2 motors, 2 command stations	4500-IE22	4500-IE22F
• 2 motors, 3 command stations	4500-IE23	4500-IE23F

**COD. VT** Electronic control systems compatible with electronic voltage motors Hyundai, Deutz, FNM, Vetus, Nanni Diesel, Lombardini, Cummins, etc. and trolling gearboxes

TROTTLER VOLTAGE (V) – GEARBOX TROLLING		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-VT11	4500-VT11F
• 1 motor, 2 command stations	4500-VT12	4500-VT12F
• 2 motors, 1 command station	4500-VT21	4500-VT21F
• 2 motors, 2 command stations	4500-VT22	4500-VT22F
• 2 motors, 3 command stations	4500-VT23	4500-VT23F

**COD. CT** Electronic control systems compatible with CANBus motors FPT, Nanni Diesel, Toyota, VM, etc. and trolling gearboxes

TROTTLER CANBUS – GEARBOX TROLLING		
	WITHOUT TRIM/FLAP	WITH TRIM/FLAP
• 1 motor, 1 command station	4500-CT11	4500-CT11F
• 1 motor, 2 command stations	4500-CT12	4500-CT12F
• 2 motors, 1 command station	4500-CT21	4500-CT21F
• 2 motors, 2 command stations	4500-CT22	4500-CT22F
• 2 motors, 3 command stations	4500-CT23	4500-CT23F



## DATA TRANSMISSION CABLES CANBUS

DESCRIPTION	CODE
• Length m 3	3500.33-03000
• Length m 5	3500.33-05000
• Length m 7.5	3500.33-07500
• Length m 10	3500.33-10000
• Length m 15	3500.33-15000
• Length m 20	3500.33-20000
• Length m 25	3500.33-25000
• Extension cable male/female m 30	3500.39-30000
• CANBus "T" splitter	N-85E010003

