## **ELECTRONIC CONTROL UNITS**



### Section / Description page REFERENCE TABLE

	EUZ
PWM DRIVERS	EC3
MACHINE MANAGEMENT SYSTEMS	EC19
GRAPHIC DISPLAY UNITS	EC33
ACCESSORIES	EC39

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# **TECNORD**

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	CANbus
	RS
	RS232 (inter
	Total Numb
	PWM (
	Analog
TABLE	High Side Po
ш	Low Side Po
ENC	Signal Dig
Ш К	Total Numb
REF	Analog

Setting by Trimmers			©										
Setting by PC				Ö		©		©		0	Ö	0	0
Setting by Switches		0							©				
Connection for Display									Ö				
CANbus Interface									©	©	©	©	Ö
RS485							]	Ö			Ö	Ö	
RS232 (interface needed)				©		©		©		٢		Ö	
Total Number of Outputs		-	m	w	œ	8-12		5	13-14	18	50	52	5
PWM Outputs		F	2 (NOT simultaneous)	4 (max 2 simultaneous)	8 (max 4 simultaneous)	8 (max 4 simultaneous)		1 (3.5 A max)	2 (3 A max) (4 if 2 dig. outputs are not used)	1 (3.5 A max)	1 (1.5 A max)	4 (2 A max)	12 (3 A max)
Analog Outputs										6 (0-5 V)		6 (0-5 V)	1 (0-5 V)
High Side Power Outputs			1 (max 3.5 A)	1 (max 5 A)		4 (optional, max 5 A)		11 (max 3.5 A)	13 (max 3.5 A) (14 if 1 dig. inputs is not used)	12 (max 3.5 A)	4 (max 3.5 A) (3 if PWM is used)	8 (max 5 A) (4 if PWM is used) 28 (max 3.5 A)	18 (max 3.5 A) (6 if PWM is used)
Low Side Power Outputs													N
Signal Digital Outputs											16 (max 700 mA)	10 (max 700 mA)	
Total Number of Inputs		-	-	œ	œ	8-10		10	6-7	22	48	62	15-19
Analog Inputs		~	-	ω	Q	ω		ω	-	ω	9	16 (0-5 V) 6 (0-20 mA)	5
Optoisolated Digital Inputs													
Digital Inputs					7	N		N	6 (5 if 1 dig. output is not used)	4	32	40	4 (8 if 4 pow. outs not used)
Power Supply Range		8.5-30 V	8-32 V	9-30 V	9-30 V	9-30 V		9-30 V	8.5-32 V	8.5-32 V	8.5-40 V	8.5-40 V	8-32 V
Tecnord P/N	rivers	EC-PWM-A1-MPC1-*	EC-PWM-A2-MPC1-*	EC-PWM-P4-MPC2-H	EC-PWM-08-MPC4-H	EC-PWM-P8-MPC4-H	EMENT SYSTEMS	EC-MMS-1012-H	EC-MMS-0713-H	EC-MMS-2218-H	EC-MMS-4820-H	EC-MMS-6252-H	EC-MMS-1521-H
Description	PWM DRIVERS	PWM card 1 coil, 1 channel	PWM card 2 coils, 1 channel	PWM card 4 coils, 2 channels	PWM card 8 coils, 4 channels (factory preset)	PWM card 8 coils, 4 channels (programmable)	MACHINE MANAGEMENT SYSTEMS	MMS 10 inputs, 12 outputs	MMS 7 inputs, 13 outputs	MMS 22 inputs, 18 outputs	MMS 48 inputs, 20 outputs (coding card)	MMS 62 inputs, 52 outputs (main unit)	MMS 15 inputs, 21 outputs (main unit)

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#### **PWM DRIVERS**

MODEL	DESCRIPTION	PAGE
EC-PWM-A1-MPC1-P	1 PWM output for single solenoid valve wire connection	EC4
EC-PWM-A1-MPC1-D	1 PWM output for single solenoid valve din plug for coil mounting	
EC-PWM-A1-MPC1-E	1 PWM output for 1 single solenoid valve male DIN plug connection	EC8
EC-PWM-A2-MPC1-*	1 PWM output for 1 dual solenoid valve wire connection	EC10
EC-PWM-P4-MPC2-H	2 PWM outputs for 2 dual solenoid valves programmable	EC12
EC-PWM-08-MPC4-H	4 PWM outputs for 4 dual solenoid valves fixed settings	EC14
EC-PWM-P8-MPC4-H	4 PWM outputs for 4 dual solenoid valves programmable	EC16

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### EC-PWM-A1-MPC1-P PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM electronic driver for remote control of a single proportional solenoid valve.

#### OPERATION

The EC-PWM-A1-MPC1-P proportional valve driver receives a command signal from a potentiometer, PLC or other control systems, and supplies a solenoid with a PWM (Pulse Width Modulated) current proportional to the input signal. An auxiliary power supply (+5 V) is provided as a reference for the command signal. Adjustments of "Imin/Imax", "Ramp time" and "Dither" can be carried out directly from a key-pad integrated on the front panel.

Mounting option: panel-mounting style with INPUT/OUTPUT multi-core sheated cable.

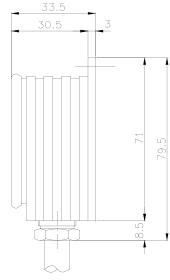
#### FEATURES

- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- Power supply line is protected against reversed polarity and load dump.
- Input is protected against short circuits to GND and power supply.
- · Output is protected against short circuits, over-current and over-temperature.
- The EC-PWM-A1-MPC1 is completely potted.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

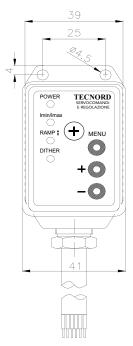
#### SPECIFICATIONS

Operating voltage:	8.5÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Input resistance 0÷5 V voltage input:	560 KOhms
0÷10 V voltage input:	1 MOhm
0÷20mA current input:	250 Ohms
Degree of protection:	IP 67
Analog input signals available:	0÷5 V
	0÷10 V
	0÷20 mA
Typical ctrl pot resistance:	2÷47 kΩ
Current output range (PWM):	100÷3000 mA
PWM dither frequency:	55÷200 Hz (adjustable)
Ramp time:	0.05÷5 s (adjustable)
Max. current from auxiliary +5 V:	15 mA

# DIMENSIONS



8 x 0.5 CABLE - Lenght = 700 mm



#### **APPLICATIONS**

Primary applications are the control of proportional pressure reducing valves and proportional flow regulators to attain smooth acceleration/ deceleration and fine-metering control of electro-hydraulic functions.

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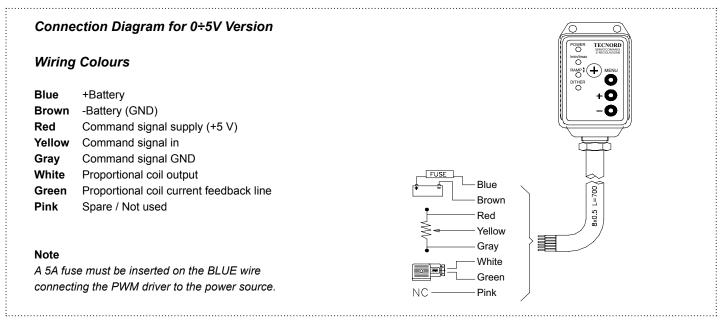
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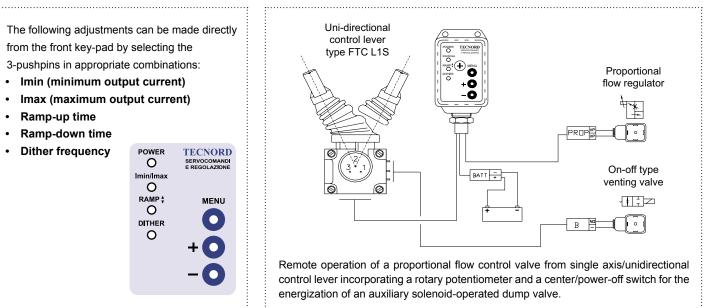
#### EC-PWM-A1-MPC1-P PWM DRIVER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



#### ADJUSTMENTS

#### APPLICATION EXAMPLE



#### **ORDERING INFORMATION**

E	Part numbers	Version	
	23.0409.045	0-5 V	
		23.0409.087	0-10 V
A = Adjustable	<b>P</b> = Panel mounting	23.0409.136	0-20 mA

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# TECNORD

#### EC-PWM-A1-MPC1-D PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM electronic driver for remote control of a single proportional solenoid valve.

#### OPERATION

The EC-PWM-A1-MPC1-D proportional valve driver receives a command signal from a potentiometer, PLC or other control systems, and supplies a solenoid with a PWM (Pulse Width Modulated) current proportional to the input signal. An auxiliary power supply (+5 V) is provided as a reference for the command signal. Adjustments of "Imin/Imax", "Ramp time" and "Dither" can be carried out directly from a key-pad integrated on the front panel.

**Mounting option:** female DIN 43650 socket on valve's side and sheated exit cable to connect to power source and remote control devices.

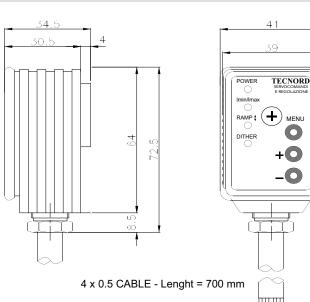
#### FEATURES

- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- Power supply line is protected against reversed polarity and load dump.
- Input is protected against short circuits to GND and power supply.
- Output is protected against short circuits, over-current and over-temperature.
- The EC-PWM-A1-MPC1 is completely potted.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

Operating voltage:	8.5÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Input resistance 0÷5 V voltage input:	560 KOhms
0÷10 V voltage input:	1 MOhm
0÷20mA current input:	250 Ohms
Degree of protection:	IP 67
Analog input signals available:	0÷5 V
	0÷10 V
	0÷20 mA
Typical ctrl pot resistance:	2÷47 kΩ
Current output range (PWM):	100÷3000 mA
PWM dither frequency:	55÷200 Hz (adjustable)
Ramp time:	0.05÷5 s (adjustable)
Max. current from auxiliary +5 V:	15 mA

#### APPLICATIONS

Primary applications are the control of proportional pressure reducing valves and proportional flow regulators to attain smooth acceleration/ deceleration and fine-metering control of electro-hydraulic functions.



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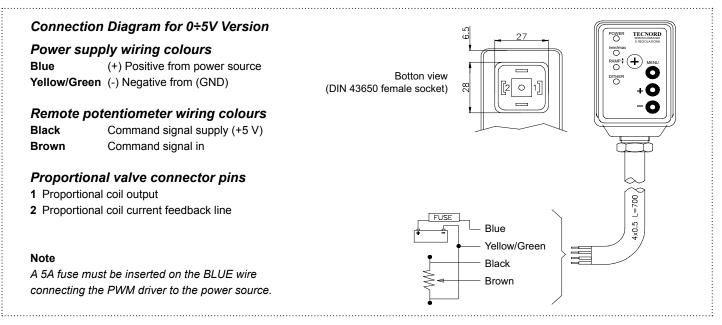


# DIMENSIONS

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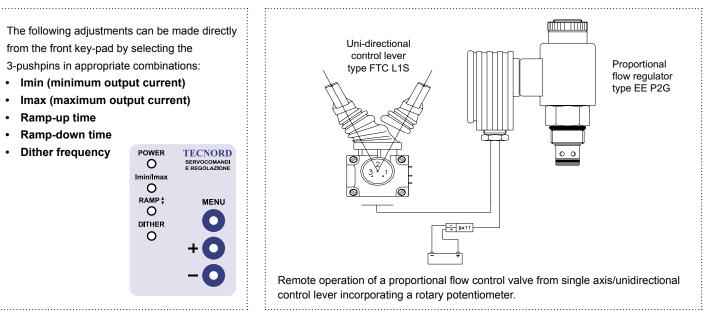
#### EC-PWM-A1-MPC1-D PWM DRIVER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



#### ADJUSTMENTS

#### **APPLICATION EXAMPLE**



#### **ORDERING INFORMATION**

EC-PWM-A1-MPC1-D		Part numbers	Version
	T	23.0409.046	0-5 V
		23.0409.065	0-10 V
A = Adjustable	P = DIN 43650 socket connector	23.0409.077	0-20 mA

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# TECNORD

### EC-PWM-A1-MPC1-E PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM electronic driver for remote control of a single proportional solenoid valve.

#### OPERATION

The EC-PWM-A1-MPC1-E proportional valve driver receives a command signal from a potentiometer, PLC or other control systems, and supplies a solenoid with a PWM (Pulse Width Modulated) current proportional to the input signal. An auxiliary power supply (+5 V) is provided as a reference for the command signal. Adjustments of "Imin/Imax", "Ramp time" and "Dither" can be carried out directly from a key-pad integrated on the front panel.

**Mounting option:** female DIN 43650 socket on valve's side and male DIN 43650 plug to connect to power source and remote control devices.

#### FEATURES

- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- · The inherent superimposed dither frequency helps to overcome friction and stiction effects in the
- controlled device.Power supply line is protected against reversed polarity and load dump.
- Input is protected against short circuits to GND and power supply.
- Output is protected against short circuits, over-current and over-temperature.
- · The EC-PWM-A1-MPC1 is completely potted.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

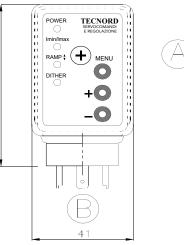
#### SPECIFICATIONS

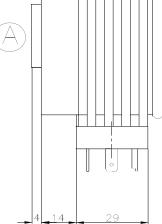
Operating voltage:	8.5÷30 VDC	
Max current consumption:	100 mA (no load applied)	
Operating temperature:	-25°C / +85°C	
Input resistance 0÷5 V voltage input:	560 KOhms	
0÷10 V voltage input:	1 MOhm	
0÷20mA current input:	250 Ohms	
Degree of protection:	IP 67	
Analog input signals available:	0÷5 V	
	0÷10 V	
	0÷20 mA	
Typical ctrl pot resistance:	2÷47 kΩ	
Current output range (PWM):	100÷3000 mA	
PWM dither frequency:	55÷200 Hz (adjustable)	
Ramp time:	0.05÷5 s (adjustable)	
Max. current from auxiliary +5 V:	15 mA	

#### **APPLICATIONS**

Primary applications are the control of proportional pressure reducing valves and proportional flow regulators to attain smooth acceleration/ deceleration and fine-metering control of electro-hydraulic functions.

#### DIMENSIONS





12/2019

A socket connector type DIN 43650 (to proportional valve)

**B** plug connector type DIN 43650 (from voltage supply and remote potentiometer)

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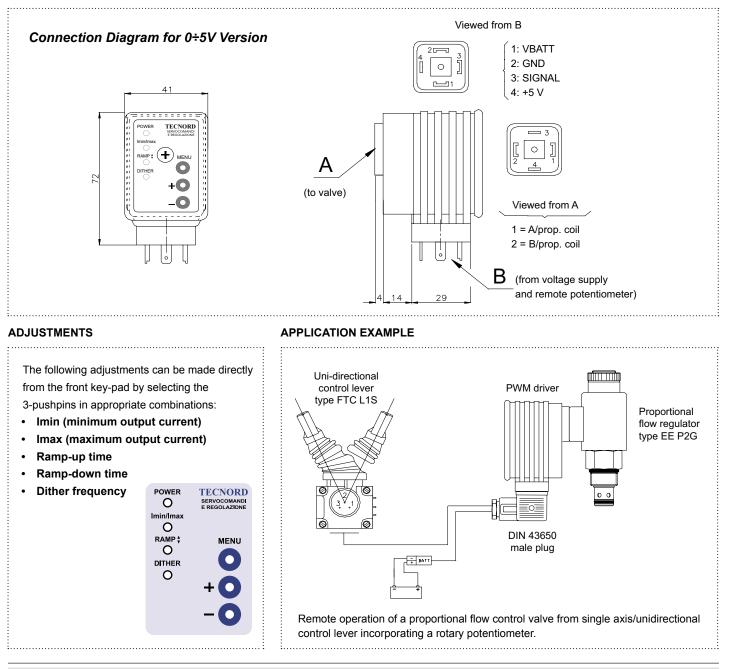
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# TECNORD



#### EC-PWM-A1-MPC1-E PWM DRIVER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



#### ORDERING INFORMATION

	Part numbers	Version	
	T T	23.0409.089	0-5 V
		23.0409.047	0-10 V
A = Adjustable	E = DIN 43650 plug connector	23.0409.137	0-20 mA

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# TECNORD

#### EC-PWM-A2-MPC1-\* PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM electronic driver for remote control of a dual-coil proportional solenoid valve.

#### OPERATION

The EC-PWM-A2-MPC1 proportional valve driver supplies a double solenoid with a PWM (Pulse Width Modulated) current proportional to the input signal from a potentiometer, PLC or other control systems.

Proportional valve A is controlled with an input command signal varying from 2.5 to 4.5 V. Proportional valve B is controlled with an input command signal varying from 2.5 to 0.5 V. An auxiliary on-off type solenoid can be energised anytime the input signal goes out of the 2.25-2.75 V range.



#### FEATURES

- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- · Supply line is protected against reversed polarity.
- · Input is protected against short circuits to GND and supply.
- · Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- The EC-PWM-A2 circuit is potted inside a plastic enclosure suitable for panel mounting by means of 2 set screws.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

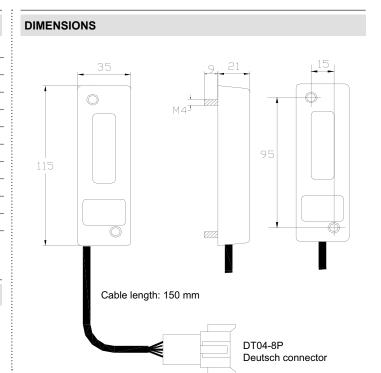
#### SPECIFICATIONS

Operating voltage:	8÷32 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 68
Input impedance:	40 kΩ
Analog input signals:	0.5 - 2.5 - 4.5 VDC
Typical ctrl pot resistance:	2÷10 kΩ
Current output range (PWM):	100÷1500 mA
Current on-off output:	max 1800 mA
PWM dither frequency:	100 Hz
Resolution:	10 bits
DT04-8P Deutsch connector (male co	ntacts)

DT04-8P Deutsch connector (male contacts)

#### APPLICATIONS

- 12 VDC and 24 VDC systems.
- Remote control of proportional valves.
- Field-adjustable applications.
- Control of a proportional bidirectional valve with a venting valve.



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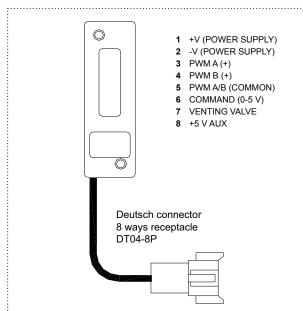


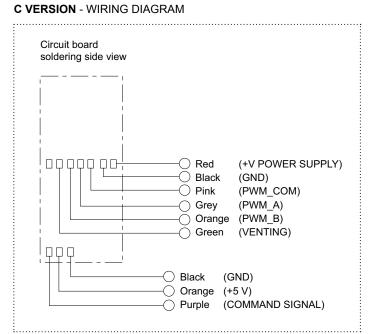
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# TECNORD

#### EC-PWM-A2-MPC1-\* **PWM DRIVER**

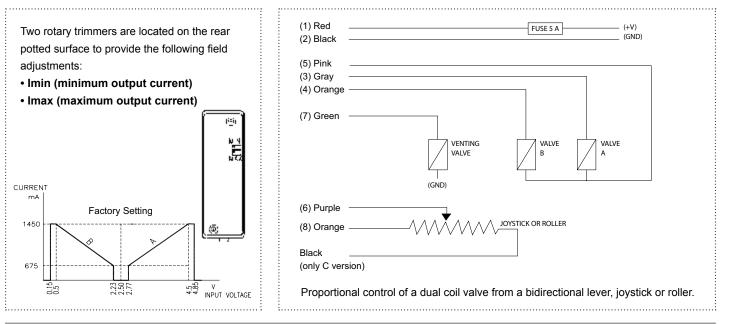
#### **H VERSION - PINOUT**





#### ADJUSTMENTS

#### APPLICATION EXAMPLE



#### **ORDERING INFORMATION**



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# TECNORD

#### EC-PWM-P4-MPC2-H PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM driver for remote control of 2 dual-coil proportional solenoid valves.

#### OPERATION

The EC-PWM-P4-MPC2-H proportional valve driver supplies up to two dual-coil proportional valves with PWM (Pulse Width Modulated) current proportional to input signals coming from potentiometers, PLC or other control systems. The control characteristics (Imin/Imax, ramps, dither) are configurable via PC connected with a RS232 serial line to a configuration kit and PC interface of Tecnord supply.

#### FEATURES

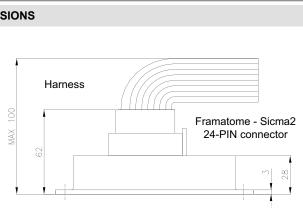
- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- Supply line is protected against reversed polarity and load dump.
- · Inputs are protected against short circuits to GND and supply.
- Outputs are protected against short circuits, reversed polarity, over-current and overtemperature.
- · The EC-PWM-P4-MPC2-H is completely potted.
- · Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

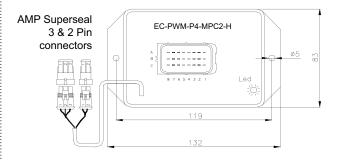
### SPECIFICATIONS

Operating voltage:	9÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 67
Input impedance:	100 kΩ
Analog inputs:	4 x 0-5 V
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	analog inputs can be used as digital
Resolution:	10 bit
PWM outputs channels:	2 x dual-coil proportional valves
Current output range (PWM):	100÷1500 mA (3 A version available)
PWM dither frequency:	75÷250 Hz (adjustable)
On-off digital output:	1 (1500 mA)

#### APPLICATIONS

- Specifically designed for applications requiring accurate adjustments and calibrations.
- 12 VDC and 24 VDC systems.
- · Remote control of non-feedback proportional valves.
- · Control of a proportional bidirectional valve with a venting valve.





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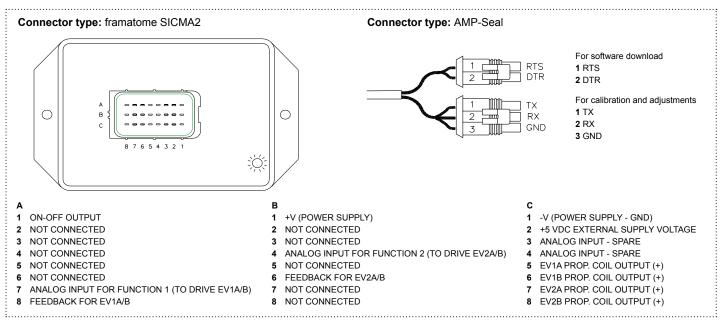


### DIMENSIONS

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#### EC-PWM-P4-MPC2-H **PWM DRIVER**

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**

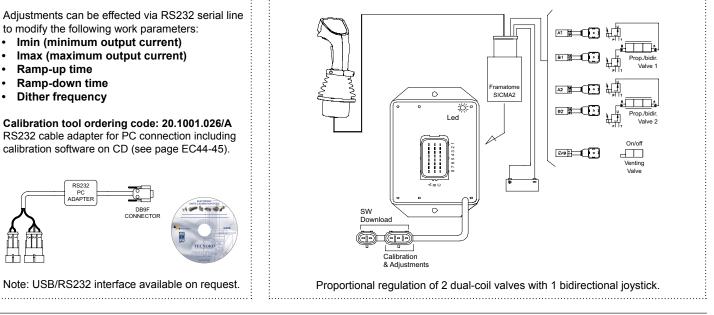


**APPLICATION EXAMPLE** 

#### ADJUSTMENTS

Ramp-up time

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#### **ORDERING INFORMATION**

RS232 PC 



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# **TECNORD**

### EC-PWM-08-MPC4-H PWM DRIVER

#### DESCRIPTION

Microprocessor-based PWM driver for remote control of 4 dual-coil proportional solenoid valves.

#### OPERATION

The EC-PWM-08-MPC4 proportional valve driver supplies up to four dualcoil proportional solenoid valves with PWM (Pulse Width Modulated) current proportional to the input signals coming from potentiometers, PLC or other control systems. PWM currents are factory pre-set and cannot be adjusted.

### FEATURES

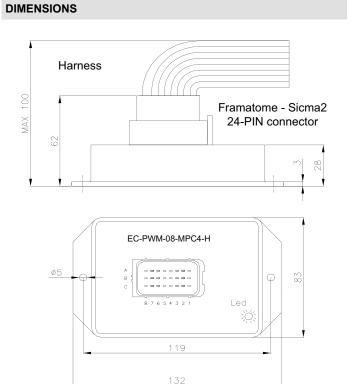
- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- Supply line is protected against reversed polarity and load dump.
- · Inputs are protected against short circuits to GND and supply.
- · Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- The EC-PWM-08-MPC4-H is completely potted.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

#### SPECIFICATIONS

Operating voltage:	9÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-40°C / +100°C
Degree of protection:	IP 67
Input impedance:	100 kΩ
Analog inputs:	6 x 0-5 V
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	2 x PNP (Active High)
Resolution:	10 bit
PWM outputs channels:	4 x dual-coil proportional valves
Current output range (PWM):	100÷1500 mA
PWM dither frequency:	75÷250 Hz
	(factory pre-set, standard 100 Hz)

#### APPLICATIONS

- Specifically designed for applications with factory-set working parameters and requiring no field-adjustments.
- 12 VDC and 24 VDC systems.
- Remote control of proportional valves.
- Control of a 4 functions proportional bidirectional system.



WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



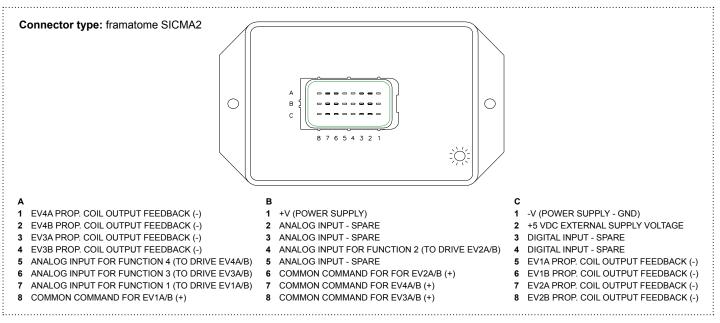
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#### EC-PWM-08-MPC4-H **PWM DRIVER**

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



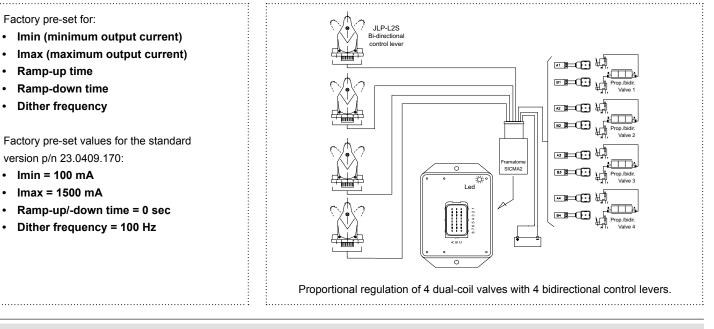
#### ADJUSTMENTS

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#### APPLICATION EXAMPLE



#### **ORDERING INFORMATION**



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# **TECNORD**

#### EC-PWM-P8-MPC4-H **PWM DRIVER**

#### DESCRIPTION

Microprocessor-based PWM driver for remote control of 4 dual-coil proportional solenoid valves.

#### **OPERATION**

The EC-PWM-P8-MPC4 proportional valve driver supplies up to four dual-coil proportional solenoid valves with PWM (Pulse Width Modulated) current proportional to the input signals coming from potentiometers, PLC or other control systems. The control characteristics (Imin/Imax, ramps, dither) are configurable via PC connected with a RS232 serial line to a configuration kit and PC interface of Tecnord supply.

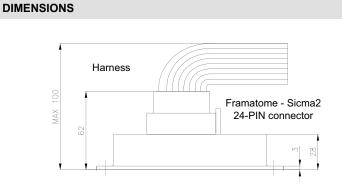
#### **FEATURES**

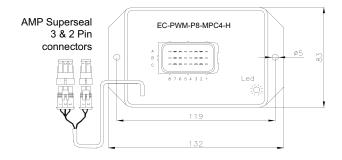
- The current in the solenoid is independent from any change in the coil resistance or in the supply voltage.
- The inherent superimposed dither frequency helps to overcome friction and stiction effects in the controlled device.
- Supply line is protected against reversed polarity and load dump.
- Inputs are protected against short circuits to GND and supply.
- Outputs are protected against short circuits, reversed polarity, over-current and over-• temperature.
- The EC-PWM-P8-MPC4-H is completely potted.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

SPECIFICATIONS	
Operating voltage:	9÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 67
Input impedance:	100 kΩ
Analog inputs:	8 x 0-5 V
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	analog inputs can be used as digital
Resolution:	10 bit
PWM outputs channels:	4 x dual-coil proportional valves
Current output range (PWM):	100÷1500 mA (3 A version available)
PWM dither frequency:	75÷250 Hz (adjustable)

#### **APPLICATIONS**

- Specifically designed for applications requiring accurate adjustments and calibrations.
- 12 VDC and 24 VDC systems.
- Remote control of non-feedback proportional valves. •
- Control of up to 4 proportional bidirectional valves. •





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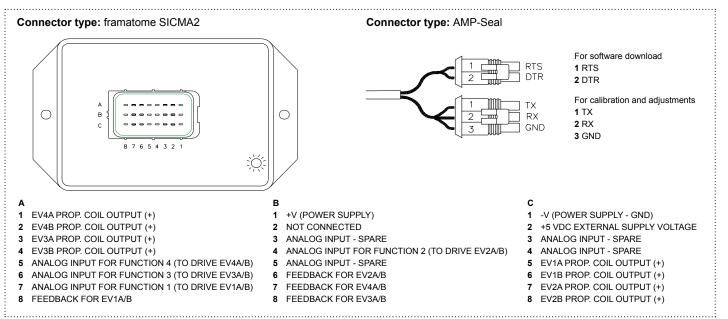
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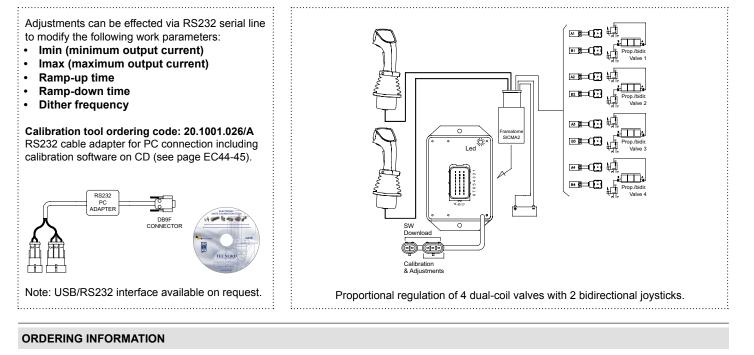
#### EC-PWM-P8-MPC4-H PWM DRIVER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



#### ADJUSTMENTS

**APPLICATION EXAMPLE** 



E	C-PWM-P8-MPC4-H	Part numbers	Version
	T T	23.0409.081	1.5 A
		23.0409.071	3 A
P = Programmable	H = potted plastic Housing		

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#### **MACHINE MANAGEMENT SYSTEMS**

MODEL	DESCRIPTION	PAGE
EC-MMS-1012-H	10 inputs, 12 outputs meter-in systems controller	EC20
EC-MMS-2218-H	22 inputs, 18 outputs RS232 CANbus interface	EC22
EC-MMS-1521-H	15 inputs, 21 outputs CANbus interface	EC24
EC-MMS-4820-H	48 inputs, 20 outputs RS 485 / CANbus interface	EC26
EC-MMS-0713-H	7 inputs, 13 outputs Deutsch connection / RS 485 interface	EC28
EC-MMS-6252-H	62 inputs, 52 output RS485 / CANbus interface	EC30

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### EC-MMS-1012-H MACHINE MANAGEMENT SYSTEM

#### DESCRIPTION

Digital MMS (Machine Management System) with built-in advanced safety and fault detection features for integrated control of mobile equipment functions.

#### OPERATION

10 inputs and 12 outputs are managed by this small-size unit. PWM current outputs are fieldadjustable and their setting is stored in a EEPROM memory. Parameters can be loaded via software from a standard PC connected with a RS232 serial line. It can be used as a standalone controller for both meter-in systems (up to 5 functions) and bidirectional proportional systems (up to 4 functions). Additional output for a safety venting valve is available.

#### FEATURES

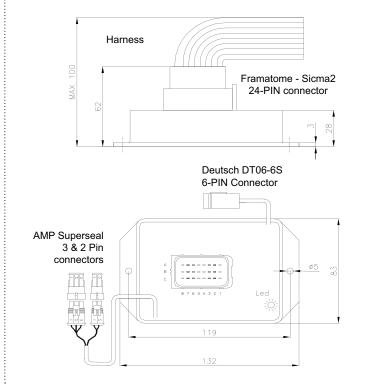
- · Supply line is protected against reversed polarity and overvoltage.
- Inputs are protected against short circuits to GND and power supply.
- · Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- · 3-wires RS232 serial interface.
- Auxiliary +5 V supply for control devices (e.g. potentiometers).
- Performance level c capability according to ISO 13849, due to high reliability of components and embedded diagnostics.
- · Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

#### SPECIFICATIONS

Operating voltage:	9÷30 VDC
Max current consumption:	100 mA (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 67
Input impedance:	100 kΩ
Analog inputs (10 bits):	8 (0-5 V)
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	2
High side power outputs:	12 (3.5 A max)
Inputs for current feedback:	4
Current output range (PWM):	100÷1500 mA
PWM dither frequency:	60÷200 Hz

#### **APPLICATIONS**

- 12 VDC and 24 VDC systems.
- · Remote control of non-feedback proportional and on-off valves.
- Specifically designed for applications requiring accurate adjustments and calibrations.
- Control of up to 4 proportional bidirectional valves plus a venting valve and additional 3 auxiliary outputs.
- Control of up to 5 functions in meter-in configuration (10 on-off valves plus 1 proportional valve and 1 venting valve).



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### DIMENSIONS



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Page **EC20** 

#### EC-MMS-1012-H MACHINE MANAGEMENT SYSTEM

#### Connector type: framatome SICMA2 Connector type: AMP-Seal Connector type: Deutsch DT06-6S 5 22 1 DIGITAL IN - SPARE For software download 0 С в 1 RTS 2 DIGITAL IN - DEAD MAN C 2 DTR NOT CONNECTED 3 EV1A (HIGH SIDE) 4 7 65432 For calibration and adjustments 5 EV1B (HIGH SIDE) žŎ: 1 TX 6 EV5B (HIGH SIDE) 2 RX 3 GND Α в С EV4A (HIGH SIDE) +V (POWER SUPPLY) -V (POWER SUPPLY - GND) 1 1 1 EV4B (HIGH SIDE) EV9 (VENTING - HIGH SIDE) 2 5V EXT 2 2 3 EV3A (HIGH SIDE) 3 ANALOG IN - SPARE ANALOG IN - SPARE 3 4 EV3B (HIGH SIDE) ANALOG IN 2 4 ANALOG IN - SPARE 4 ANALOG IN 4 EVP (HIGH SIDE) 5 5 ANALOG IN 5 5 PROP. CURRENT FEEDBACK - SPARE ANALOG IN 3 EV5A (HIGH SIDE) 6 6 6 ANALOG IN 1 PROP. CURRENT FEEDBACK - SPARE EV2A (HIGH SIDE) 7 7 7 PROP. CURRENT FEEDBACK PROP. CURRENT FEEDBACK - SPARE 8 EV2B (HIGH SIDE) 8 8

#### CIRCUIT BOARD PINOUT - WIRING DIAGRAM (reference: meter-in layout)

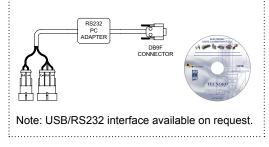


Adjustments can be effected via RS232 serial line to modify the following work parameters:

.....

- Imin (minimum output current)
- Imax (maximum output current)
- Ramp-up time
- Ramp-down time
- Dither frequency

Calibration tool ordering code: 20.1001.026/A RS232 cable adapter for PC connection including calibration software on CD (see page EC44-45).



**ORDERING INFORMATION** 

 EC-MMS-1012-H
 Part number (Std Version)

 1012 = 10 inputs - 12 outputs
 H = potted plastic

 Housing for panel mounting
 H = potted plastic

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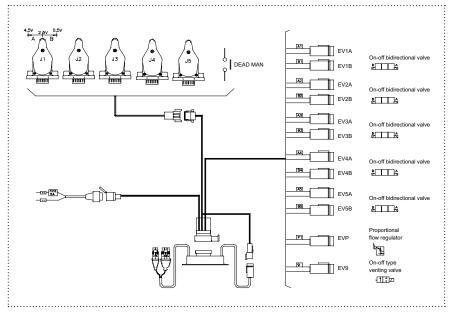


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#### APPLICATION EXAMPLE



TECNORD

### EC-MMS-2218-H MACHINE MANAGEMENT SYSTEM

#### DESCRIPTION

Digital MMS (Machine Management System) with built-in advanced safety and fault detection features for integrated control of Mobile Equipment functions. CANbus capability make it suitable for high-end network systems.

#### OPERATION

22 inputs and 18 outputs are managed by this small-size unit. Analog outputs are fieldadjustable and their setting is stored in an EEPROM memory and can be loaded via software from vehicle's controller through CANbus or from a standard PC connected through an RS232 serial line. It can be used as a stand-alone controller or in conjunction with other MMS electronic units like Tecnord's Mod. MMS-4820.

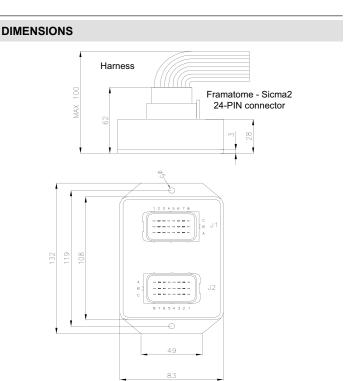
#### FEATURES

- · Power Supply line is protected against reversed polarity and overvoltage.
- · Inputs are protected against short circuits to GND and supply.
- High resolution, 16-bits, analog inputs.
- · Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- · CANbus serial interface.
- RS232 serial interface.
- Especially designed to drive up to 6 electro-hydraulic proportional actuators Tecnord type MLT-FD4/5.
- Auxiliary +5 V supply for control devices (e.g. potentiometers).
- Performance Level c capability according to ISO 13849, due to high reliability of components and embedded diagnostics.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).

SPECIFICATIONS	
Operating voltage:	8÷32 VDC
Max current consumption:	0.5 A (no load applied)
Operating temperature:	-30 ÷ +85°C
Degree of protection:	IP 67
Analog inputs (10 bits):	8 (0-5 V)
Input impedance:	100 kΩ
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	14
High side power outputs:	12 (3.5 A max)
PWM current feedback:	1
Max current load on all outputs:	10 A
Analog outputs:	6 (0-5 V)

#### APPLICATIONS

- 12 VDC and 24 VDC systems.
- · Closed loop systems with electro-hydraulic proportional actuators.
- · General purpose applications requiring field-adjustments.
- MMS-2218 can be connected to a CANbus network (J1939 or CANopen).



WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



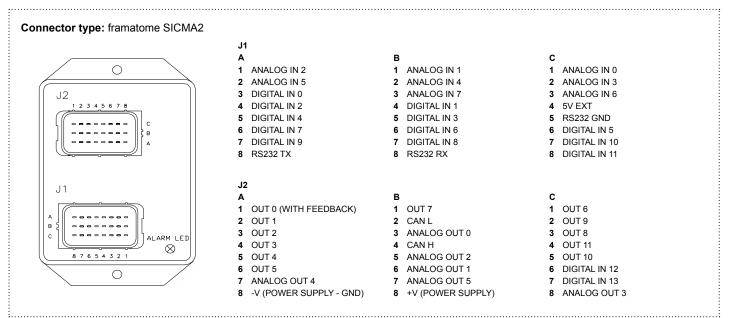
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# TECNORD



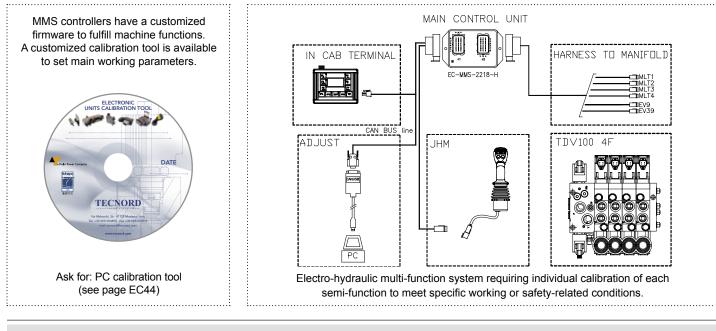
#### EC-MMS-2218-H MACHINE MANAGEMENT SYSTEM

#### CIRCUIT BOARD PINOUT - WIRING DIAGRAM



#### ADJUSTMENTS

#### **APPLICATION EXAMPLE**



**ORDERING INFORMATION** 

EC-MMS-2218-H

2218 = 22 inputs - 18 outputs

**H** = potted plastic Housing for panel mounting

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



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## TECNORD

#### EC-MMS-1521-H MACHINE MANAGEMENT SYSTEM CONTROLLER

#### DESCRIPTION

MMS (Machine Management System) controller in rugged aluminum enclosure dual microprocessor, CANbus, built-in safety and fault-detection features for integrated control of complex functions in mobile equipment applications.

#### **OPERATION**

It is normally used as the main control unit in a complete management system. Two microprocessors and advanced diagnostics for safety applications. The EC-MMS-1521 comes with an aluminium casing, a silicon rubber gasket and connectors, designed to ensure power dissipation, robustness and tightness required in severe environment conditions. Software download available.

#### **FEATURES**

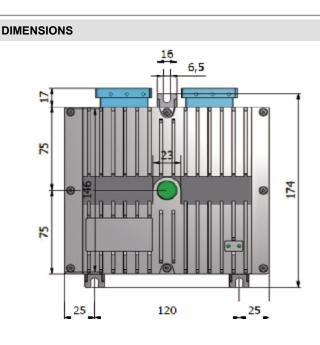
- Robust aluminum enclosure. ٠
- Power supply is protected against reversed polarity (external fuse required) and overvoltage.
- Inputs are protected against short circuits to GND and power supply. •
- Outputs protected against short circuits, over-current and over-temperature.
- 2 CANbus connections.
- PWM drivers with current feedback. •
- +5 V auxiliary power supply for external control devices.
- Performance level d capability according to ISO 13849, thanks to redundant microcontroller and embedded diagnostics.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).
- Reserved power supply pins for safety power outputs.
- Optional add-on inclinometer.

Optional real time clock for data logging. •

SPECIFICATIONS	
Operating voltage:	8÷32 VDC
Max. current consumption:	< 400 mA (no load applied)
Operating temperature:	-40°C / +105°C
Degree of protection:	IP 69
Analog inputs (16 bits):	3 (0-5 V)
Analog inputs (10 bits):	8 (0-5 V)
Digital (frequency) inputs:	4
High side power outputs:	18 (6 if PWM outputs are used)
Low side power outputs (LS):	2
PWM outputs with current feedback (3A):	12
Analog voltage outputs (0-5 V):	1
Pins selectable as power OUT or digital IN	: 6
Inputs with SW selectable pull-up:	4
CANbus lines:	2 (ISO 11898, CAN 2.0A/B)
Available bus speed:	up to 1 Mbit/s

#### APPLICATIONS

- Main ECU for aerial platforms, cranes, telehandlers, agriculture vehicles. ٠
- 12 VDC and 24 VDC systems.
- Two or more MMS boards can be interconnected through the CANbus line.





WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



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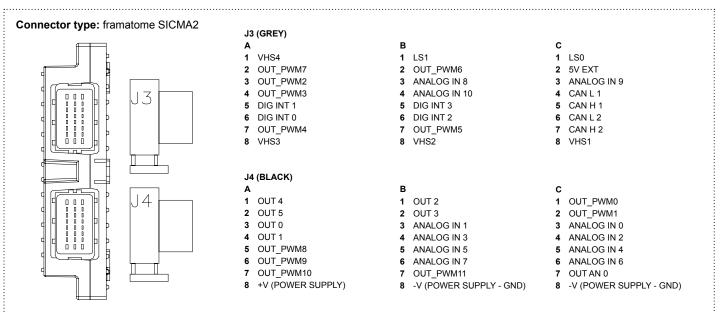
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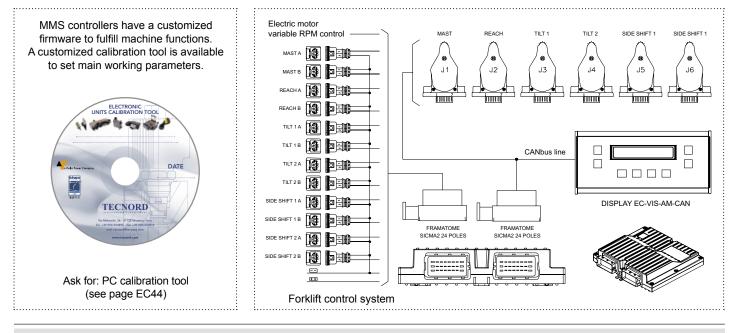
#### EC-MMS-1521-H MACHINE MANAGEMENT SYSTEM CONTROLLER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**

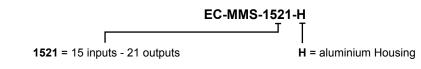


#### ADJUSTMENTS

#### **APPLICATION EXAMPLE**



#### **ORDERING INFORMATION**



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# **TECNORD**

#### EC-MMS-4820-H MACHINE MANAGEMENT SYSTEM

#### DESCRIPTION

MMS (Machine Management System) coding card with CANbus and RS485 interface and built-in advanced safety and fault-detection features for integrated control of mobile equipment functions.

#### OPERATION

The MMS-4820 can be lodged inside any remote control box or panel to make command signals compatible with CANbus networks or RS485 serial lines.

It can be used as a stand-alone controller for Tecnord's Multidrom MLT/FD5 CANbus-configured electro-hydraulic proportional actuators. It can be used as a remote coding card for RS485 serial line connection to other MMS electronic units like Tecnord's Mod. MMS-2218.

#### FEATURES

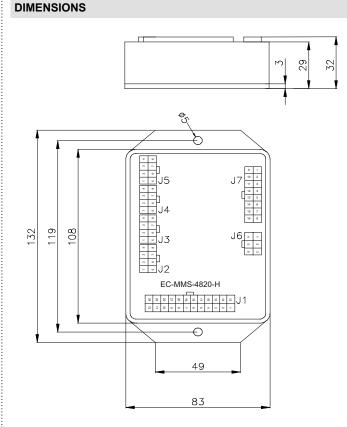
- · Power supply line is protected against reversed polarity and overvoltage.
- Inputs are protected against short circuits to GND and supply.
- · Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- · 2-wires CANbus or RS485 serial interface.
- · Performance level d capability according to ISO 13849, thanks to microprocessor redundancy.
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions).
- Auxiliary +5 V supply for control devices (e.g. potentiometers).

#### SPECIFICATIONS

Operating voltage:	8.5÷40 VDC
Max current consumption:	0.5 A (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 54
Input impedance:	100 kΩ
Analog inputs (10 bits):	16 (0-5 V)
Typical ctrl pot resistance:	1÷10 kΩ
Digital inputs:	32
High side power outputs:	4 (3.5 A max)
Max current load on all outputs:	5 A
High side signal outputs:	16 (0.7 A max)
Inputs for current feedback:	1
Current output range (PWM):	100÷1500 mA
PWM dither frequency:	60÷200 Hz (adjustable)

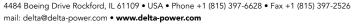
#### APPLICATIONS

- 12 VDC and 24 VDC systems.
- Control panel management.
- · Field-adjustable applications.
- Closed loop systems with electro-hydraulic digital actuators.
- Two or more MMS boards can be interconnected by means of 2-wires RS485 serial lines or CANbus where rotating joints or cable reels are installed.



WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.





# TECNORD

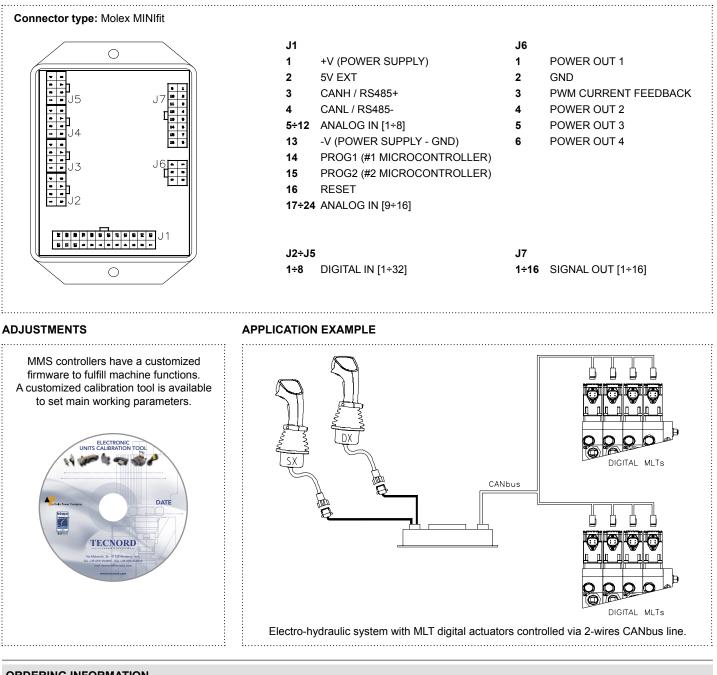
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#### EC-MMS-4820-H MACHINE MANAGEMENT SYSTEM

#### CIRCUIT BOARD PINOUT - WIRING DIAGRAM



#### ORDERING INFORMATION

EC-MMS-4820-H

**4820** = 48 inputs - 20 outputs

**H** = potted plastic Housing for panel mounting

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



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## **TECNORD**

#### EC-MMS-0713-H MACHINE MANAGEMENT SYSTEM

#### DESCRIPTION

MMS (Machine Management System) controller with built-in advanced driving and fault-detection features to be used as a stand-alone unit or in connection with other CANbus units (e.g. joysticks, MLTs, radio, other MMS).

#### OPERATION

EC-MMS-0713 can be used as a stand-alone controller for applications with a single PWM or dual proportional manifolds where the functions are operated in meter-in configuration. Its CANbus interface allows it to be used as a part of complex CAN networks e.g. equipped with radio systems. EC-MMS-0713 is provided with display and push-buttons to configure the control characteristics (Imin/Imax, ramps, deadbands, dither) of its PWM output channels.

#### FEATURES

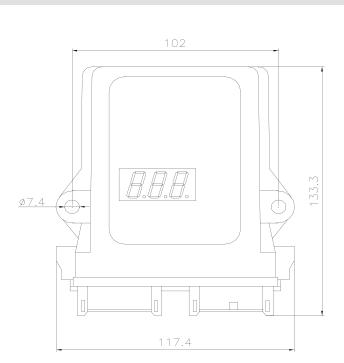
- · Power supply line is protected against reversed polarity and overvoltage.
- · Inputs are protected against short circuits to GND and supply.
- · Outputs are protected against short circuits, over-current and over-temperature.
- CANbus (CAN 2.0B) interface
- Internal measurement of battery voltage.
- The current in the proportional solenoids is independent of change in the coil resistance and supply voltage variations.
- · Especially designed for applications with manifolds in meter-in configuration (single or dual proportional).

#### SPECIFICATIONS

Operating voltage:	8.5÷32 VDC	
Max current consumption:	0.25 A (no load applied)	
Operating temperature:	-25°C / +85°C	
Degree of protection:	IP 65 (with housing)	
Analogue inputs:	1, 10-bits resolution	
Analogue input type:	0÷20 mA or 0÷5 V selectable by sw	
	(HW option 0÷10 V)	
Digital inputs:	6	
Input impedance:	100kΩ (internal pull-down)	
Max current load on all outputs: 10 A		
High Side power outputs:	13 (3.5A max each)	
	(HW option: 14-one digital input not available)	
Current output range (PWM):	3 A	
Available current feedbacks:	2 (on the high side)	
	(HW option: 4)	

#### **APPLICATIONS**

- 12 VDC and 24 VDC systems.
- · For hand held terminal cable/radio applications.
- Field adjustable applications.
- · Machine management systems based on CANbus.



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DIMENSIONS

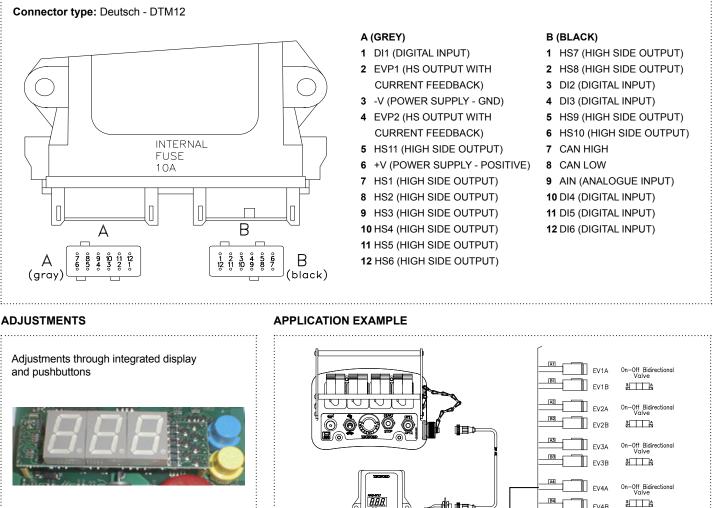
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#### EC-MMS-0713-H MACHINE MANAGEMENT SYSTEM

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



B4 T EV4B ۩∎⊇> P1 EVP 면 EV9 One MMS connected to a portable control unit through a CANbus line. Radio connection available. **ORDERING INFORMATION** 

EC-MMS-0713-H J

0713 = 7 inputs - 13 outputs

H = potted plastic Housing for panel mounting

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.



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Proportional Flow Regulator

ON-OFF type Venting Valve

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#### EC-MMS-6252-H MACHINE MANAGEMENT SYSTEM CONTROLLER

#### DESCRIPTION

MMS (Machine Management System) controller with built-in advanced safety and faultdetection features for integrated control of a high number of functions in mobile equipment applications.

#### **OPERATION**

It is normally used as the main control unit in a complete machine management system. Two microprocessors and advanced diagnostics for safety applications. CANbus communication. Serial connection for software download.

#### FEATURES

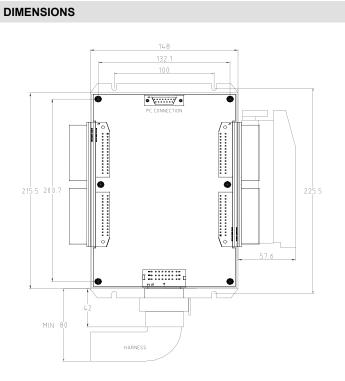
- ٠ Robust metal enclosure and complete potting.
- Power supply line is protected against reversed polarity and overvoltage. •
- Inputs are protected against short circuits to GND and supply.
- Outputs are protected against short circuits, reversed polarity, over-current and over-temperature.
- Dual microprocessor for advanced diagnostics capability. •
- Serial communication ports: CANbus, RS485, RS232. •
- Optional add-on inclinometer. •
- +5 V auxiliary power supply for external control devices.
- Performance level d capability according to ISO 13849, thanks to redundant microcontroller and embedded diagnostics. ٠
- Electro Magnetic Compatibility (EMC): EN 61000-6-2 (Immunity), EN 61000-6-3 (Emissions). •

#### SPECIFICATIONS

Operating voltage:	8.5÷32 VDC
Max current consumption:	400 mA (no load applied)
Operating temperature:	-25°C / +85°C
Degree of protection:	IP 67
Input impedance:	100 kΩ
Analog inputs (10 bits):	16 (0-5 V)
	6 (0-20 mA)
Typical ctrl pot resistance:	1÷10 kΩ
High side power outputs:	8 (5 A max)
	28 (3.5 A max)
High side signal outputs:	10 (0.7 A max)
Digital inputs:	40
Max current load on all outputs:	16 A
Inputs for current feedback:	4
Current output range (PWM):	100÷1600 mA
Analog voltage outputs:	6 (0-5 V)

#### **APPLICATIONS**

- 12 VDC and 24 VDC systems. •
- Main ECU for aerial platforms, cranes, telehandlers, agric. machines.
- Field-adjustable applications.
- Two or more MMS boards can be interconnected by means of 2-wires RS485 serial lines or CANbus.



#### Stainless steel enclosure completely potted.

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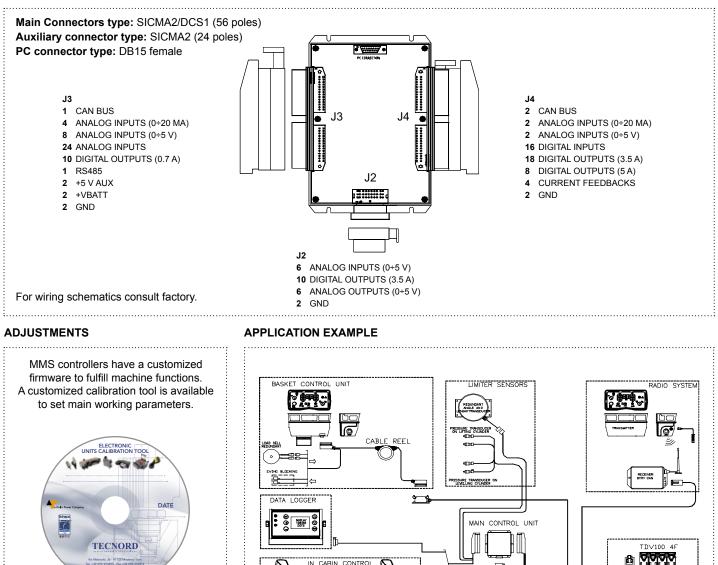
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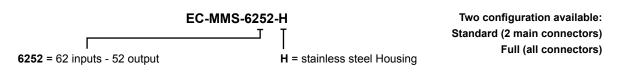
#### EC-MMS-6252-H MACHINE MANAGEMENT SYSTEM CONTROLLER

#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



Ask for: PC calibration tool (see page EC44)

**ORDERING INFORMATION** 



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HARNESS TO MANIFOLD 

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#### **GRAPHIC DISPLAY UNITS**

MODEL	DESCRIPTION	PAGE
EC-VIS-G-D128X64-P	Graphic color display 128x64	EC34
EC-VIS-G-D128x64-M-C	Graphic display 128x64 dots (192 kB eeprom)	
EC-VIS-GC-P480x272-S	Graphic color display 480x272 pixels (64 kB eeprom)	EC38

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#### EC-VIS-G-D128X64-P GRAPHIC DISPLAY UNIT

#### DESCRIPTION

Graphic Display Unit to be used as operator's interface in complex Machine Management Systems.

#### FEATURES

- · Compact control unit to be fixed inside a cabin.
- Robust suction cup on the rear.
- CANbus connection.
- Graphic display 128 x 64 dots backlighted.

#### **MECHANICAL / ENVIRONMENTAL SPECIFICATIONS**

Dimensions:	131 x 100.5 x 20.8 mm
Housing:	Plastic body
	Membrane keypad
Operating temperature:	-25 / 85°C
Degree of protection:	IP 67
Connector:	Molex Minifit 20 poles

#### **ELECTRICAL SPECIFICATIONS**

#### Display

graphic
128 x 64 dot-matrix
50 x 25 mm
led
white
40°

#### ELECTRONIC CONTROL UNIT

Operating voltage:	8.5÷30 VDC
Communication interfaces:	CANbus
	SAE J1939
Analog inputs (10 bits):	4 (0-5 V)
Digital inputs:	5
High side power outputs:	4 (3.5 A max each)
Internal inputs:	
for current feedback:	4
PWM output current range:	100 - 1500 mA
Membrane keypad with:	
Pushbuttons:	9
SMD leds:	9
Control potentiometer on the top:	1

#### **APPLICATIONS**

- 12 VDC and 24 VDC systems.
- Service/Maintenance Tool.
- Diagnostic/Configuration unit for Hedgecutters.
- In-cab terminal.

WARNING: the specifications/application data shown in our catalogs and data sheets are intended only as a general guide for the product described (herein). Any specific application should not be undertaken without independent study, evaluation, and testing for suitability.

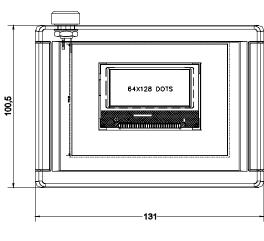
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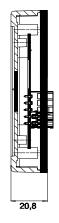


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#### DIMENSIONS





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#### EC-VIS-G-D128X64-P GRAPHIC DISPLAY UNIT

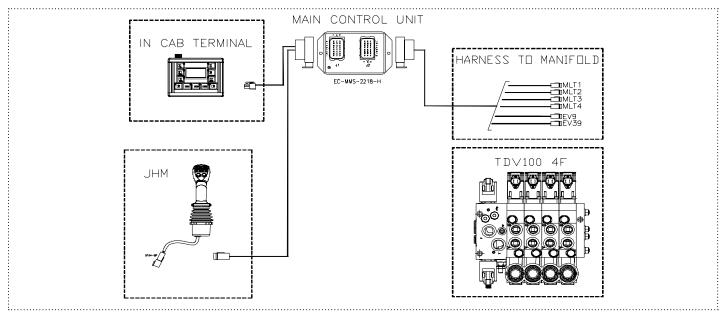
#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**

#### Connector type: Molex Minifit

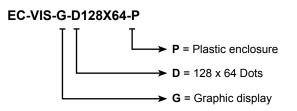
1	-V (POWER - GND)	11	+V (POWER)
2	CAN H	12	CAN L
3	ANALOG IN 2	13	ANALOG IN 3
4	ANALOG IN 0	14	ANALOG IN 1
5	DIGITAL IN 2	15	DIGITAL IN 3
6	DIGITAL IN 0	16	DIGITAL IN 1
7	DIGITAL IN 4	17	OUT P0
8	OUT P1	18	OUT P2
9	N.C.	19	OUT P3
10	N.C.	20	+5 V EXT



#### **APPLICATION EXAMPLE**



#### **ORDERING INFORMATION**



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### EC-VIS-G-D128X64-M-C GRAPHIC DISPLAY UNIT

#### DESCRIPTION

Graphic display unit to be used as operator's interface in complex Machine Management Systems.

#### FEATURES

- RS-232 serial interface.
- 1 CANbus connection.
- Graphic display 128 x 64 dots backlighted.
- Real time clock with calendar.
- Wide data storage memory.

#### **MECHANICAL / ENVIRONMENTAL SPECIFICATIONS**

Dimensions:	174 x 108 x 31 mm
Housing:	Metal body
	Polycarbonate cover
Operating temperature:	-25°C / 85°C
Degree of protection:	IP 67
Connector:	SICMA2, 24 pin

#### **ELECTRICAL SPECIFICATIONS**

#### Display

Display		
Type and size:	graphic	
Resolution:	128 x 64 dot-matrix	
Viewing area:	62 x 44 mm	
Brightness:	8 cd/m <sup>2</sup>	
Contrast:	8:1	
Viewing angle range:	40°	

#### **ELECTRONIC CONTROL UNIT**

Operating voltage:	8.5÷30 VDC
Communication interfaces:	CANbus ISO11898
	RS 232
Analog inputs (10 bits):	8 (0-5 V)
Digital inputs:	1
High side power outputs:	4 (3.5 A max each)
Inputs for current feedback:	2
PWM output current range:	100-1500 mA
Non volatile memory:	192 kB
Backlighted pushbuttons:	standard 6 (max 9)
High efficiency leds:	standard 3 (max 4)

#### **APPLICATIONS**

- 12 VDC and 24 VDC systems.
- Load limiter and/or area control systems.
- In-cab terminal.
- Data logger.

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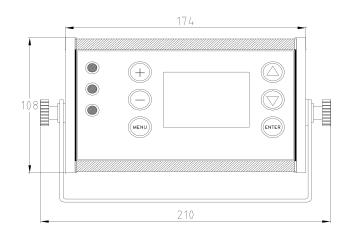
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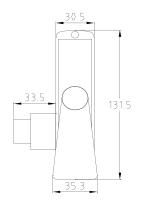


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### DIMENSIONS





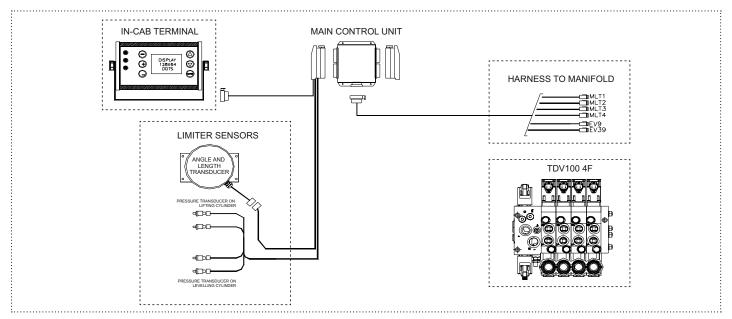


#### EC-VIS-G-D128X64-M-C GRAPHIC DISPLAY UNIT

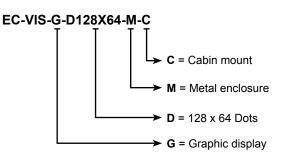
#### **CIRCUIT BOARD PINOUT - WIRING DIAGRAM**



#### APPLICATION EXAMPLE



#### **ORDERING INFORMATION**



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#### ACCESSORIES

MODEL	DESCRIPTION	PAGE
Control unit connection	Connector kits	EC40
Control unit calibration tool	Software calibration too linking cables	EC42
Cables	Linking Cables	EC43

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### CONNECTOR KITS

### 6 POLES DEUTSCH DT04-6P

Kit includes: female connector, male contacts, secondary lock and fillers Available for electronic control unit: EC-MMS-1012-H

**ORDERING CODE: 13.0310.386** 

### 8 POLES DEUTSCH DT06-8S

Kit includes: male connector, female contacts, secondary lock and fillers Available for electronic control unit: EC-PWM-A2-MPC1-H

ORDERING CODE: 13.0310.432

#### 12 POLES "DEUTSCH DTM06-12SA & DTM06-12SB"

Kit includes: male connector, female contacts, secondary lock and fillers Available for electronic control unit: EC-MMS-0713-H

**ORDERING CODE: 13.0310.253** 



### **26 POLES AMP SUPERSEAL**

Kit includes: male connector, female contacts Available for electronic control unit: EC-VIS-GC-P480x272-S

**ORDERING CODE: 13.0310.635** 



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#### CONNECTOR KITS

#### 24 POLES SICMA BLACK COLOR

Kit includes: male connector, female contacts, locking cum, fillers Available for electronic control unit: EC-PWM-P4-MPC2-H; EC-PWM-P8-MPC4-H; EC-PWM-08-MPC4-H; EC-MMS-1012-H; EC-MMS-2218-H; EC-MMS-1521-H

#### **ORDERING CODE: 13.0310.150**

#### 24 POLES SICMA GREY COLOR

Kit includes: male connector, female contacts, locking cum, fillers Available for electronic control unit: EC-MMS-1521-H

#### **ORDERING CODE: 13.0310.634**

#### 24 POLES SICMA BLACK COLOR WITH WIRES 0.8 M LENGTH

Kit includes: male connector, female contacts, locking cum and wires 0.8 m length Available for electronic control unit: EC-PWM-P4-MPC2-H; EC-PWM-P8-MPC4-H; EC-PWM-08-MPC4-H, EC-MMS-1012-H; EC-MMS-2218-H; EC-MMS-1521-H

#### **ORDERING CODE: 13.0310.236**

#### **56 POLES SICMA**

Kit includes: male connector, female contacts, locking cum, cover and fillers Available for electronic control unit: EC-MMS-6252-H

#### **ORDERING CODE: 13.0310.324**

#### **56 POLES SICMA WITH WIRES 0.8 M LENGTH**

Kit includes: male connector, female contacts, locking cum, cover and fillers Available for electronic control unit: EC-MMS-6252-H

#### **ORDERING CODE: 13.0310.868**

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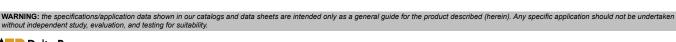












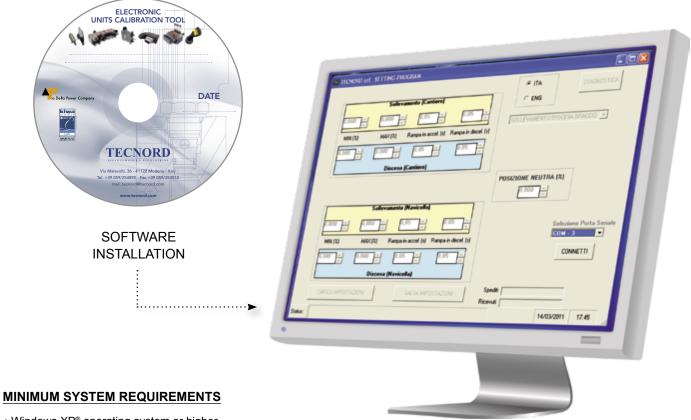




#### **CALIBRATION TOOL**

#### TECNORD SOFTWARE ELECTRONIC UNITS CALIBRATION TOOL

Tecnord electronic control units are supplied with operation parameters standard programming, which satisfies most applications. For special application SCT calibration software allows some of the parameters for proportional solenoid valve control to be modified via computer; for example the minimum and maximum current or ramp up and ramp down parameters may be defined. The linking cable shown in the following page (optional, to be ordered separately) is necessary for the computer connection.



- Windows XP® operating system or higher.
- Intel<sup>®</sup> Pentium processor.
- 32 Mb RAM.
- · CD player unit.
- Connecting through a standard RS232 serial port, DB9 connection; alternatively, a USB-RS232 converter can be used.

#### **PROGRAM INSTALLATION**

To install the SCT software onto a personal computer, simply execute the file setup.exe.

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### LINKING CABLES

### AMPSEAL-DB9 CABLE ADAPTER (with software calibration tool)

Available for electronic control unit: EC-PWM-P4; EC-PWM-P8; EC-MMS-1012-H

ORDERING CODE: 20.1001.026/A

DEUTSCH-DB9 LINKING CABLE (with customized software calibration tool)

Available for electronic control unit: EC-MMS-2218-H

**ORDERING CODE: 21.0801.031** 

DB15-DB9 LINKING CABLE (with software calibration tool)

Available for electronic control unit: EC-MMS-6252-H

**ORDERING CODE: 21.0801.053** 



It allows Tecnord electronic control units to personal computer connection when the latter is unprovided of serial port; for installation follow the instruction enclosed with the converter

## **ORDERING CODE: 21.0801.039**



## **CAN - USB CONVERTER**

It allows Tecnord CAN joysticks to Personal Computer connection with a USB port; for installation follow the instruction enclosed with the interface device

### **ORDERING CODE: 21.0801.040**



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