

Integrated module with analog- and galvanically separated digital input and CAN bus interface for control applications

Features

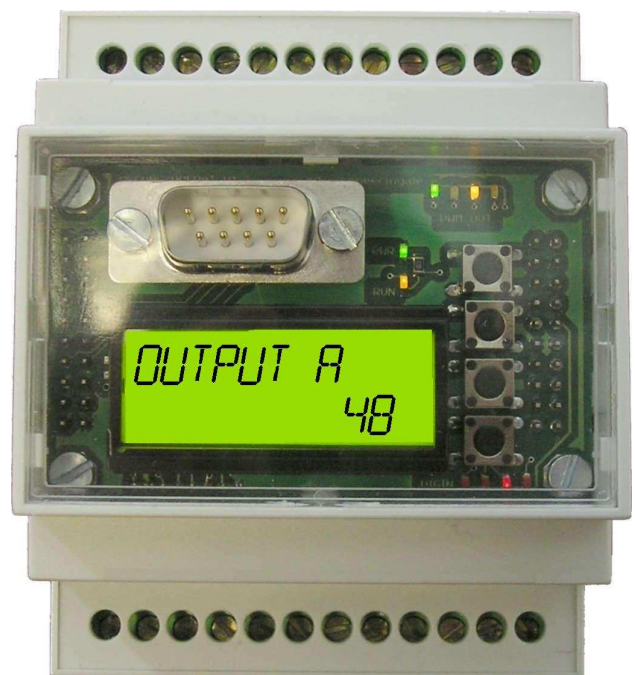
- power supply 10-30 V
- 8 galvanically separated digital inputs 10-30 V
 - 2 frequency / duty cycle inputs
- 7 analog inputs 0-10 V
 - 4 voltage/current/resistor (multiplexed)
 - 3 voltage (0-10V) or 3 current (0-25mA)
- 8 V supply output for analog inputs
- CAN bus interface
 - secure MDCAN realtime protocol
 - MDFUNC series compatible
 - MDCAN series compatible
 - NAVIO series compatible
- configurable on-chip software
 - MDFUNC_{Out} input vs. output matrix
 - select an input out of more than 30 sources for each output channel or link function
 - several automatic control functions (P/PID/RPM)
 - latch function
 - triple station control
 - logic functions
 - transfer function (input vs. output)
 - RS232 interface or USB interface
 - configuration and monitoring with LC display
 - comfort configuration and monitoring with free PC-Tool
 - MDFUNC-I/O Tool
 - easy to use
 - more possibilities, more functions
 - firmware upgrades
- status indication by LEDs
- safety feature for AIN/CANbus cable break
- mountable on 35 mm DIN-rail
- max. cable diameter for connectors: 1.5mm² with ferrule

Applications

Galvanically separated input module for mobile and marine applications, valve controls, engine controls, control systems, input/output CAN bus node

- speed request for marine or industrial engines
 - suitable for Steyr/Deutz/Caterpillar etc.
- together with MDFUNC-PWM3 modules suitable for propulsion systems
 - hydraulic propulsion systems
 - RPM control
 - mechanical clutches with soft shifting
 - mechanical clutches with trolling function
 - RPM control
 - emergency controls
- voltage measurement
- current measurement
- resistor measurement (passive sensor)
 - pressure measurement
 - temperature measurement

MD engineering GmbH can help to choose the right components and implement your application.



Description

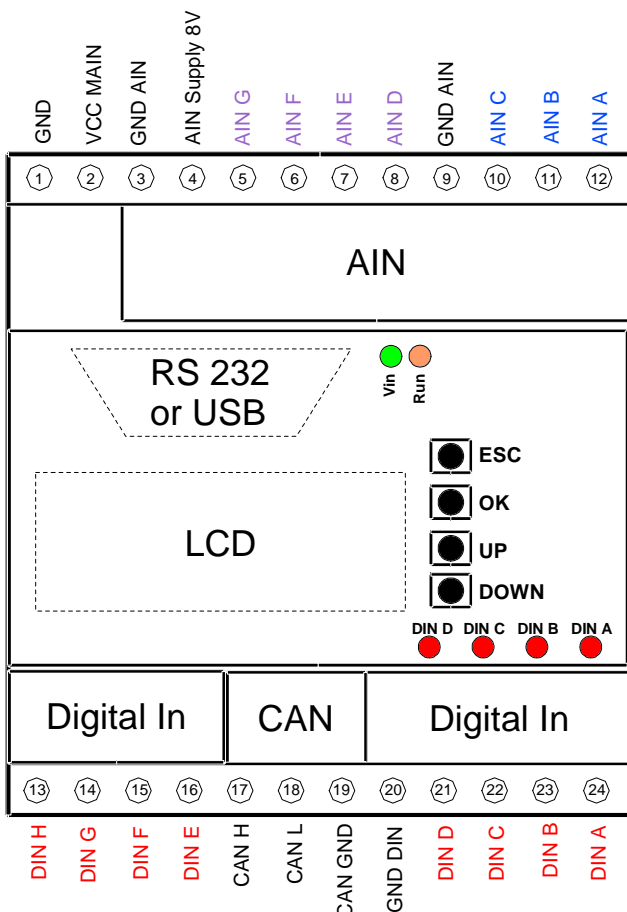
The MDFUNC-ADIN unit is a pre-programmed and easy to use input module for voltage, current or resistor measurement.

Seven analog, eight digital inputs and a CAN-interface are available. Two of the digital inputs can also be used for frequency measurement (i.e. read engine revolutions) or to measure the duty cycle.

The ADIN uses the new *MDFUNCout*-engine, which offers more powerful possibilities for creating your control application. Functions like multiple station control, network control or positioning control are pre-programmed and easily accessible.

The onboard LC-display has multiple language support (English, German, Dutch - others are possible), offers monitoring functions and the possibility to change module parameters. For configuring the module more comfortable, the new PC-Tool *MDFunc-I/O* is available at the support site. A PC can be connected via RS232 serial port or via USB (hardware option).

Connection diagram



Connector description

supply

1	GND	main system ground
2	V _{CC} MAIN	main system supply

inputs

digital inputs		
13,14,15,16	DIN E/F/G/H	digital inputs
24,23,22,21	DIN A/B/C/D	digital inputs
20	GND DIN	digital ground, reference potential
analog inputs		
12,11,10	AIN A/B/C	analog inputs (voltage)
8,7,6,5	AIN D/E/F/G	analog inputs (voltage/current/resistor)
CAN-Bus		
17,18	CANH/CANL	CAN bus connectors
19	CAN GND	CAN bus ground

outputs

4	AIN Supply 8V	supply for passive analog devices: e.g. joysticks, potentiometers etc.
3,9	GND AIN	analog ground

Button description

- UP/DOWN switch through current menu / in/decrease a value
- OK jump in submenu / select value for edit / accept edited value
- ESC jump out of submenu / cancel value edit

Software assignments

- Output A free, calculation channel
- Output B free, calculation channel
- Output C free, calculation channel
- Output D free, calculation channel
- Output E free, calculation channel

Electrical Characteristics

($T_{env} = 25^{\circ}\text{C}$)

Power supply

Symbol	Parameter	min	typ.	max.	abs max.	Unit
V_{in}	system power supply voltage DC	10	12/24	30	32	V
$I_{in} @ 12\text{ V}$	system current (with LCD)		180			mA
$I_{in} @ 24\text{ V}$	system current (with LCD)		90			mA
T_{env}	environment temperature	-10	25	50	60	$^{\circ}\text{C}$

Digital Inputs A/B/C/D/E/F/G/H

- inputs galvanically separated
- frequency measurement on DIN A/B
- duty cycle measurement on DIN A/B

Symbol	Parameter	min	typ.	max.	abs max.	Unit
$V_{DIN,H}$	voltage for high level	3.5	12/24	28	32	V
$V_{DIN,L}$	voltage for low level	-0.5	0	2.5	-	V
$t_{S,DIN}$	turn on/off time (sample time)	-	1	3	-	ms
$I_{DIN} @ 24\text{ V}$	current per channel	1.0 ¹	11.0 ²	12	-	mA

¹ @ $V_{DIN} = 3.5\text{ V}$

² optocoupler: 5.5 mA, LED: 5.5 mA

Analog Inputs A/B/C

- averaged values
- overvoltage protected input

Symbol	Parameter	min	typ.	max.	abs max.	Unit
V_{AIN}	analog input voltage	0	-	10	11	V
R_{AIN}	input impedance	50 ⁴	94	110	-	k Ω
f_{Sample}	internal register update frequency	-	400	-	-	Hz

⁴ input impedance decreases, when V_{AIN} is higher than 11.2 V

Analog Inputs D/E/F/G (multiplexed)

Voltage measurement

Symbol	Parameter	min	typ.	max.	abs max.	Unit
V_{AIN}	analog input voltage	0	-	10	11	V
R_{AIN}	input impedance	50 ⁴	94	110	-	k Ω
f_{Sample}	internal register update frequency	-	100	-	-	Hz

⁴ input impedance decreases, when V_{AIN} is higher than 11.2 V

Current measurement

Symbol	Parameter	min	typ.	max.	abs max.	Unit
V_{AIN}	analog input voltage	0	-	10	11	V
A_{AIN}		0	-	25	30	mA
R_{AIN}	input impedance	50 ⁴	94	110	-	kΩ
f_{Sample}	internal register update frequency	-	100	-	-	Hz

⁴ input impedance decreases, when V_{AIN} is higher than 11.2 V

Resistor measurement

Symbol	Parameter	min	typ.	max.	abs max.	Unit
V_{AIN}	analog input voltage	0	-	10	11	V
R_{AIN}	input impedance	50 ⁴	94	110	-	kΩ
f_{Sample}	internal register update frequency	-	100	-	-	Hz

⁴ input impedance decreases, when V_{AIN} is higher than 11.2 V

CAN bus interface

- galvanically separated
- connectors with CANH, CANL and CANGnd
- max. bus length: 40 m..1000 m
- selectable CAN bus speed: 50, 125, 250, 500, 1000 kBit/s
- blinking RUN-LED and blinking antenna symbol on LCD, when bus OK
- 3 free 16 bit inputs (MDCAN protocol)
- 3 free 8 bit inputs (MDCAN protocol)
- MDCAN protocol output (10 Hz):
 - analog inputs A/B/C/D/E/F/G
 - digital inputs (A/B/C/D/E/F/G/H)
 - frequency input (DINA/DINB)
 - latch status results (A/B/C/D/E)
 - output channels (A/B/C/D/E)

AIN supply output

- $V_{sup,AIN} = 8\text{ V}$
- $I_{sup,AIN,max} = 90\text{ mA}$
- output not galvanically separated

RS232 connection

- not galvanically separated
ATTENTION when using PC with grounded outlet power supply GND_{PC} must have the same potential as GND_{PWM3} . If the difference is more than 100 mV you can damage the ADIN and your PC. Best use a laptop powered by battery.
- SUB-D 9 pin male connector on board
- connect common zero modem cable to port (also possible with "USB/RS232" adapter)
- data connection: 57600,8,N,1

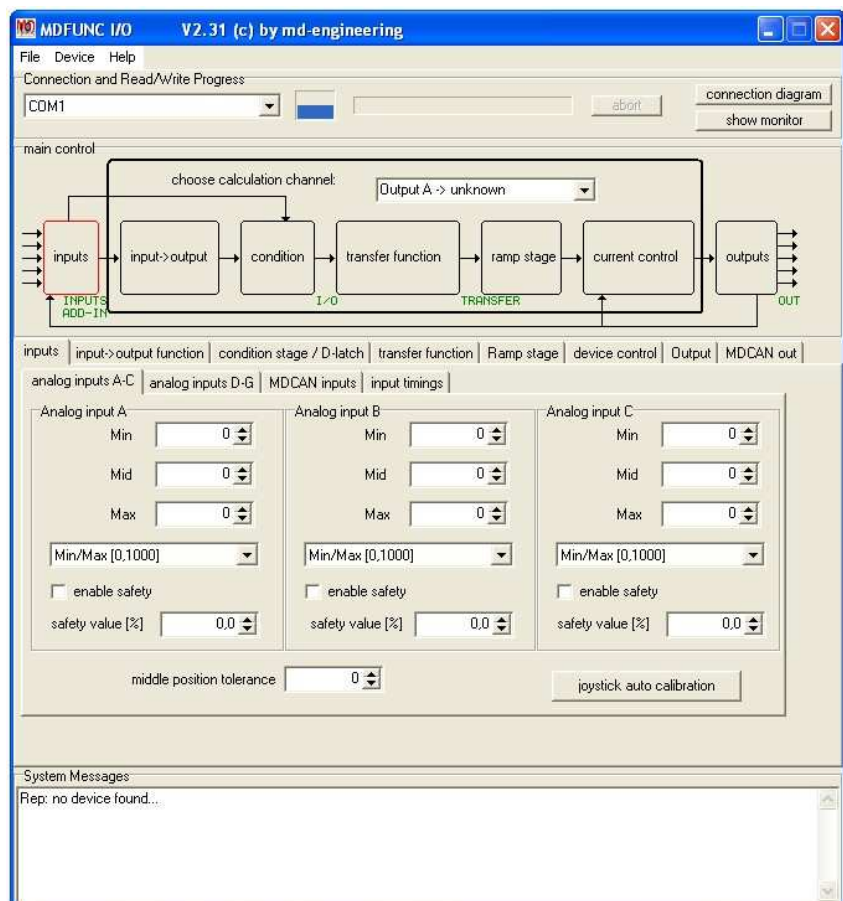
USB connection

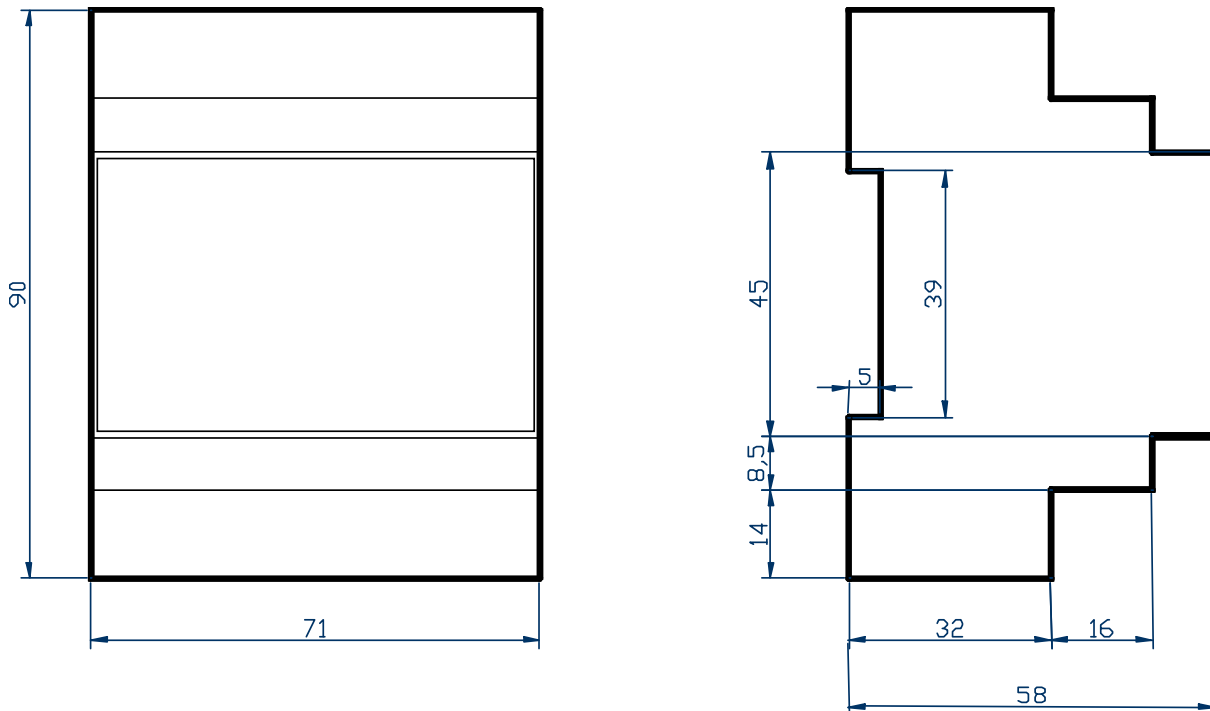
- not galvanically separated
ATTENTION when using PC with grounded outlet power supply GND_{PC} must have the same potential as GND_{PWM3} . If the difference is more than 100 mV you can damage the ADIN and your PC. Best use a laptop powered by battery.
- Mini-USB connector 5 pin on board
- USB 1.1 standard
- connect ADIN with common Mini-USB cable to your PC

- on board USB/RS232 adapter, device will appear as COM-port on your PC
- RS232 data connection: 57600,8,N,1
- driver for free download

Setup Program: MDFUNC-I/O Tool Version 2.3

- more possibilities, better overview
- easy user interface
- free input-output combinations
- inputs from local analog inputs, digital inputs, can inputs or system outputs for feedback
- boolean operations, latch function
- CAN bus inputs/outputs
- output transfer function
- monitor functions
- load/save settings from/to file
- special functions: automatic control, multiple station control
- Requirements:
 - Win2000/XP
 - CPU with 600 MHz or higher
 - COM port or USB port



Package dimensions (in mm)**Order codes**

ADIN with 3 current inputs and RS232 connector
MDFUNC-ADINc-RS232-LCD

ADIN with 3 voltage inputs and RS232 connector
MDFUNC-ADINu-RS232-LCD

ADIN with USB-connector
MDFUNC-ADINc-USB-LCD

ADIN with USB-connector
MDFUNC-ADINu-USB-LCD

RS232-PC connection cable
MDCABLE-RS232-ZERO

USB-PC connection cable
MDCABLE-MiniUSB

Please ask for our "low cost solutions" (e.g. not galvanically separated or no LCD), or special device programming.

Support

Get datasheets, drivers, firmware, software and examples from:

<http://www.md-engineering.de/produkte/mdfunc/main.html>