



## Mobile Automation

Products and Services

We automate your success.

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## Mobile Automation

Experience | Know-how | Made in Germany

For decades, the name Jetter AG has stood for highest demands on automation solutions that are used in a wide range of industrial and mobile automation sectors.

Products and components by Jetter AG stand out thanks to their high degree of system integrity and diversity. Our in-house R&D departments (hardware and software), as well as our production plants in Germany allow us to always act in a quick and flexible manner. This, combined with a comprehensive range of Professional Services, enables us to put almost any customer request into practice.

In Industrial Automation Jetter AG is focusing on selected industries. Highly customized solutions contributing to decisive advantages in our customers' business environment put them into a position to produce state-of-the-art machines and plants.

In Mobile Automation Jetter AG develops and manufactures highly complex and robust automation concepts for controlling a wide variety of functions in municipal, fire-fighting, and agricultural vehicles. Thus, permanent availability of vehicles and implements is ensured.

Radical changes in industry caused by Industrie 4.0 and Internet of Things demand for future-proof solutions. Jetter AG is able to provide you with well-proven and safe systems, and to actively support you in implementing all process steps.

The product and networking philosophy of Jetter AG has always been based on the seamless integration of all automation components into production processes, such as end-of-line programming of vehicles. Jetter AG was the first company in the world to rely on consistent networking with Ethernet TCP/IP and on using common Internet protocols. A great number of systems that already now meet all essential criteria of future demands on production processes has been applied for many years by renowned customers with great success.

The Jetter AG mission statement:

Jetter AG is a leading provider of automation systems. Understanding your application helps us find the perfect solution in terms of functionality, sustainability and efficiency.

## HMIs

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Jetter AG provide numerous HMIs for a wide range of requirements and applications. These devices especially distinguish themselves by their diversity of individualization options, as well as by their large number of interfaces.



# JetViewMobile 104

## Product brief

With its compact design and rugged enclosure the JVM-104 is an ideal HMI for any application of mobile machinery.

It is equipped with a powerful controller which can be expanded by additional I/O connections, as well as by one Ethernet and one USB port. This device saves you an extra controller for many applications.

The HMI is operated via eight backlit keys, and a digipot with pushbutton.

The built-in light sensor perfectly adapts the illumination of the display to the brightness of the surroundings.



## Product features

- Display with built-in controller  
32 bits/500 MHz
- Flexible expandability
- High connectivity
- Customizable
- Available either as a flush mount or as surface mount model

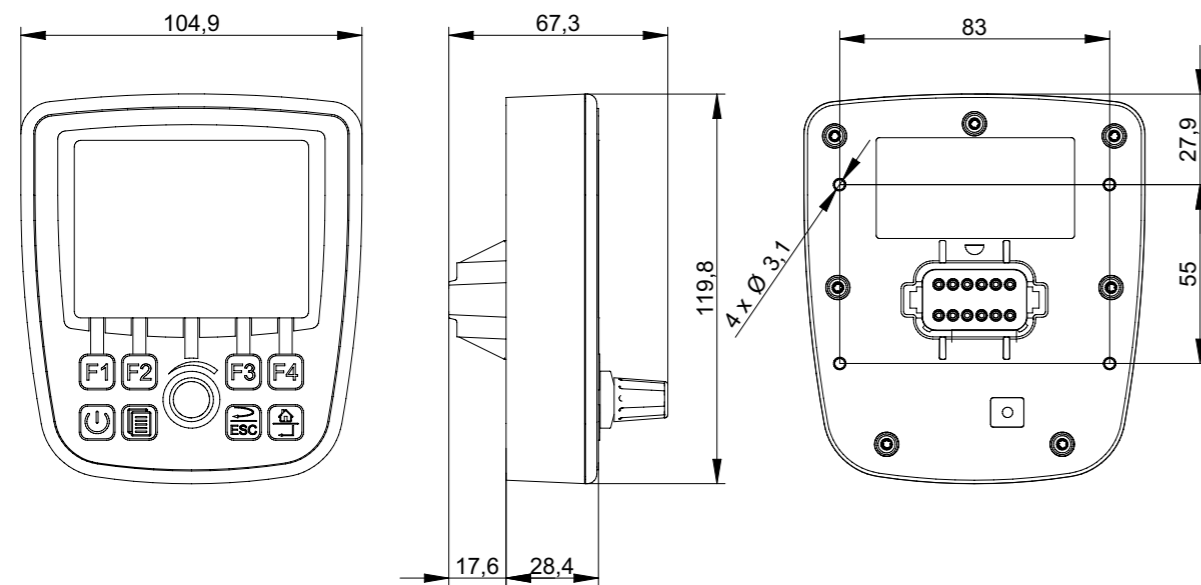
JVM-104	
Display	3.5" TFT with LED backlight
Display resolution and brightness	320 x 240 pixels (QVGA); 350 cd/m <sup>2</sup> (dimnable)
CPU	iMX 35, 32 Bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Programming	Graphics: JetViewSoft - Logics: IEC61131-3 STX
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-20 ... +65 °C/-30 ... +85 °C
Ports and interfaces	
▪ CAN	1 (2) CANopen®, SAE J1939, ISOBUS 11783 (option: 2 interfaces)
▪ USB	1 (option)
▪ Ethernet	1 (option)
▪ RS232	1 (option)
Control elements	8 Membrane pushbuttons, backlit (customer-specific membrane on request)
	1 Digipot - pushbutton function (option)
	1 Touch display (option)
Acoustic signaling	1 Buzzer 83 dB/10 cm/2670 Hz
Max. number of inputs/outputs	6 (option: enclosure with Deutsch-DT connectors)
▪ Inputs (option)	
Analog	2 0 ... 15 V/0 ... 20 mA, can be configured individually Resolution: 12 bits, input impedance: 50 kΩ, load resistor: 120 Ω Alternative usage: ▪ Digital input active-high, input impedance 50 kΩ ▪ Frequency input 0.1 ... 10 kHz, period > 1 μs, input impedance 20 kΩ ▪ Counting input 0.1 Hz - 10 kHz, counting range 32 bits
▪ Outputs (option)	
H-bridge	2 2.5 A; peak current 5 A (500 ms) Alternative usage: ▪ 4x PWM 2.5 A; 100 Hz ... 1 kHz, diagnostics capability ▪ 4x digital output 2.5 A, high-side, diagnostics capability ▪ 4x digital input active-high, NAMUR support, 8.2V at 1 kΩ pull-up
Max. permitted total current	12 A fully equipped with I/Os
RTC	(optional, replaceable battery)
Degree of protection	IP65 front/IP65 rear with rear-side Ethernet/USB port: IP20
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetViewMobile 104

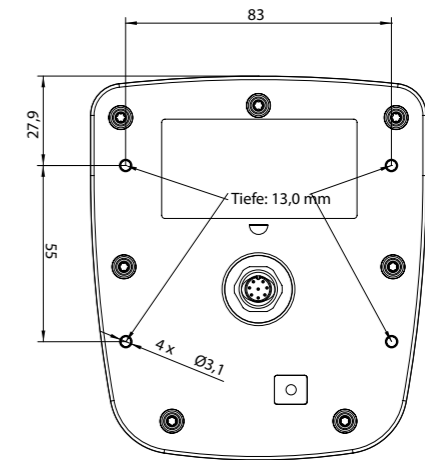
## Dimensional drawing

### Surface mount model

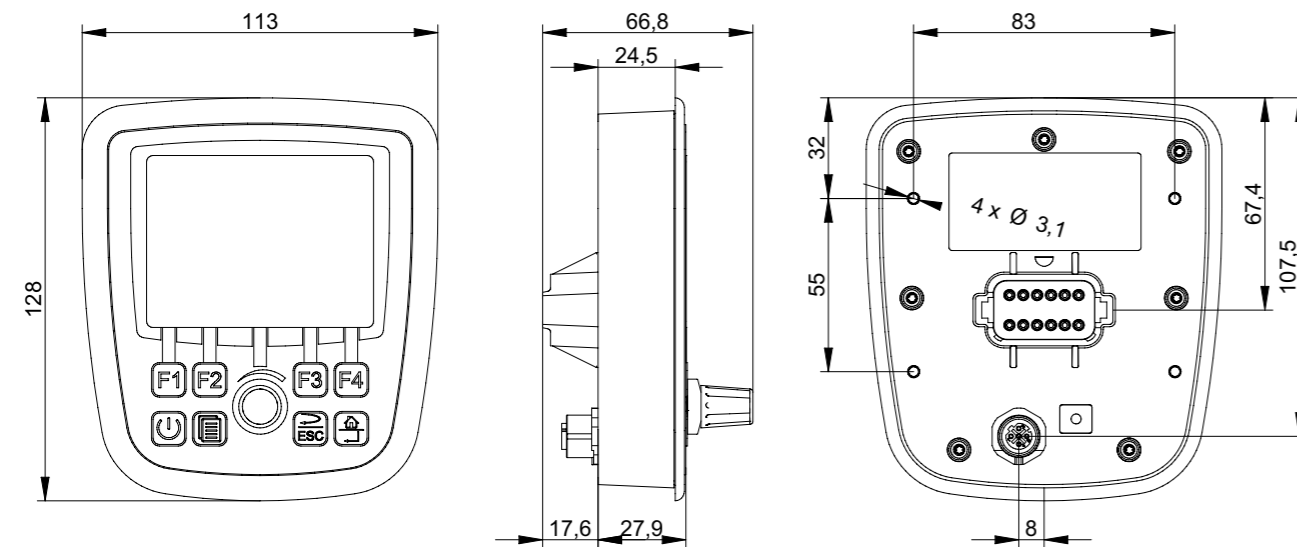


## Connector pinout

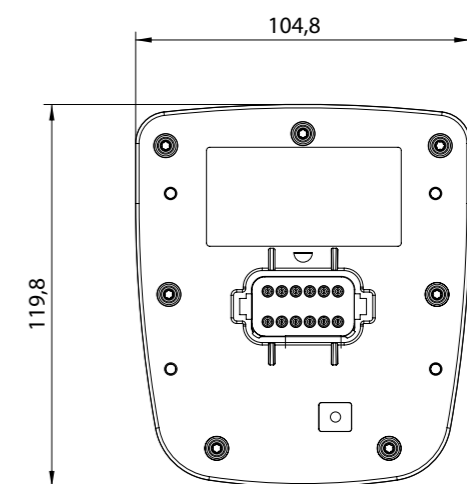
JVM-104	
Model with M12 screw type connector	
Power supply - Logic unit - 2 A	1
n.c.	2
Power supply ON	3
n.c.	4
CAN1-L	5
Ground	6
CAN1_H	7
n.c.	8



### Flush mount model



JVM-104	
Model with Deutsch connector for power outputs	
Ground	1
Output 1	2
Output 2	3
Output 3	4
Output 4	5
Power supply - Logic unit - 2 A	6
Supply for power outputs 10 A	7
Power supply ON	8
CAN1_L	9
CAN1_H	10
Analog input 1	11
Analog input 2	12

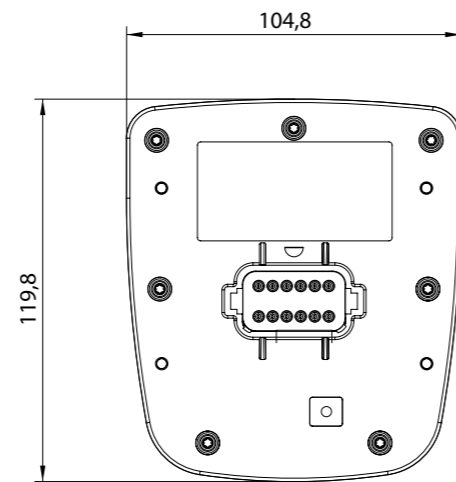


# JetViewMobile 104

## JVM-104 - Model with Deutsch connector with power outputs / 2 CAN ports

Ground	1
CAN2_L	2
CAN2_H	3
Output 3	4
Output 4	5
Power supply - Logic unit - 2 A	6
Supply for power outputs 10 A	7
Power supply ON	8
CAN1_L	9
CAN1_H	10
Analog input 1	11
Analog input 2	12

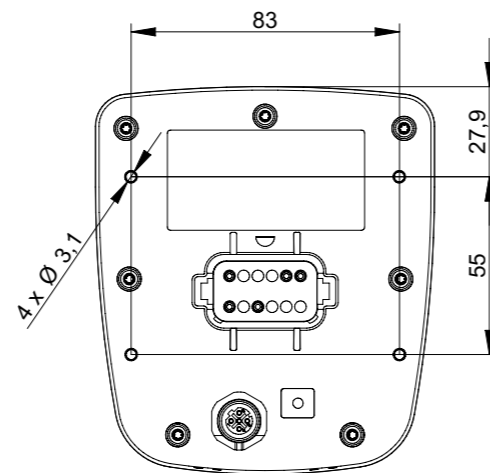
Ethernet RJ45 and USB host interface USB2.0



## JVM-104 Model with Deutsch connector and COM module

Ground	1
USB+	2
USB DP	3
USB DM	4
USB-	5
Power supply	6
RS232 Tx D	7
RS232 Rx D	8
CAN1_L	9
CAN1_H	10
CAN2_L	11
CAN2_H	12

Ethernet M12x1 (available only for flush-mount devices)



## Accessories

Dash mounts by RAM Mount



# JXM-HMI

## Product brief

The JXM-HMI is a universal HMI with three robust push encoders. It is therefore ideally suited for a wide range of dosing and control applications in self-propelled machines.

Thanks to its compact design, it can be flexibly mounted in the driver's cab either individually or, for example, in combination with a JetViewMobile 104. CANopen® ensures compatibility with the overall vehicle architecture and communication with the rest of the electronics. The comprehensive functions of the push encoders leave nothing to be desired in terms of adaptation to the application: Bidirectional rotation and a push button enable, for example, precise dosing of products to be applied. Instead of the push encoders, customer-specific adaptation with illuminated membrane keys (up to 16 keys) is possible.

The integrated LEDs ensure that the functions of the individual push encoders are clearly visible at all times thanks to the respective symbols. The LEDs can also be dimmed for individual adaptation to the periphery or lighting conditions at day and night. This ensures excellent user-friendliness.



## Product features

- 1 CANopen® interface for seamless integration into the vehicle architecture
- 3 push encoders with bidirectional rotary function and push button for precise dosing and control tasks
- Dimmable LED backlight for adaptation to different daylight and lighting conditions
- Highest application flexibility due to compact design: Can be installed individually or in combination with a JVM-104 HMI

JXM-HMI	
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-30 ... +85 °C
CAN ports	1 CANopen®, terminating resistor integrated
Number of push encoders	3
Push encoder property	
Features	Bidirectional rotation and push button
Illumination	Dimmable LEDs (symbols)
Degree of protection	IP42
Vibration	ISO 16750-3
Shock	ISO 16750-3
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Connector pinout

JXM-HMI	
Male connector Deutsch DT06-08SA, 8-pin	
CAN_L	1
CAN_H	2
Ground	3
Power supply	4
Power supply	5
Ground	6
CAN_H	7
CAN_L	8



# JetViewMobile 407B

## Product brief

With its elegant and high-quality design, the JVM-407B HMI is a standout product and can be supplied both as flush mount or surface mount model.

To the left and right of the 7" display are 10 LEDs with typical automotive warning and indicator lights which can be directly controlled independently of the electronics. This allows the JVM-407B to be used as an instrument cluster.

The integrated controller of the HMI is equipped with multi-purpose interfaces and can therefore be used as a powerful master controller for medium-size systems. A video input allows for integrating a rear view camera.

The HMI is operated via four high-value backlit keys, as well as a push encoder, i.e. a digipot used as pushbutton. The acoustic signaling device produces an alarm loud enough to be heard even in noisy surroundings. A USB port at the front side allows for simple data interchange in the field.



## Product features

- Display with built-in controller  
32 bits/500 MHz
- 3 CAN ports, Ethernet, SD card and front-side USB port
- Video input
- Integrated automotive LEDs
- Elegant and high-value design
- Available either as a flush mount or as surface mount model

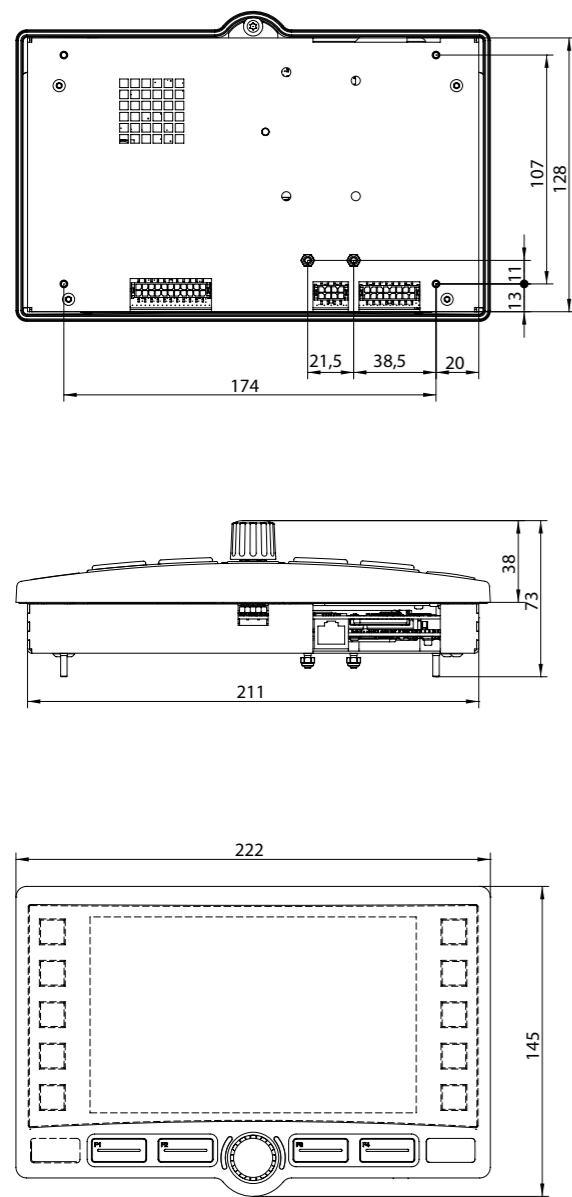
JVM-407B	
Display	7" TFT with LED backlight
Display resolution and brightness	800 x 480 pixels (WVGA); 300 cd/m <sup>2</sup> (dimnable)
CPU	iMX 35, 32 Bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Programming	Graphics: JetViewSoft - Logics: IEC61131-3 STX
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-20 ... +65 °C/-30 ... +85 °C
Ports and interfaces	
▪ CAN	3 CANopen®, SAE J1939, ISOBUS 11783
▪ USB	1 On front panel
▪ SD memory card	1 On rear panel
▪ Ethernet	1
▪ CVBS	1
Control elements	4 Keys, backlit
	1 Digipot used as pushbutton, backlit
Acoustic signaling	1 Buzzer
	10 LEDs with customer-specific symbols
Inputs (option)	
▪ Digital	10 Switch input for LEDs, supply by U <sub>b</sub> is possible
	5 Digital input active-high, input impedance 43 kΩ
Outputs (option)	
▪ Digital	1 Peak current 3 A
RTC	Yes; replaceable battery
Degree of protection	Flush mount model: IP65 front/IP20 rear Surface mount model: IP65 front/IP54 rear
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

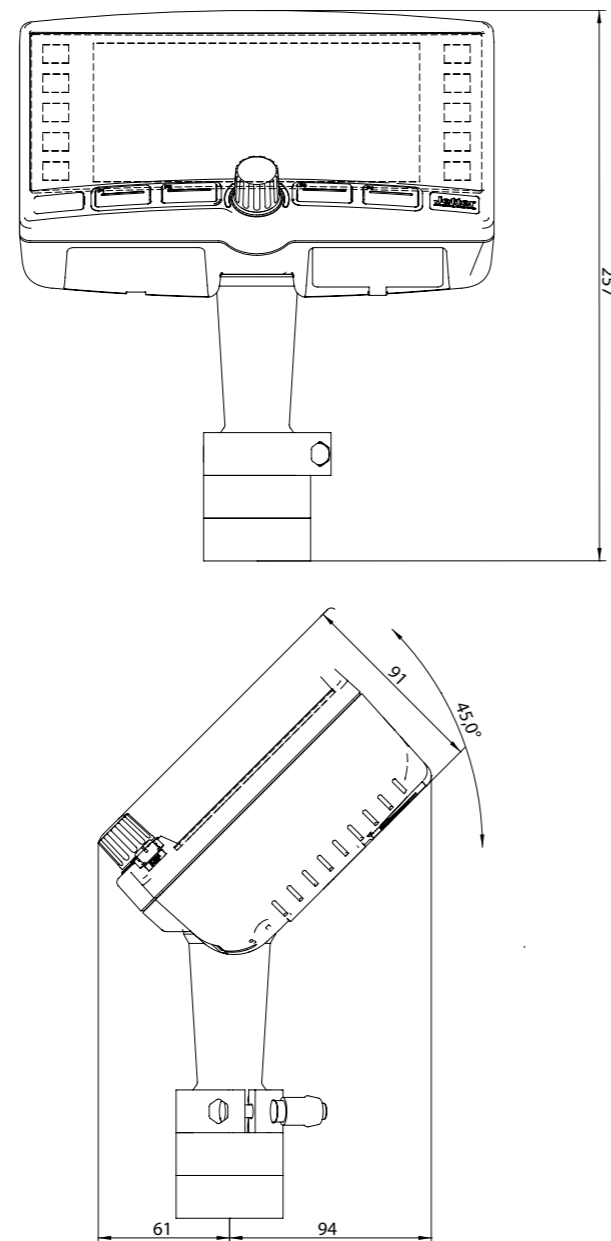
# JetViewMobile 407B

## Dimensional drawing

### Flush mount model



### Surface mount model



## Connector pinout

JVM-407B Molex Microfit 3.0 - 22-pin	
Power supply	1
Power supply ON	2
Output 1	3
LED 2	4
LED 4	5
LED 6	6
LED 8	7
LED 10	8
Input 2	9
Input 4	10
Ground	11
Power supply	12
Output 1	13
LED 1	14
LED 3	15
LED 5	16
LED 7	17
LED 9	18
Input 1	19
Input 3	20
Input 5	21
Ground	22

JVM-407B Molex Microfit 3.0 - 16-pin	
CAN1_H_IN	1
CAN1_Term	2
CAN1_L_OUT	3
CAN2_L_IN	4
CAN2_H_OUT	5
CAN3_H_IN	6
CAN3_Term	7
CAN3_L_OUT	8
CAN1_L_IN	9
CAN1_U_OUT	10
CAN2_H_IN	11
CAN2_Term	12
CAN2_L_OUT	13
CAN3_L_IN	14
CAN3_H_OUT	15
Shield	16

JVM-407B Molex Microfit 3.0 - 8-pin	
Supply voltage DC 12 V for the camera	1
Video signal +	2
Shield	3
Ground	4
Video signal -	5
Ground	6
Video signal -	7
n.c.	8

USB host interface, USB 2.0

Ethernet port, RJ45 jack

SD card slot, rear side

# JetViewMobile 507B

## Product brief

The HMI JVM-507B is equipped with a 7" display and 12 backlit keys with symbols printed to customer's wishes. The keys have been arranged right and left of the display. As an option, the HMI can be supplied with a resistive touch screen. This way, highly flexible and comprehensive operating concepts can be implemented. The HMI has been designed for installation in a double DIN slot in the dashboard.



The integrated controller of the HMI is equipped with multi-purpose interfaces and can therefore be used as a powerful master controller for medium-size systems. Four video inputs allow for establishing high-level monitor applications.

A light sensor allows for automatically adjusting to display brightness and key backlighting. The acoustic signaling device produces an alarm loud enough to be heard even in noisy surroundings.

## Product features

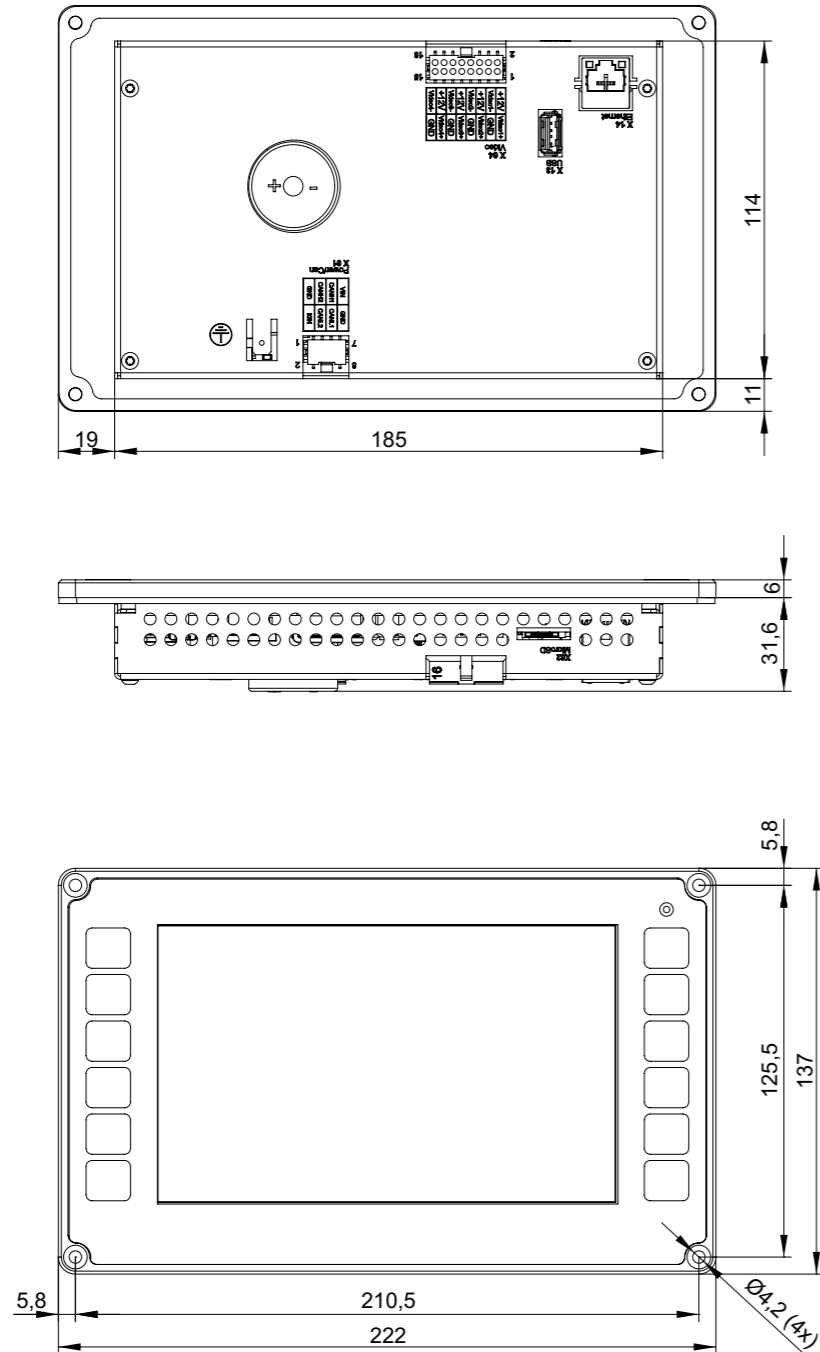
- Display with built-in controller  
32 bits/500 MHz
- Keys to be labeled
- 2 CAN ports, Ethernet, microSD card and USB port
- 4 video inputs
- Rugged aluminum front panel

JVM-507B	
Display	7" TFT with LED backlight
Display resolution and brightness	800 x 480 pixels (WVGA); 300 cd/m <sup>2</sup> (dimnable)
CPU	iMX 35, 32 Bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Programming	Graphics: JetViewSoft - Logics: IEC61131-3 STX
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-20 ... +65 °C/-30 ... +85 °C
Ports and interfaces	
▪ CAN	2 CANopen®, SAE J1939, ISOBUS 11783 - 125 kB/s to 1MB/s
▪ USB	1
▪ microSD card	1
▪ Ethernet	1
▪ CVBS	4
Control elements	12 Backlit keys with symbols printed to customer's wishes
	1 Resistive touch (optional)
Acoustic signaling	1 Buzzer
RTC	Yes, backup supply through Gold cap (approx. 1 week)
Degree of protection	Flush mount model: IP65 front/IP20 rear Surface mount model upon request
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetViewMobile 507B

## Dimensional drawing



## Connector pinout

JVM-507B	
Molex Microfit 3.0 - 16-pin X64	
Video signal 1+	1
Supply voltage 12 V, camera 1	2
Ground	3
Video signal 1-	4
Video signal 2+	5
Supply voltage 12 V, camera 2	6
Ground	7
Video signal 2-	8
Video signal 3+	9
Supply voltage 12 V, camera 3	10
Ground	11
Video signal 3-	12
Video signal 4+	13
Supply voltage 12 V, camera 4	14
Ground	15
Video signal 4-	16

JVM-507B	
Molex Microfit 3.0 - 8-pin X61	
Ground	1
Ignition ON	2
CAN2_H	3
CAN2_L	4
CAN1_H	5
CAN1_L	6
Power supply	7
Ground	8

X13 USB host interface, USB 2.0

X14, Ethernet port, RJ45 jack

X62 microSD card slot, rear side

## Multi-display controller

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# JetControlMobile 630

## Product brief

The multi-monitor controller JCM-630 combines outstanding video features with high-performance HMI and PLC disciplines in one system.

A powerful 32-bit CPU with 800 MHz clock rate forms the heart of the automation functions. Four CAN interfaces, Gbit Ethernet connectivity, USB, LIN, and RS232 offer high connectivity for complex architectures.

The visualization takes place on 2 displays via LVDS interfaces with one connector per display being sufficient. A host of supported display formats and configurations allow a high flexibility in the arrangement of the screens.

6 camera images from 8 camera channels can be processed simultaneously in one FPGA with minimal latency. The images can be freely scaled, cut, positioned or superimposed with graphic and text elements. This way, operating concepts exceeding the level of integration into modern middle-class cars can be physically established in special-purpose vehicles with moderate application expense.

The IEC-61131-3-compliant programming language STX, a plug-in for programming in C, and scalable vector graphics support by JetViewSoft offer a highly efficient workflow for control and visualization. The JCM-630 is available with ISOBUS stack.



## Product features

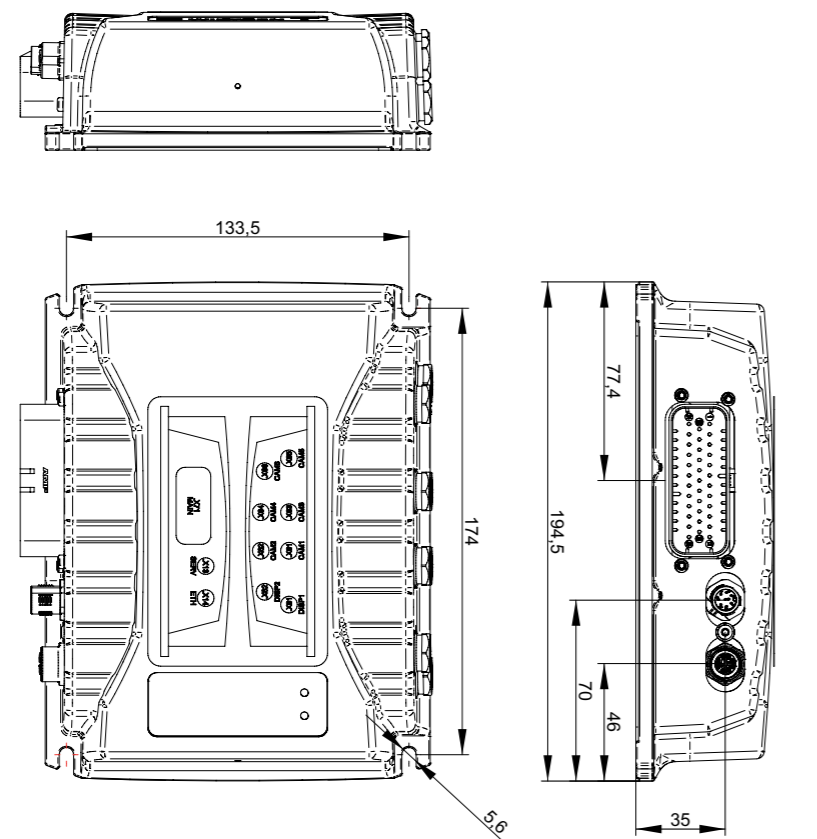
- Powerful PLC with high connectivity
- Excellent HMI features on two displays
- Free positioning, size adjustment and scaling of 6 camera images
- Integrated programming environment to IEC-61131-3 JetSym and JetViewSoft
- Plug-in for programming in C or 3rd party software
- Can be updated via USB flash drive

JetControlMobile 630	
CPU	iMX 6, 32-bit, 800 MHz
Memory: RAM - Application - Non-volatile	1 GB ... 4 GB eMMC flash
Co-CPU ( CAN 3, 4 / watchdog)	120 MHz, 128 KB ... 512 KB flash
Graphics programming	JetViewSoft - Logics: IEC61131-3 STX
Controller programming	JetSym - Logics: IEC61131-3 STX
Operating system	WinCE 2013
Power management	Boot-up duration < 10 s (until application screen appears)
Operating/storage temperature	-30 ... +75 °C/-40 ... +85 °C
<b>Ports and interfaces</b>	
▪ FPD-LINKII	2 Display, display power supply, CAN
▪ CAN	4 CANopen®, SAE J1939, ISOBUS 11783 - 125 kB/s to 1 MB/s
▪ USB	1
▪ Ethernet	1 (option)
▪ CVBS cameras	8 6 of them can simultaneously be displayed (camera supply included)
▪ RS-232	2 (option)
▪ LIN	1 (option, uses DI3)
Inputs	1 Camera supply
Inputs, digital	1 Ignition 3 Digital input active-high, input impedance 43 kΩ
Outputs, digital	2 Peak current 3 A
RTC	Yes, various backup modes, battery included
Degree of protection	IP65
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetControlMobile 630

## Dimensional drawing



## Connector pinout

JCM-630	
35-pin male connector	
Ignition, U <sub>ign</sub> (terminal 15)	1
GND, battery - (terminal 31)	2
UB, battery + (terminal 30)	3
n.c. (not connected)/option: CAN3 L	4
CAN2 L	5
CAN1 L	6
n.c./option: CAN4 L	7
n.c./option: CAN4 H	8
GND for RS-232 (COM2)	9
GND (supply) for CAM8	10
DO1	11
DO2	12
Supply DC 12 V DC 12 V/24V for CAM8	13
Video input for CAM7	14
Video input + for CAM8	15
n.c./option: CAN3 H	16
CAN2 H	17
CAN1 H	18
GND	19
GND	20
GND (supply) for CAM7	21
GND	22
Shield	23
Power supply DC 12 V/24 V for CAM7	24
Video input + for CAM7	25
Video input for CAM8	26
RS-232 TX (COM2)	27
RS-232 RX (COM2)	28
DI1	29
Output power camera (OUT)/DO3 to 3 A	30
Power consumption camera (IN: DC 12 V/24 V)	31
DI2	32
n.c./option: DI3	33
Shield	34
Shield	35

JCM-630	
M12 male connector - Service port 1	
USB signal VCC5 + I/O	1
USB signal DATA -	2
USB signal DATA +	3
- (do not connect)	4
Screen for USB	5
RS-232 RX (COM1)	6
RS-232 TX (COM1)	7
GND	8

JCM-630	
M12 female connector - Service port 2 (Gbit Ethernet)	
D1 +	1
D1 -	2
D2 +	3
D2 -	4
D4 +	5
D4 -	6
D3 -	7
D3 +	8

JCM-630	
M12 socket - WLVDs 1 ... 2 - OUT	
24-V supply	1
GND (supply)	2
GND (supply)	3
LVDS 1 ... 2 +	4
CAN1 Low	5
LVDS1...2 -	6
24-V supply	7
CAN1 High	8

JCM-630	
M12 socket - CAM1 ... CAM6	
Video input - for CAM1 ... 6	1
GND (supply)	2
Video input + for CAM1 ... 6	3
Supply DC 12 V / 12 V for CAM1 ... 6	4
GND (supply)	5

# JetViewMobile MT101 | M043

## Product brief

The outstanding feature of the new monitor generation JVM-Mxxx is its brilliant displays of appealing design which are also readable in bright sunlight.

Coming as mere monitors of 4.3 to 10.1", the devices are low-size enough to be installed even in small spaces.

The corresponding high-performance ECU JCM-630 does not only establish all connections with the mobile machine, but it also provides two monitors with operating parameters by single-cable technology.

Thanks to its multi-kernel processors, its four CAN, LIN, Gbit Ethernet connections, and its eight camera inputs, the JCM-630 is fit for any kind of today's and tomorrow's operating philosophy.

## Product features

- Brilliant displays readable in bright sunlight
- Slim, modern design
- Single-cable connection to JCM-630
- PCAP can be integrated
- Mounting: VESA/RAM, flush mounting



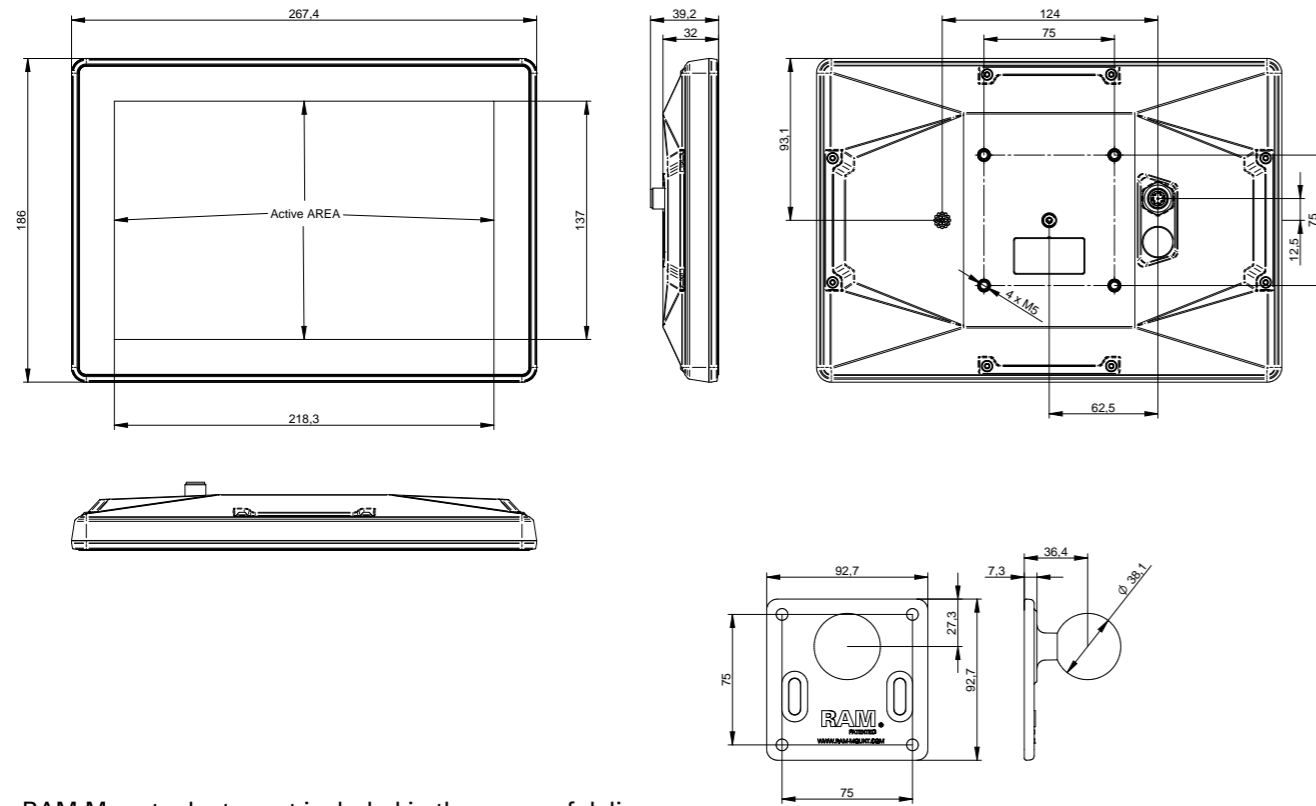
	JVM-MT101	JVM-M043
Display	10.1" TFT with LED backlight	4.3" TFT with LED backlight
Resolution	1280 x 800 pixels	480 x 272 pixels
Brightness	500 cd/m2( dimmable)	800 cd/m2( dimmable)
Viewing angle (h/v, u/d)	160°;160°	150°;150°
Contrast	500:1	300:1
Control elements	1	PCAP touchscreen (option)
	4	Keys, backlit (option)
	1	Push encoder, backlit (option)
Acoustic signaling	1	Buzzer 85 db (option)
Ports and interfaces		
- FPD-LINKII	1	Display, display power supply, CAN
- CAN	1	CANopen®; 125 kB/s to 1 MB/s
- External keyboard, push encoder, ...	10 ch.	Matrix keyboard, switches, push encoder (option)
Programming		Via JCM-630 series Graphics: JetViewSoft - Logics: IEC61131-3 STX
Operating voltage		DC 8 ... 32 V
Operating/storage temperature		-20 ... +65 °C/-30 ... +85 °C
Degree of protection		Flush mount model "open frame": IP23 front/IP20 rear Surface mount model: IP54 front/IP54 rear
Vibration		DIN EN 60068-2-64, Cat. 2
Shock		DIN EN 60068-2-64, 30g
Protection against polarity reversal		Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.



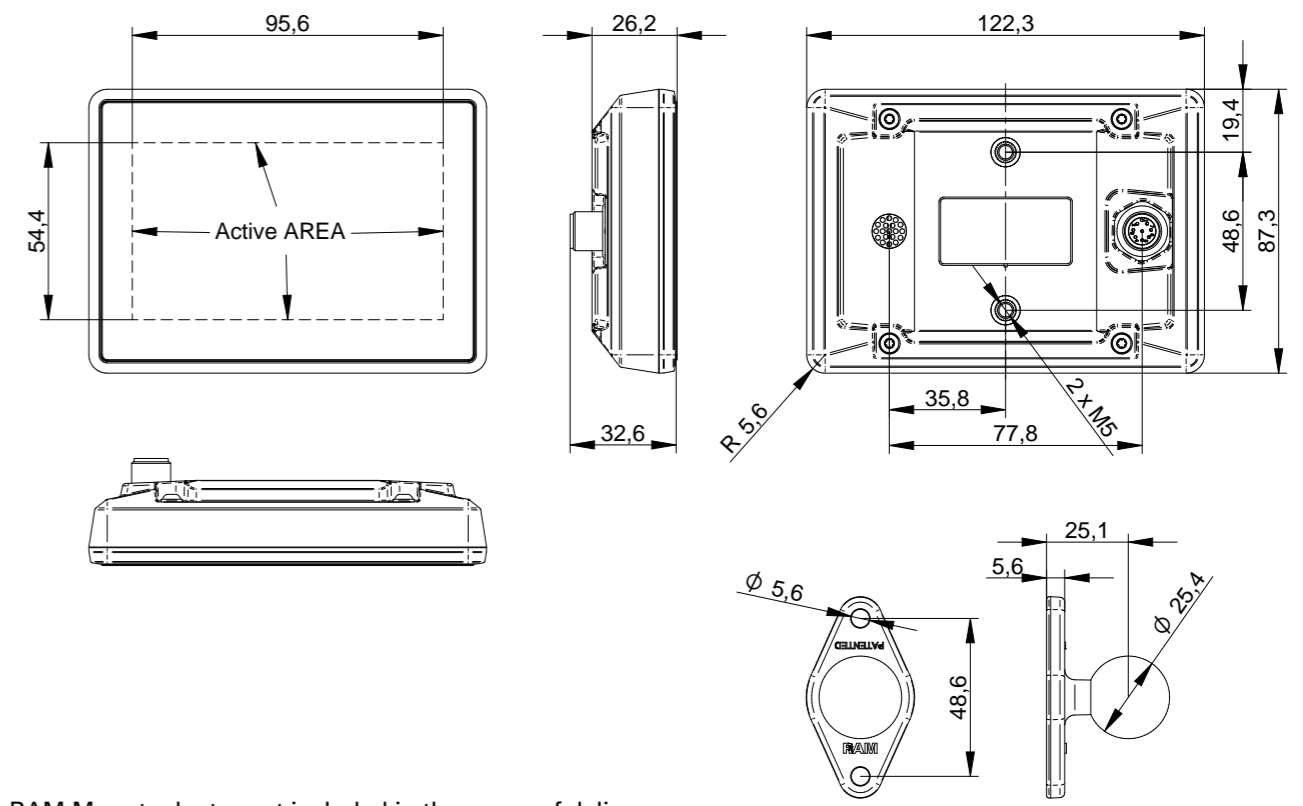
# JetViewMobile MT101 | M043

Dimensional drawing of the MT101



RAM Mount adapter not included in the scope of delivery.

Dimensional drawing of the M043



RAM Mount adapter not included in the scope of delivery.

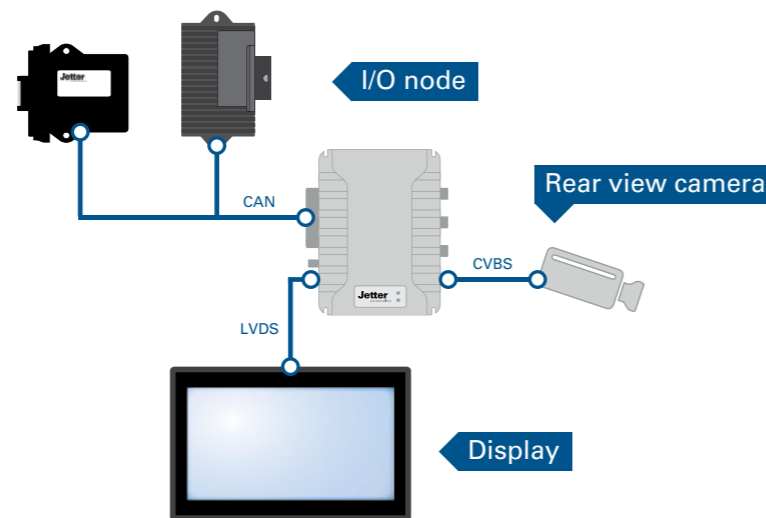
# Application Examples

## Flexible in application

- Based on different display options, the cost of various configurations in a vehicle can be weighted. Displays of different sizes can be easily exchanged thanks to their vector graphics support. The visualization remains the same for all variants
- Superimposition of graphic elements or text information on video images facilitates intuitive operation. The optional PCAP multi-touch interface allows for unlimited ease of operation
- Several identical displays with identical contents can be cascaded - ideal for vehicles with multiple operator consoles
- The optional ISOBUS stack enables powerful implement control. What's more, its video integration compensates for the limited camera performance of ISOBUS.

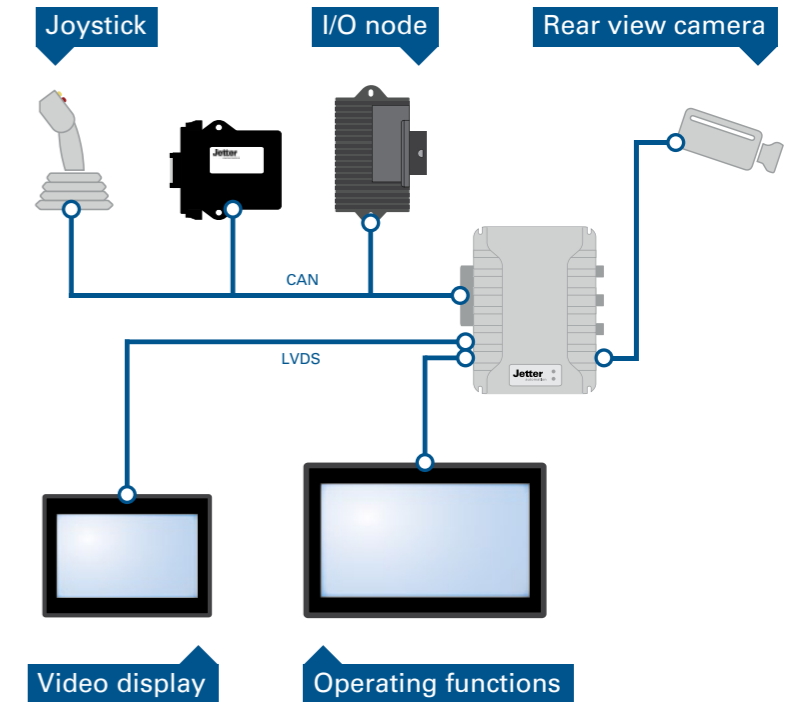
## Application example # 1

Typical basic equipment for a municipal vehicle with complete body control and integration of the rear view camera into the operating concept.



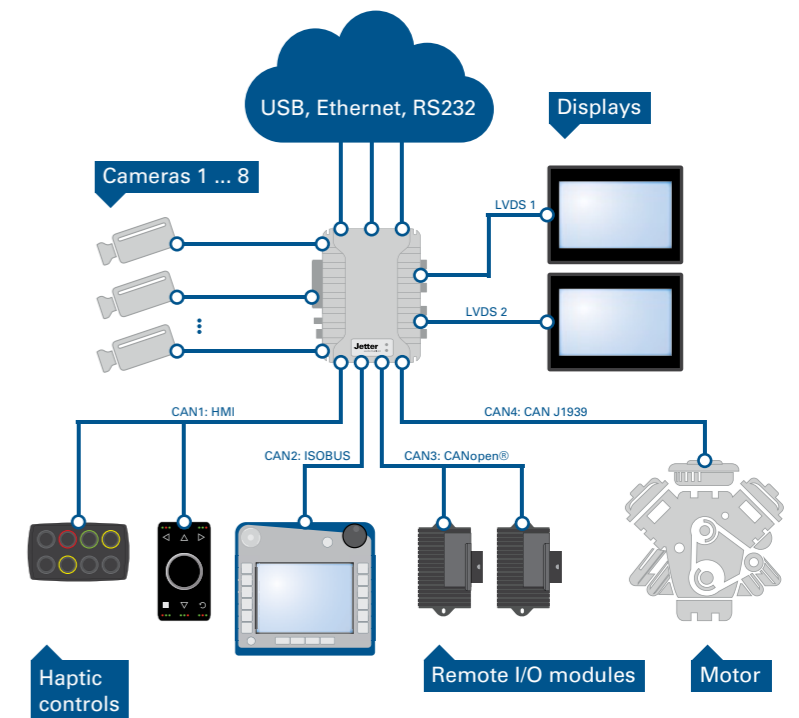
## Application example # 2

Extended range of functions with 2 displays for splitting up the visualization of machine functions and video camera.



## Application example # 3

Powerful ISOBUS ECU with extended video performance for visual monitoring of a production chain in an agricultural self-propelled machine.



## Controllers

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Controllers of the JetControlMobile series can best meet the special demands made on mobile automation. Their pre-eminent trait is the combination of ultimate ruggedness, high and scalable CPU performance and the ability to implement individual customer requirements. The controllers can directly be built into the vehicle without a control cabinet being needed. This is space-saving and therefore allows for flexible installation.



# JetControlMobile 501

## Product brief

The compact master controller JCM-501 forms the heart of compact, distributed architectures.

With 2 CAN interfaces, RS232, USB and Ethernet port, as well as the proven, powerful 32-bit CPU it can be used in system solutions of simple to medium complexity.

An integrated real-time clock completes the range of functions.



## Product features

- Controller 32 bit/500 MHz
- Compact design
- High connectivity

JCM-501	
CPU	iMX 35, 32 Bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Programming	Logics: IEC61131-3 STX
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-20 ... +65 °C/-30 ... +85 °C
<b>Ports and interfaces</b>	
▪ CAN	2 CANopen®, SAE J1939, ISOBUS 11783 (option: 2 interfaces)
▪ USB	1
▪ Ethernet	1
▪ RS232	1
RTC	optional, replaceable battery
Connector	Deutsch DT06-12S
Degree of protection	IP65
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Connector pinout

JCM-501	
Model with Deutsch connector and COM module	
Ground	1
USB+	2
USB DP	3
USB DM	4
USB-	5
Power supply	6
RS232 TxD	7
RS232 RxD	8
CAN1_L	9
CAN1_H	10
CAN2_L	11
CAN2_H	12

JCM-501	
M12 connector (female) 4-pole D-coded	
ETH_TX+	1
ETH_RX+	2
ETH_TX+	3
ETH_TR+	4

# JetControlMobile 511

## Product brief

The semi-modular compact controller JetControlMobile 511 is based on the modular JCM-521 series. Due to its vast I/O capacity featuring high-performance H-bridges, PWM outputs, flexibly applicable inputs and high total ampacity, even its basic configuration is already sufficient for numerous applications. Besides hydraulic actuators, it can even directly control electric motors. Extensibility by two MX modules allows for easily adjusting to a great variety of functions and applications.

Besides standard ports and interfaces, the JCM-511 is equipped with inputs apt for NAMUR, as well as with a LIN port. This way, it can be integrated into almost any systems architecture.

The high-level language STX to IEC 61131-3 lets you realize virtually any control task. Programming in C/C++ is possible, too.

## Product features

- 32-bit controller, 500 MHz
- Programming to IEC 61131-3 STX or in C/C++
- Partially modular I/O configuration for high flexibility
- CAN, USB, LIN and RS232 port for high connectivity
- Compact design

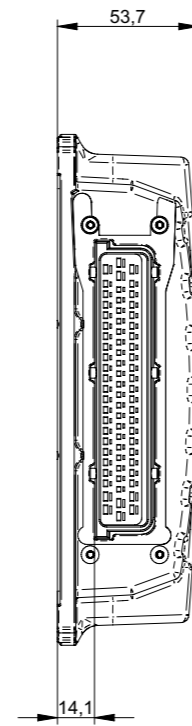
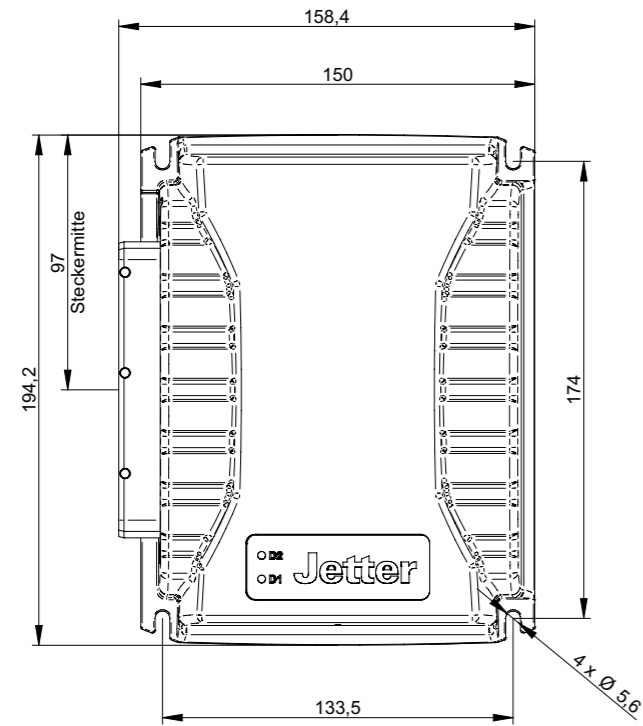


JetControlMobile 511	
CPU	ARM 11, 32-bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Peripheral devices	FPGA
Programming	IEC 61131-3 STX, C/C++
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32 V, separate load voltage
Operating/storage temperature	-40 ... +85 °C
Ports and interfaces	
▪ CAN	2 125 kB/s to 1 MB/s CANopen®, SAE J1939, ISOBUS 11783 Jetter CAN-Prim for customer-specific proprietary protocols
▪ USB	1
▪ RS232	1
▪ LIN	1
▪ Ethernet	1 (option)
Operation and diagnostics	2 status LEDs
RTC	Option
Max. number of inputs/outputs	40
Inputs (basic configuration)	
▪ Analog	8 0 ... 5.7 V/0 ... 22 mA, can be configured individually resolution: 12 bits, input impedance: 75 kΩ, load resistor: 120 Ω Alternative usage: ▪ NAMUR input with a bias voltage of 8.2 V ▪ Digital input active-high, input impedance 50 kΩ ▪ Frequency input, 0.1 ... 10 kHz, period > 1 μs
▪ Digital	8 Active-high, input impedance 50 kΩ Alternative usage: ▪ Frequency input, 0.1 ... 10 kHz, period > 1 μs
Outputs (basic configuration)	
▪ PWM	4 3.5 A; current control 1 %; 10 Hz ... 1 kHz Alternative usage: ▪ Digital output 3.5 A, high-side
▪ H-bridge	2 15 A; 10 Hz ... 1 kHz Alternative usage: ▪ 4x PWM 10 Hz ... 1 kHz, 15 A ▪ 4x digital output 15 A high-side ▪ 4x digital output 15 A low-side
Maximum number of MX modules (expansion modules)	2 Up to 8 inputs/outputs per MX module
Power supply - External sensors	5 V or 10 V, can be toggled via software configuration
Max. permitted total current	30 A, temporarily 60 A
Safety relay in the load circuit	Yes, PWM outputs can be disabled
Diagnostics	Total current monitoring, protection against polarity reversal, overload and no-load detection, all I/Os are protected against short circuit to GND and V <sub>BAT</sub>
Degree of protection	IP65
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetControlMobile 511

## Dimensional drawing



## Connector pinout

JCM-511   70-pin AMP Tyco 963484	
H-bridge A1	1
V <sub>IGN</sub>	2
Power supply - Logic unit and external circuit	3
CAN1-L	4
CAN1-H	5
PWM3	6
PWM1	7
PWM2	8
PWM4	9
USB CNX	10
USB D+	11
USB D-	12
Output - Reference voltage	13
Analog input 1	14
Analog input 2	15
Analog input 3	16
Analog input 4	17
Analog input 5	18
Analog input 6	19
Analog input 7	20
Analog input 8	21
Supply for power outputs	22
Ground	23
H-bridge B1	24
H-bridge A2	25
Ground	26
Input for enabling relay	27
CAN2-L	28
CAN2-H	29
Digital input 1	30
Digital input 2	31
Digital input 3	32
Digital input 4	33
Digital input 5	34
Digital input 6	35
Digital input 7	36
Digital input 8	37
RS232-TX	38
Ground	39
Ground	40

JCM-511   70-pin AMP Tyco 963484	
MX6-1	41
MX6-2	42
MX6-3	43
MX6-6	44
MX6-7	45
Supply for power outputs	46
Ground	47
H-bridge B2	48
Switched power for external devices	49
Power supply - Enabling relay	50
n.c.	51
n.c.	52
MX5-2	53
MX5-3	54
MX5-8	55
MX5-7	56
MX5-6	57
MX5-5	58
MX5-4	59
LIN	60
RS232-RX	61
Ground	62
MX5-1	63
Ground	64
Ground	65
MX6-8	66
MX6-4	67
MX6-5	68
Supply for power outputs	69
Ground	70

# JetControlMobile 521

## Product brief

The JCM-521 controllers are fully modular. They have been designed for control systems exacting high-level requirements on flexibility and connectivity.

The controllers consist of a main board and of MX modules which are add-ons providing various functions. The main board is equipped with a powerful CPU and FPGA. Depending on the desired configuration, it can be equipped with up to 6 MX modules in any combination. Fully equipped, it offers up to 48 I/O connections. This way, the number of I/Os can precisely be customized to any application.

An optional diagnostics display with controls features production data display, diagnostics and configuration on the spot without additional supporting devices such as PC or testing devices still being needed.

## Product features

- 32-bit controller, 500 MHz
- Programming to IEC 61131-3 STX or in C/C++
- Modular I/O configuration for high flexibility
- CAN, USB, LIN, and RS232 port for high connectivity.
- Built-in controls with graphic display



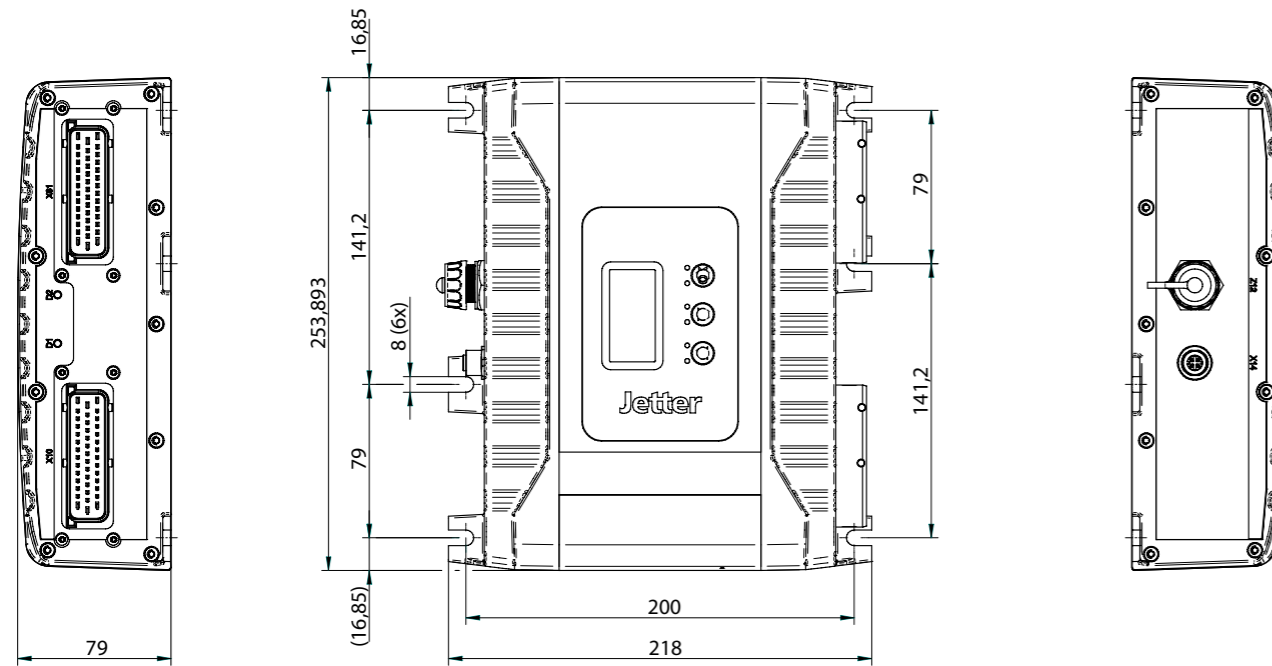
JetControlMobile 521	
CPU	ARM 11, 32-bit, 500 MHz
Memory: RAM - Application - Non-volatile	128 MB RAM – 512 MB Flash – 128 kB MRAM
Peripheral devices	FPGA
Programming	IEC 61131-3 STX, C/C++
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 32V, separate load voltage
Operating/storage temperature	-40 ... +85 °C
Ports and interfaces	
▪ CAN	2 (optionally more) 125 kB/s to 1 MB/s CANopen®, SAE J1939, ISOBUS 11783 Jetter CAN-Prim for customer-specific proprietary protocols
▪ Ethernet	Option; up to 100 Mbit/s
▪ USB	1 (optionally more), host and client
▪ RS232	1
▪ LIN	1
Operation and diagnostics (optional)	1 LCD graphics display 6 LEDs red, green 3 Keys
RTC	Option
Maximum number of inputs/outputs*	48
Maximum number of MX modules	6
Max. permitted total current	40 A
Safety relay in the load circuit	Yes, PWM outputs can be disabled
Degree of protection	IP65
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

\* Number of I/O connections depends on configuration with MX modules.

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetControlMobile 521

## Dimensional drawing



## Connector pinout

X10 and up to 2 MX modules   Tyco Ampseal	
Supply for power outputs	1
MX2-1	2
MX2-4	3
MX2-7	4
MX1-2	5
MX1-5	6
MX1-8	7
CAN1 L input	8
CAN1 H input	9
RS-232 TX	10
RS-232 RX	11
Ground - Logic circuit	12
Ground - Logic circuit	13
Ground - Power outputs	14
Supply for power outputs	15
MX2-2	16
MX2-5	17
MX2-8	18
MX1-3	19
MX1-6	20
CAN1 L output	21
CAN1 H output	22
Emergency OFF signal	23
Emergency OFF PWR	24
LIN1	25
CONFIG	26
Power supply - Logic unit	27
Ground - Power outputs	28
Supply for power outputs	29
MX2-3	30
MX2-6	31
MX1-1	32
MX1-4	33
MX1-7	34
CAN2 L	35
CAN2 H	36
V <sub>ING</sub>	37
TBC OFF	38
Power supply - Logic unit	39
Power supply - Sensors	40
Power supply - Sensors	41
Ground - Power outputs	42

X61 4 MX modules each   Tyco Ampseal	
Supply for power outputs	1
MX6-1	2
MX6-4	3
MX6-7	4
MX5-2	5
MX5-5	6
MX5-8	7
MX4-3	8
MX4-6	9
MX3-1	10
MX3-4	11
MX3-7	12
Ground - Logic circuit	13
Ground - Power outputs	14
Supply for power outputs	15
MX6-2	16
MX6-5	17
MX6-8	18
MX5-3	19
MX5-6	20
MX4-1	21
MX4-4	22
MX4-7	23
MX3-2	24
MX3-5	25
MX3-8	26
Power supply - Logic unit	27
Ground - Power outputs	28
Supply for power outputs	29
MX6-3	30
MX6-6	31
MX5-1	32
MX5-4	33
MX5-7	34
MX4-2	35
MX4-5	36
MX4-8	37
MX3-3	38
MX3-6	39
Power supply - Sensors	40
Power supply - Sensors	41
Ground - Power outputs	42



# JetControlMobile 529

## Product brief

In JCM-529, circuit parts for modular expansion of the JCM-521 series have been translated into a concept comprising fixed I/O configuration. This makes it a cost-effective solution keeping up the performance features of the JCM-521 series. Layout-reuse technology enables adjustments to be made in PCB assembly at low cost. 103 I/O connections are available in the fully equipped configuration.

An optional diagnostics display with controls features production data display, diagnostics and configuration on the spot without additional supporting devices such as PC or testing devices still being needed.



## Product features

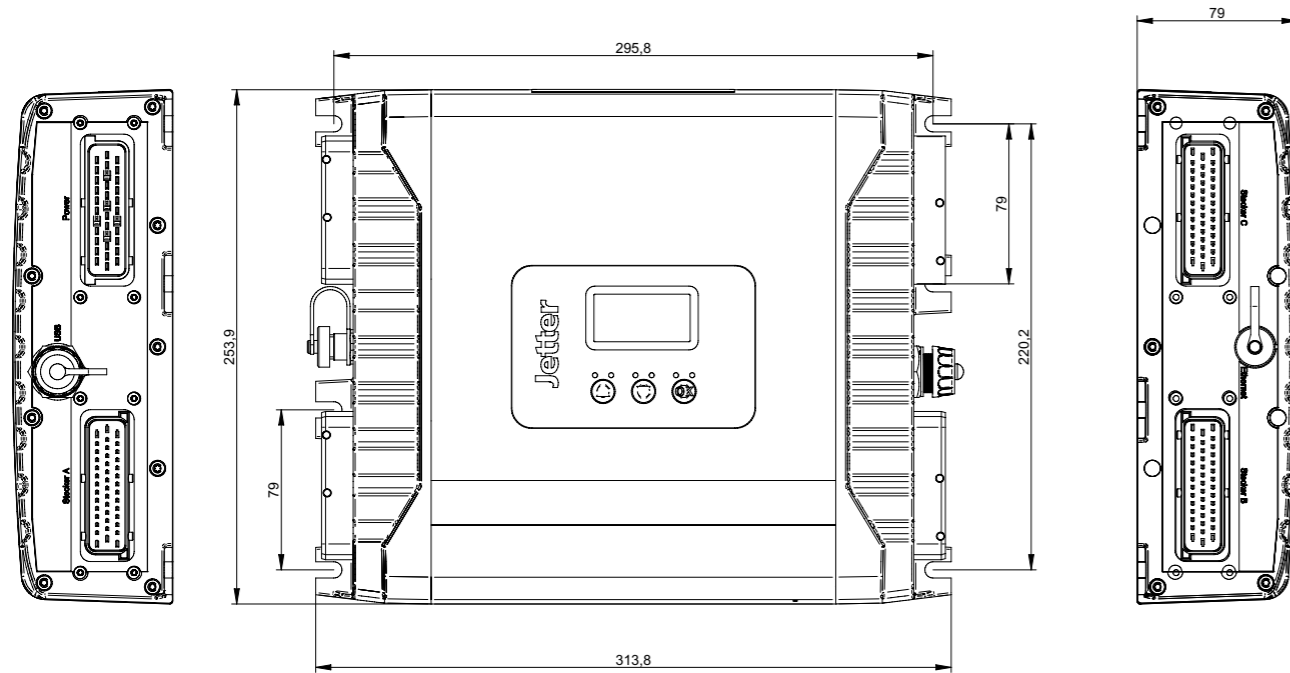
- 32-bit controller, 500 MHz
- Programming to IEC 61131-3 STX or in C/C++
- Fixed I/O configuration featuring modularizing varieties
- CAN, LIN, Ethernet and RS232 port for high connectivity
- Built-in controls with graphic display

JetControlMobile 529	
CPU	ARM 11, 32-bit, 500 MHz
Memory: RAM - Application - Non-volatile	64 MB RAM – 512 MB Flash – 64 kB MRAM
Peripheral devices	FPGA
Programming	IEC 61131-3 STX, C/C++
Operating system	WinCE 6.0
Operating voltage	DC 8 ... 30 V, separate load voltage
Operating/storage temperature	-40 ... +85 °C
<b>Ports and interfaces</b>	
▪ Ethernet	1 Up to 100 Mbit/s
▪ CAN	2 125 kB/s to 1 MB/s CANopen®, SAE J1939, ISOBUS 11783 Jetter CAN-Prim for customer-specific proprietary protocols
▪ RS232	1
▪ LIN	4
Operation and diagnostics (optional)	1 LCD graphics display 6 LEDs red, green 3 Keys
RTC	Option
Number of inputs/outputs	103
<b>Inputs</b>	
▪ Analog	58 0 ... 5.7 V/0 ... 15 V/0 ... 20 mA, can be configured individually, capable of diagnostics, resolution: 12 bits, input impedance: 50 ... 100 kΩ, load resistor: 120 Ω  Alternative usage: ▪ NAMUR input with a bias voltage of 8.2 V ▪ Digital input active-high, input impedance 50 ... 100 kΩ ▪ Frequency input 0.1 ... 10 kHz, period > 1 μs, input impedance 50 ... 100 kΩ ▪ Input for gate time measuring 0.1 ... 10 s ▪ Interruptible input, 16-bit time stamp, resolution 1 μs
<b>Outputs</b>	
▪ PWM	4 3.8 A; current control 1 %; 10 Hz ... 1 kHz Alternative usage: ▪ Digital output 3.5 A, high-side  34 3.8 A; current control 6 %; 10 Hz ... 1 kHz Alternative usage: ▪ Digital output 3.5 A, high-side  5 0.5 A; 10 Hz ... 1 kHz Alternative usage: ▪ Digital output 2.0 A, high-side
▪ H-bridge	2 3.8 A; current control 6 %; 10 Hz ... 1 kHz  Alternative usage: ▪ 4x digital output 3.8 A high-side ▪ 4x digital output 3.8 A low-side
Max. permitted total current	40 A
Diagnostic functions	Total current monitoring, protection against polarity reversal, overload and no-load detection, all I/Os are protected against short circuit to GND and V <sub>BAT</sub>
Degree of protection	IP65
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JetControlMobile 529

## Dimensional drawing



## Connector pinout

JVM-529 AMP timer, 29-pin - Power	
Power supply - Emergency stop 1	1
Signal - Emergency stop 1	2
V <sub>IGN</sub>	3
LIN1	4
CAN1_IN_H	5
CAN1_IN_L	6
PWM low-current 1	7
Input 1	8
PWM low-current 2	9
Input 2	10
PWM low-current 3	11
Input 3	12
PWM low-current 4	13
Input 4	14
RS232_TXD	15

JVM-529 AMP timer, 29-pin - Power	
RS232_RXD	16
CAN1_OUT_H	17
CAN1_OUT_L	18
TBC_OFF	19
PWM low-current D1	20
Power supply - Logic unit	21
Power supply	22
Power supply	23
Power supply	24
Power supply	25
Ground	26
Ground	27
Ground	28
Ground	29

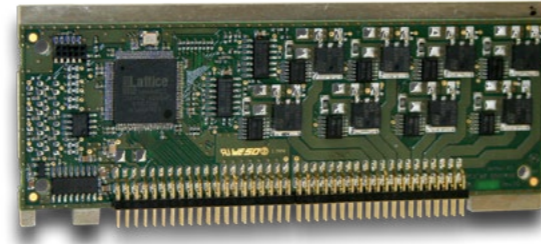
## Connector pinout

JVM-529 AMP timer, 42-pin - Group A	JVM-529 AMP timer 42-pin - Group B	JVM-529 AMP timer 42-pin - Group C
H-bridge 1_B	Sensor supply 1	Sensor supply 1
H-bridge 2_B	Input 22	Input 42
Input 5	Input 23	Input 43
Input 6	PWM 6	Input 44
PWM precision current measuring 1	PWM 7	Input 45
PWM precision current measuring 2	PWM 8	Input 46
PWM precision current measuring 3	PWM 9	Input 47
Sensor supply 3	Input 24	Input 48
Input 7	Input 25	Input 49
Input 8	Input 26	Input 50
Input 9	Input 27	PWM 17
Input 10	Input 28	PWM 18
PWM 1	Input 29	PWM 19
Ground	Ground	Ground
H-bridge 2_A	Sensor supply 2	Sensor supply 2
Input 11	Input 30	PWM 20
PWM precision current measuring 4	PWM 10	PWM 21
PWM 2	H-bridge 3_A	Input 51
Sensor supply 1	H-bridge 3_B	Input 52
Sensor supply 2	H-bridge 4_A	Input 53
Input 12	H-bridge 4_B	Input 54
Input 13	Input 31	PWM 22
Input 14	Input 32	PWM 23
Input 15	Input 33	PWM 24
PWM 3	Input 34	PWM 25
PWM 4	Input 35	PWM 26
PWM 5	Input 36	PWM 27
Ground	Ground	Ground
H-bridge 1_A	Sensor supply 3	Sensor supply 3
Input 16	Input 37	PWM 28
Input 17	PWM 11	PWM 29
Input 18	PWM 12	Input 55
Input 19	PWM 13	Input 56
Input 20	Input 38	Input 57
Input 21	Input 39	Input 58
Power supply - Emergency stop 2	Input 40	PWM 30
Signal - Emergency stop 2	Input 41	PWM 31
UON_EXT	PWM 14	PWM 32
LIN2	PWM 15	PWM 33
CAN2_H	PWM 16	PWM 34
CAN2_L	LIN3	LIN4
Ground	Ground	Ground

# MX modules

## Product brief

MX modules are configurable multi-purpose add-on modules for the JCM-511 and JCM-521 controllers.



## Available configurations

- Multi-purpose 8-channel input module with analog/digital mode, current measuring and frequency measuring mode
- 8-channel output module with precision current measuring mode
- 4-channel H-bridge module
- 2-channel weighing module (load cell) with tilt sensor

	MX-MFOE8	MX-DOU8P
Operating voltage; separate load voltage	DC 8 ... 32 V	DC 8 ... 32 V, yes
Operating/storage temperature	-40 ... +85 °C	-40 ... +85 °C
Diagnostic functions	NAMUR	Open load, short circuit; Precision current measuring (1 %)
Max. number of inputs/outputs	8	8
Inputs	Multi-purpose input	
▪ Analog	0 ... 5.7 V; 0 ... 15 V; 0 ... 22 mA (resolution 12 bits)	-
▪ Digital	Active high	-
▪ Frequency	0.1 ... 10 kHz, period > 1 µs	-
Outputs		H-side, precision controlling
▪ Digital; PWM	-	3.5 A (10 Hz ... 1 kHz, resolution 10 bits)
▪ H-bridge	-	-
▪ Analog	-	-
Max. total current	-	32 A
Safety relay in the load circuit	-	Yes
Vibration	DIN EN 60068-2-64, Cat. 2	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30 g	DIN EN 60068-2-64, 30 g
Protection against polarity reversal	Yes	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

	MX-DOU4HB	MX-RELAIS_S4
Operating voltage; separate load voltage	DC 8 ... 32 V, yes	DC 8 ... 32 V, yes
Operating/storage temperature	-40 ... +85 °C	-40 ... +85 °C
Diagnostic functions	Open load, short circuit, current measuring	n.a.
Max. number of inputs/outputs	4	4
Inputs		
▪ Analog	-	-
▪ Digital	-	-
▪ Frequency	-	-
Outputs	H-side/L-side, alternative: Individual PWM	Electrically isolated relays, NO contact
▪ Digital; PWM		32 V/400 mA
▪ H-bridge	3.5 A (10 Hz ... 1 kHz, resolution 10 bits)	-
▪ Analog	-	-
Max. total current	32 A	4x 400 mA, not short-circuit proof
Safety relay in the load circuit	Yes	-
Vibration	DIN EN 60068-2-64, Cat. 2	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30 g	DIN EN 60068-2-64, 30 g
Protection against polarity reversal	Yes	No

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Expansion modules

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I/O modules providing a wide range of features let you in the best possible way complete or expand the control systems in mobile machinery, commercial and special-purpose vehicles.



# JXM-IO-E02

## Product brief

The large number of individually configurable I/O connections, the high total current as well as the rugged and compact design make the JXM-IO-E02 a multi-purpose CAN remote node.

The supply voltage of the inputs and outputs is divided into Standard Feed and Protected Feed, and it allows for independent deactivation of inputs and outputs in safety applications.

The CAN ID of the I/O node can be defined via external connection of digital inputs. This way, up to nine nodes can be addressed within one system without further configuration measures to be taken.



## Product features

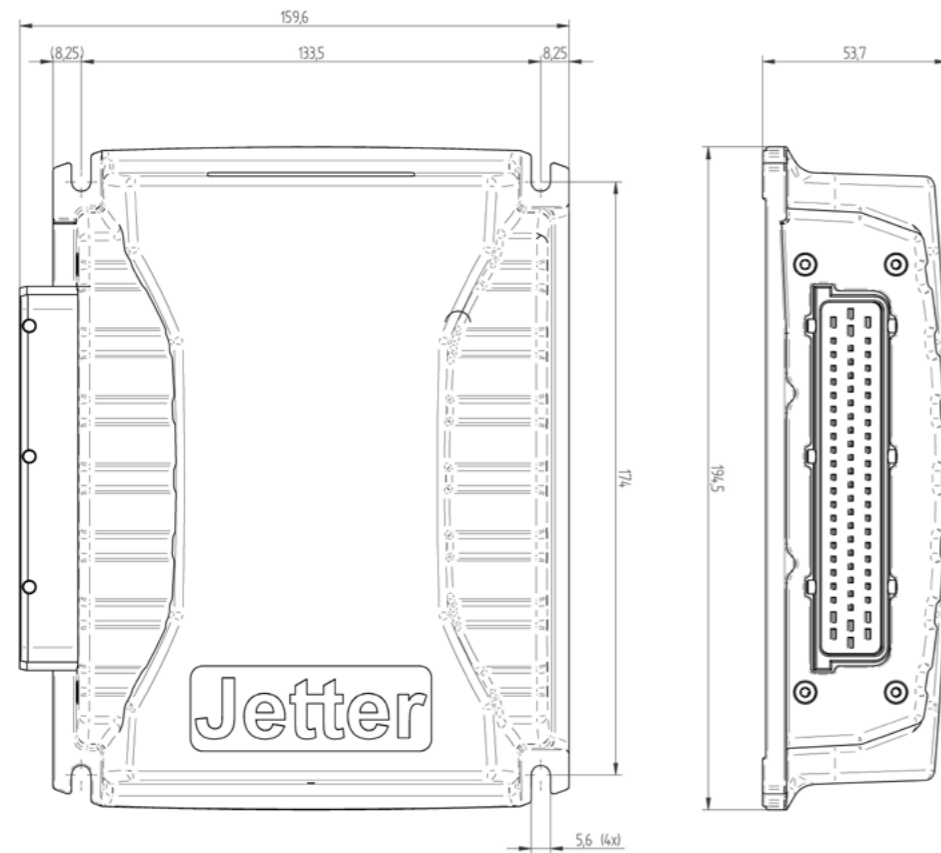
- Flexible I/O configuration
- The CAN addresses can be configured via wiring harness
- Compact and rugged enclosure
- High degree of protection IP66/IP68

JXM-IO-E02	
Operating voltage	DC 8 ... 32 V, separate load voltage
Operating/storage temperature	-40 ... +85 °C
Ports and interfaces	
CAN	1 CANopen®
Max. number of inputs/outputs	32
Inputs	
▪ Analog	4 0 ... 5 V/0 ... $V_{BAT}/0$ ... 20 mA/4 ... 20 mA, can be configured individually, resolution: 10 bits, input impedance: 50 k $\Omega$ , load resistor: 240 $\Omega$
▪ Digital	5 Active low/high, can be configured individually, input impedance 2 k $\Omega$
▪ Frequency	2 Active low/high, can be configured individually, 5 Hz ... 20 kHz, period 62.5 ns Alternative usage: ▪ Digital input active-high, input impedance 2 k $\Omega$
Outputs	
▪ Analog	1 0 ... $V_{BAT}$ 10-bit resolution, short-circuit detection, peak current 100 mA
▪ Digital	8 2.5 A high-side, diagnostics capability, short-circuit proof Alternative usage: ▪ Digital input active-high, input impedance 100 k $\Omega$
	2 2.5 A high-side, diagnostics capability, short-circuit proof Alternative usage: ▪ Digital input active-low, input impedance 100 k $\Omega$
	8 5 A high-side, diagnostics capability, short-circuit proof, supplied via Protected Feed Alternative usage: ▪ Digital input active-high, input impedance 100 k $\Omega$
▪ PWM	3 2.5 A, max. 2 kHz, resolution: 8 bits, current-controlled, capable of diagnostics Alternative usage: ▪ Digital output 2.5 A
H-bridge	1 2.5 A
Power supply	1 5 V power supply for sensors
Max. permitted total current	40 A
Degree of protection	IP66/IP68
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JXM-IO-E02

## Dimensional drawing



## Connector pinout

JXM-IO-E02	
70-pin male AMP Tyco connector	
Power supply - Protected Feed	1
V <sub>IGN</sub>	2
Digital In 1 - Standard Feed	3
Digital In 2 - Standard Feed	4
Digital In 3 - Standard Feed	5
Digital In 4 - Standard Feed	6
Digital In 5 - Standard Feed	7
Digital In 6/Out 1 - Standard Feed*	8
Digital In 7/Out 2 - Standard Feed*	9
Digital In 8/Out 3 - Standard Feed*	10
Digital In 9/Out 4 - Standard Feed*	11
Digital In 10/Out 5 - Standard Feed*	12
Digital In 11/Out 6 - Standard Feed*	13
Digital In 12/Out 7 - Standard Feed*	14
Digital In 13/Out 8 - Standard Feed*	15
Digital In 14/Out 9 - Protected Feed*	16
Digital In 15/Out 10 - Protected Feed*	17
Digital In 16/Out 11 - Protected Feed*	18
Digital In 17/Out 12 - Protected Feed*	19
Digital In 18/Out 13 - Protected Feed*	20
Digital In 19/Out 14 - Protected Feed*	21
Digital In 20/Out 15 - Protected Feed*	22
Digital In 21/Out 16 - Protected Feed*	23
Power supply - Standard Feed	24
Ground	25
Ground (analog IN 1)	26
Ground (analog IN 2)	27
Ground (analog IN 3)	28
Ground (analog IN 4)	29
Switch feed output 1 *	30
Switch feed output 2 *	31
Ground (digital Out 1)	32
Ground (digital Out 2)	33
Ground (digital Out 3)	34
Ground (digital Out 4)	35

\* max. current 2.5 A  
 \*\* max. current 5 A  
 \*\*\* max. current 0.2 A

JXM-IO-E02	
70-pin male AMP Tyco connector	
Ground (digital Out 5)	36
Ground (digital Out 6)	37
Ground (digital Out 7)	38
Ground (digital Out 8)	39
Ground (digital Out 9)	40
Ground (digital Out 10)	41
Ground (digital Out 11)	42
Ground (digital Out 12)	43
Ground (digital Out 13)	44
Ground (digital Out 14)	45
Ground (digital Out 15)	46
Ground (digital Out 16)	47
Ground	48
Analog 1 - In 1 - Standard Feed	49
Analog 2 - In 2 - Standard Feed	50
Analog 3 - In 3 - Standard Feed	51
Analog 4 - In 4 - Standard Feed	52
Analog Out - Standard Feed	53
Frequency In 1	54
Frequency In 2	55
PWM Out 1 - Standard Feed*	56
PWM Out 2 - Standard Feed*	57
PWM Out 3 - Standard Feed*	58
Ground (PWM 1)	59
Ground (PWM 2)	60
Ground (PWM 3)	61
CAN A Lo	62
CAN A Hi	63
CAN B Lo	64
CAN B Hi	65
5 V+ output ***	66
Node ID input 1	67
Node ID input 2	68
H-bridge A - Standard Feed*	69
H-bridge B - Standard Feed*	70

The maximum total current is 20 A per supply voltage type (Protected Feed, Standard Feed).

# JXM-IO-E09

## Product brief

The expansion module JXM-IO-E09 was designed as a high-current CAN node. It is for controlling power consumers such as spotlights or signal encoders in CANopen® networks.

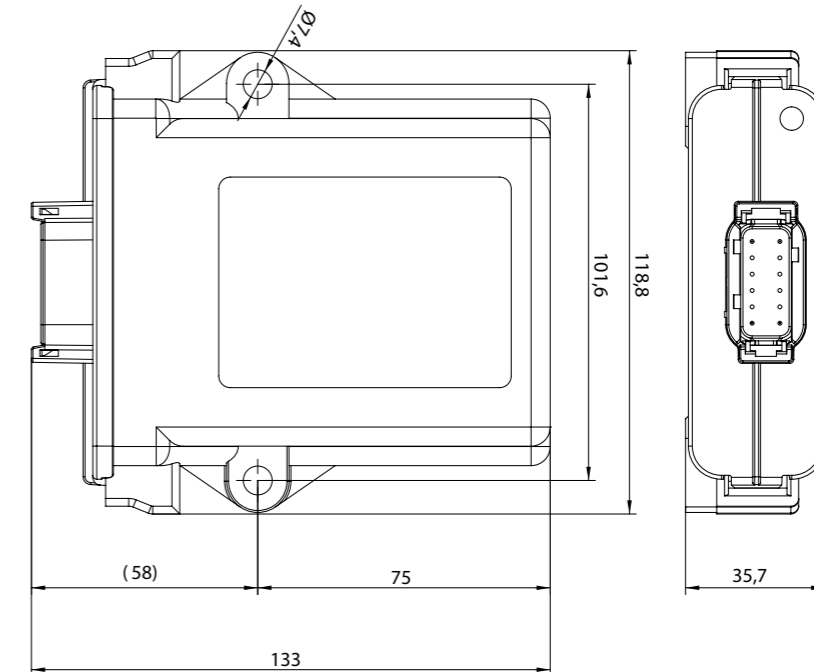
Due to its small size, the module can be placed very flexibly very close to the consumer.

## Product features

- Rugged and compact enclosure
- High degree of protection IP67
- High total current
- CAN port



## Dimensional drawing



JXM-IO-E09	
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-40 ... +85 °C
Ports and interfaces	
▪ CAN	1 CANopen®
Outputs	
▪ Digital	4 75 A high-side with current measuring, diagnostics capability, short-circuit proof
Max. permitted total current	30 A
Degree of protection	IP65/IP67
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Connector pinout

JXM-IO-E09 DEUTSCH DTM13-12 PA-R008	
Power supply	1
Power supply	2
Power supply	3
Ground	4
CAN_H	5
CAN_H	6
Output 1	7
Output 2	8
CAN_L	9
CAN_L	10
Output 3	11
Output 4	12

Note: Load ground return via car body respectively individual grounding cable.

# JXM-IO-E11

## Product brief

The expansion module JXM-IO-E11 has been designed for signal processing in the dashboard or in the driver's cabin.

20 digital switching signals, 3 analog joystick axes and a 4-way switch can be combined to be transmitted to the controller as a CAN message.

Up to 24 LEDs can be controlled via CAN in parallel. Out of these, 20 LEDs can be dimmed individually. This way, a balanced background lighting within the HMI can be set, even if different light sources are used.



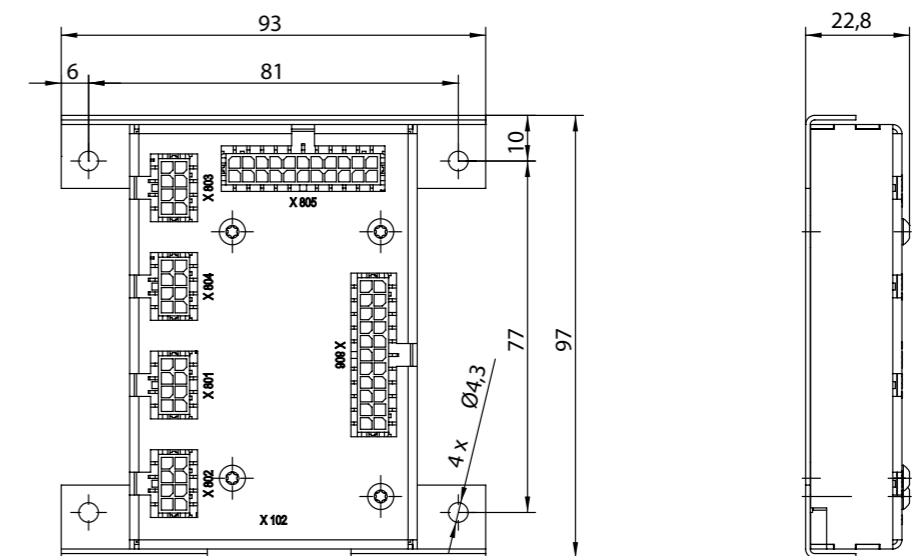
## Product features

- Grouping of discrete input and output signals
- CANopen® port
- 5 V power supply, built in
- Compact design

JXM-IO-E11	
Operating voltage	DC 8 ... 32 V
Operating/storage temperature	-40 ... +85 °C
Interface	
▪ CAN	1 CANopen®
Max. number of inputs/outputs	50
Inputs	
▪ Analog	3 0 ... 5 V for analog joystick X-Y-Z, resolution 8 bits Alternative usage: ▪ 4x digital input, 5 V, for b/w joystick
▪ Digital	22 5 V for keys
Outputs	
▪ PWM	20 5 mA for LEDs, resolution 4 bits
▪ Digital	4 5 mA for LEDs
Degree of protection	IP20
Vibration	DIN EN 60068-2-64, Cat. 2
Shock	DIN EN 60068-2-64, 30g
Protection against polarity reversal	Yes

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Dimensional drawing





# JXM-IO-E11

## Connector pinout

JXM-IO-E11 X801 CAN - Molex Microfit 8-pin	
Power supply	1
CAN-H_IN	2
CAN-H_OUT	3
CAN-L_IN	4
CAN-L_OUT	5
Ground	6
n.c.	7
Ground	8

JXM-IO-E11 X802 joystick - Molex Microfit 8-pin	
n.c.	1
Joystick x-axis or b/w, direction: north	2
Joystick y-axis or b/w, direction: east	3
Joystick z-axis or b/w, direction: south	4
b/w, direction: west	5
Joystick button 1	6
Joystick button 2	7
Ground	8

JXM-IO-E11 X803 4-way switch - Molex Microfit 8-pin	
Voltage output 5 V	1
4-way switch 3	2
4-way LED 3	3
Ground	4
Voltage output 5 V	5
4-way switch 4	6
4-way LED 4	7
Ground	8

JXM-IO-E11 X804 4-way switch - Molex Microfit 8-pin	
Voltage output 5 V	1
4-way switch 1	2
4-way LED 1	3
Ground	4
Voltage output 5 V	5
4-way switch 2	6
4-way LED 2	7
Ground	8

JXM-IO-E11 X805 switch inputs 1 to 16 - Molex Microfit 22-pin	
Voltage output 5 V	1
Slider 1	2
Slider 3	3
Slider 5	4
Slider 7	5
Slider 9	6
Slider 11	7
Slider 13	8
Slider 15	9
Ground	10
Ground	11
Slider 2	12
Slider 4	13
Slider 6	14
Slider 8	15
Slider 10	16
Slider 12	17
Slider 14	18
Slider 16	19
Ground	20
Ground	21
Ground	22

JXM-IO-E11 X806 LED outputs 1 to 20 (dimnable) Molex Microfit 22-pin	
Supply voltage DC 5 V	1
LED driver # 1	2
LED driver # 3	3
LED driver # 5	4
LED driver # 7	5
LED driver # 9	6
LED driver # 11	7
LED driver # 13	8
LED driver # 15	9
LED driver # 17	10
LED driver # 19	11
LED driver # 2	12
LED driver # 4	13
LED driver # 6	14
LED driver # 8	15
LED driver # 10	16
LED driver # 12	17
LED driver # 14	18
LED driver # 16	19
LED driver # 18	20
LED driver # 20	21
Ground	22

# JXM-IO-E30

## Product brief

The expansion module JXM-IO-E30 is the universal building block for remote I/Os on mobile machinery. Thanks to its well-adjusted I/O configuration, it can take on almost any remote task and this way significantly reduce wiring expenses. The reference output lets you use standard sensors and carry out pre-processing applications.



Communication with the JXM-IO-E30 takes place via CANopen®. This allows for integration into conventional CAN networks used in mobile machinery.

Thanks to its potted - and thus rugged - housing the expansion module is applicable in any situation even under harsh environmental conditions.

## Product features

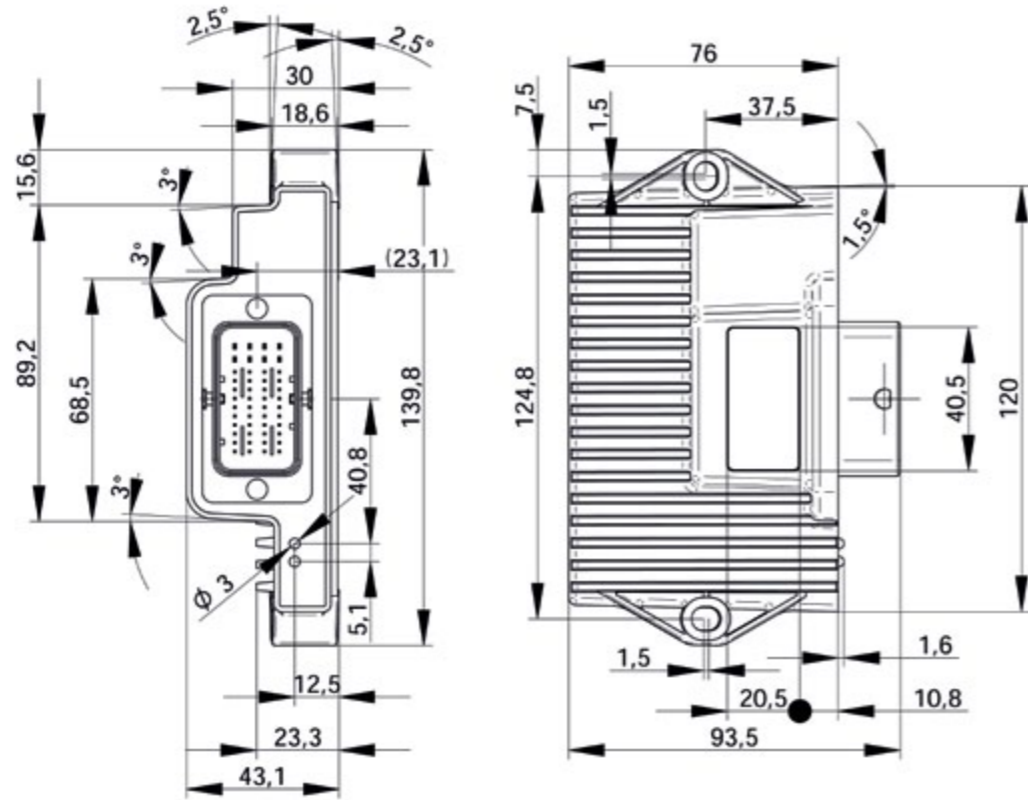
- 12 inputs and 14 diagnostics-capable outputs - including high current paths and PWM with current control
- High switching capacity thanks to parallel use of outputs and high continuous total current
- CAN ID addressing via tri-state inputs allows integration of up to nine nodes in one network without software configuration, and thus supports the common part strategy
- Short-circuit-proof sensor supplies
- Rugged, potted housing

JXM-IO-E30	
Operating voltage	DC 8 ... 32 V, with separate ECU power supply
Operating/storage temperature	-40 ... +85 °C
CAN ports	1 CANopen®
Max. number of inputs/outputs	26
<b>Inputs</b>	
▪ Analog	8 <ul style="list-style-type: none"> <li>▪ 0 ... 5 V/0 ... 20 mA, can be configured individually</li> <li>▪ Resolution: 12 bits, input impedance: 35 kΩ, load resistor: 120 Ω</li> </ul>
▪ Digital / frequency	4 <ul style="list-style-type: none"> <li>▪ Active-high,</li> <li>▪ input impedance 5.6 kΩ</li> <li>▪ 0.1 Hz ... 10 kHz</li> </ul>
▪ Digital / CAN-coding	2 Coding of the CAN ID, tristate
<b>Outputs with diagnostics capability (short-circuit, no-load)</b>	
▪ PWM, precision current measuring	4 <ul style="list-style-type: none"> <li>▪ 3 A, 1.5 kHz max., dithering, current-controlled, diagnostics capability, short-circuit proof</li> <li>▪ Alternative usage: <ul style="list-style-type: none"> <li>▪ Digital input active-low, input impedance 10 kΩ</li> <li>▪ Digital output 3 A</li> <li>▪ PNP input</li> </ul> </li> </ul>
▪ PWM	6 <ul style="list-style-type: none"> <li>▪ 7 A, 1.5 kHz max., dithering, diagnostics capability, short-circuit proof</li> <li>▪ Alternative usage: <ul style="list-style-type: none"> <li>▪ Digital input active-low, input impedance 10 kΩ</li> <li>▪ Digital output 7 A</li> <li>▪ PNP input</li> </ul> </li> </ul>
▪ Digital (50 % ON period)	4 <ul style="list-style-type: none"> <li>▪ 3 A high-side, diagnostics capability, short-circuit proof, (with 50 % ON period)</li> <li>▪ Alternative usage: <ul style="list-style-type: none"> <li>▪ Digital input active-low, input impedance 10 kΩ</li> <li>▪ PNP input</li> </ul> </li> </ul>
▪ Power supply - Sensors	3 Independent supply $V_{BAT}$ for sensors
▪ Max. permitted total current	25 A
▪ Degree of protection	IP65
Vibration	ISO 16750-3
Shock	ISO 16750-3
Protection against polarity reversal	Yes
Output diagnostics	Short circuit, no-load

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JXM-IO-E30

## Dimensional drawing



## Connector pinout

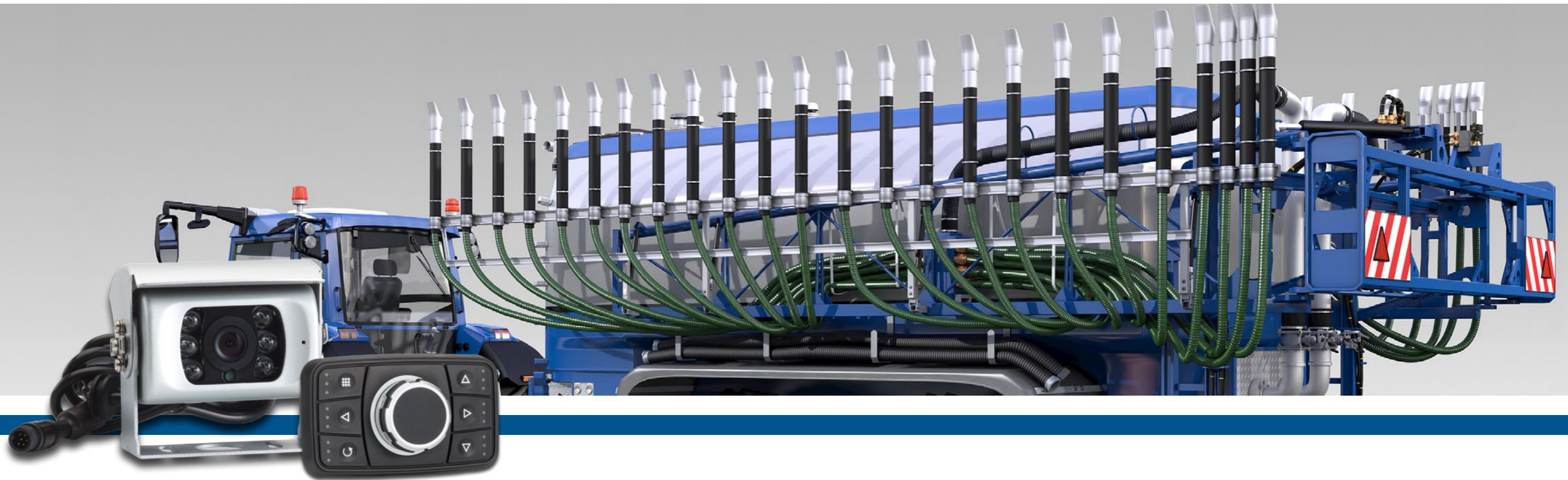
JXM-IO-E30	
CAN High signal	A1
CAN Low signal	B1
PWMi_H3_4 - High-side PWM output	C1
PWMi_H3_3 - High-side PWM output	D1
PWMi_H3_2 - High-side PWM output	E1
PWMi_H3_1 - High-side PWM output	F1
DO_H3_4 - Digital high-side output	G1
DO_H3_3 - Digital high-side output	H1
DO_H3_2 - Digital high-side output	J1
DO_H3_1 - Digital high-side output	K1
V <sub>BAT</sub> - Power supply	L1
V <sub>BAT</sub> - Power supply	M1
CAN_TERM2 - CAN termination	A2
CAN_TERM1 - CAN termination	B2
DI_P_1 - Digital and frequency input	C2
DI_P_2 - Digital and frequency input	D2
DI_P_3 - Digital and frequency input	E2
DI_P_4 - Digital and frequency input	F2
GND_SEN - Ground for sensor power supply	G2
VEXT_SEN_3 - Sensor power supply	H2
VEXT_SEN_2 - Sensor power supply	J2
VEXT_SEN_1 - Sensor power supply	K2
V <sub>BAT</sub> PWR - Power supply	L2
PWM_H7_1 - High-side PWM output	M2

JXM-IO-E30	
n.c.	A3
AI_1 - Analog input current/voltage	B3
AI_2 - Analog input current/voltage	C3
AI_3 - Analog input current/voltage	D3
AI_4 - Analog input current/voltage	E3
AI_5 - Analog input current/voltage	F3
AI_6 - Analog input current/voltage	G3
AI_7 - Analog input current/voltage	H3
AI_8 - Analog input current/voltage	J3
V <sub>BAT</sub> ECU - Power supply for logics	K3
GND_PWR - Ground for power outputs	L3
PWM_H7_2 - High-side PWM output	M3
PWM_H7_5 - High-side PWM output	A4
PWM_H7_5 - High-side PWM output	B4
PWM_H7_6 - High-side PWM output	C4
PWM_H7_6 - High-side PWM output	D4
PWM_H7_4 - High-side PWM output	E4
PWM_H7_4 - High-side PWM output	F4
PWM_H7_3 - High-side PWM output	G4
PWM_H7_3 - High-side PWM output	H4
CFG1_IN	J4
CFG2_OUT	K4
GND_PWR - Ground for power outputs	L4
GND_PWR - Ground for power outputs	M4

## System components

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The variety of functions and ease of operation are significantly increased by system components. Individual demands placed on user-friendly operation and configuration of mobile machinery can very easily be met this way.



# POWERTRACK

## Product brief

POWERTRACK allows for HMIs to be expanded by a push encoder and 6 user-programmable keys. POWERTRACK connected via CAN enables intuitive and efficient user guidance.



## Product features

- Easy-to-grip push encoder which can also be handled by a user wearing gloves
- 6 user-programmable keys which can be labeled individually
- Keys with multi-color LEDs for state reporting
- Compact design (degree of protection: IP54)
- CAN interface for CANopen® or SAE J1939 (option)

POWERTRACK	
Connector	Deutsch DT04-4P
Service life - keypad	3 million switching cycles min.
Service life - push encoder (push function)	1 million switching cycles min.
Service life - push encoder (rotary function)	100,000 cycles min.
Keyboard	Silicone rubber, PU-hardcoated
Operating/storage temperature	-40 °C ... +70 °C / -40 °C ... +85 °C
UV radiation protection	UVB resistance: 400 hours
Resistance to salt spray	To ASTM B117
Chemical resistance	DEET, motor cleaners, isopropanol, sunscreen, multi-purpose cleaners, orange- or lemon-based cleaners
Degree of protection	IP54
Power supply	Rated voltage DC 12 ... 24 V (DC 8 ... 32 V)
Communications bus	CANopen®

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# POWERKEY PRO

## Product brief

The keyboard series POWERKEY PRO excels by its compact design. Being equipped with a CAN interface and keys which can be assigned by the user, this device opens up a wide range of application options. Meeting specific requirements for the operation of mobile machinery can be very easy this way.



## Product features

- The keys are raised so they can even be easily pressed by operators wearing gloves.
- User-programmable keys. Layout 2x2, 3x2, 4x2, and 6x2
- Individually printable key caps, standard: > 100 icons
- Keys with multi-color LEDs for state reporting
- Compact design (degree of protection: IP67)
- CAN interface for CANopen® or SAE J1939 (option)

POWERKEY PRO	
Connector	Deutsch DT04-4P
Service life - keyboard	3 million switching cycles min.
Keyboard	Silicone rubber, PU-hardcoated
Operating/storage temperature	-40 °C ... +70 °C / -40 °C ... +85 °C
UV radiation protection	UVB resistance: 400 hours
Resistance to salt spray	To ASTM B117
Chemical resistance	DEET, motor cleaners, isopropanol, sunscreen, multi-purpose cleaners, orange- or lemon-based cleaners
Degree of protection	IP67
Power supply	Rated voltage DC 12 ... 24 V (DC 8 ... 32 V)
Communications bus	CANopen®

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

# JXM-CAM

## Product brief

The JXM-CAM is a video camera especially designed for outdoor use. It is ideal for use as a surveillance camera in mobile machinery, or as a rear-view camera in vehicles.

When the light conditions turn weak the photo sensor automatically activates the infrared LEDs which completely illuminate a circle of 10 m in diameter.

The JXM-CAM can be used along with all devices by Jetter AG which are equipped with the corresponding video input.



## Product features

- Compact steel-sheet enclosure
- Degree of protection: IP68
- Operating voltage: DC 12 V
- Ambient temperature: -30 ... +65 °C

JXM-CAM	
System	PAL/NTSC, automatic changeover
Operating voltage	DC 12 V
Operating/storage temperature	-30 ... +65 °C/-40 ... +80 °C
Input current	0.2 A
Outputs:	
- Video	1 (MiniDIN - Composite 1 Vp-p 75 ohms)
Degree of protection	IP68
Night-time operation	Infrared LEDs for illumination at night (sensor-controlled activation)
Dimensions (WxHxD)	90 x 80 x 55 mm

Further details and order information are available on request. Specifications are subject to change without notice. Errors and omissions excepted.

## Connector pinout

JXM-CAM	
5-pin MiniDIN connector	
Power DC 12 V (yellow)	1
Audio IN (red)	2
Mirror (blue)	3
Video IN (white)	4
GND	5

## Wiring harness

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### Product brief

Design and manufacturing of wiring harnesses are a decisive factor for the functional reliability of mobile machinery. Customized wiring harnesses enable implementing customer-specific features. Jetter AG provides long-year expertise in wiring harness technology.



## RAM Mount mounting bases

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### Product brief

Dash mounts by RAM Mount allow quick and easy positioning of HMIs for the perfect angle.

For individual HMIs there are corresponding dash mounts and mounting solutions available.



Jetter AG software solutions unite simplicity and integration. A decisive factor in this case is the usability of the systems.





# JetSym

## Product brief

JetSym is the central programming tool by Jetter AG compliant with IEC-61131-3. It corresponds to all technology functions needed for mobile machinery.

From programming the control system to commissioning the mobile machine, every programming detail can be realized with JetSym.

## Product features

- Configuration
- Programming
- Debugging
- Commissioning
- Diagnostic functions
- Version management



## The programming language STX

STX meets all requirements of mobile machinery automation. Its syntax is based on IEC 61131-3 ST. With this process-oriented language, the real processes of a machine can be directly mapped and described. High-performance commands for PWM-controlled valve handling, motor control, operator interaction and strings make programming of controllers much easier.

The object-oriented approach of STX offers clear advantages. With it, tried and tested routines can be encapsulated so that neither the code nor the essential data can be changed.

In addition, classes can also take over data structures and methods of other classes and extend them. It is exactly this basic principle of object-oriented programming, which is highly interesting for automation systems: Here, the programmer can map shared object properties through a base class and therewith define derived classes for the different manifestations of the objects. The use of these program elements is especially efficient.

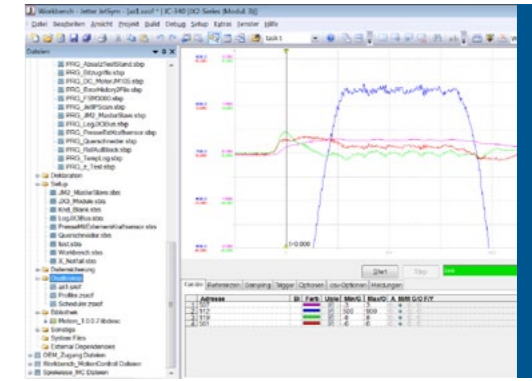
## Object orientation helps to reduce development and testing times

The object-oriented approach of STX helps to reduce development and testing times. With it, tried and tested routines can be encapsulated so that neither the code nor the essential data can be changed. Besides mere reusability, classes can also take over data structures and methods of other classes and extend them. It is exactly this basic principle of object-oriented programming, which is highly interesting for state-of-the-art software architecture in mobile machinery. Here, the programmer can map shared object properties through a base class and therewith define derived classes for the different manifestations of the objects/functions. The use of these program elements is especially efficient and significantly reduces testing times.

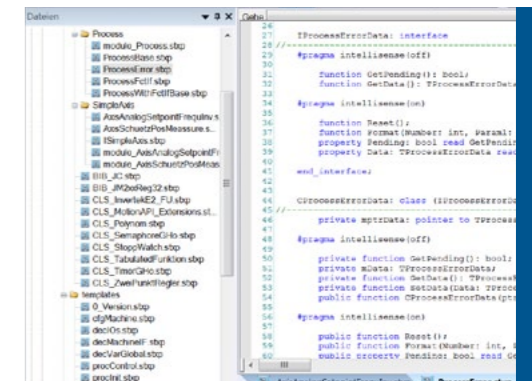
## STX – Can do more

STX has been extended beyond the standard to include many important elements that are indispensable in modern automation. These include object orientation, which is integrated into STX to a very high degree. Many further indispensable functions can be mapped with simple and common commands:

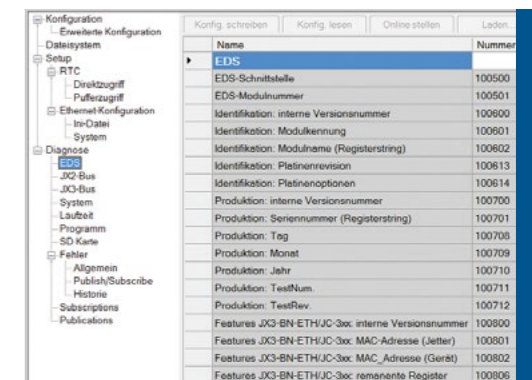
- Positioning
- CAN library
- Hydraulics temperature compensation by current regulation
- Task management
- File operations on the file system of the control system
- String processing
- Data processing in complex structures
- Exception handling
- and much more



Oscilloscope mode



Pragma INTELLISENSE(OFF)



EDS (Electronic data sheet)

# JetViewSoft

## Product brief

The software tool JetViewSoft lets you easily visualize processes and design individual screens for HMIs. The proven object-oriented approach allows you to easily and efficiently complete even complex visualization tasks without previous experience. The user-friendly editor and a pool of predefined objects actively help you create screens in no time at all.

All important functions such as alarm handling, trending and libraries are available for the creation of sophisticated visualizations. Thanks to its object-oriented concept, the user-friendly editor helps to implement large-scale projects easily and efficiently.



## Product features

- Supports scalable vector graphics and SVG import
- Features gesture control for modern visualizations
- Efficient design process thanks to object-oriented structure
- Database with predefined objects and preview feature
- Supports creation of multilingual screens and import/export of language resources
- Alarm handling and trend graph
- STX as scripting language lets you add new functions
- Terminal Wizard and simple download to HMIs

## Full scalability thanks to vector graphics technology

The vector graphics technology of JetViewSoft allows for complete and lossless scalability of all objects (except for bitmap graphics). Thus, projects or project parts that are designed for a specific resolution of the target device can be used on displays with a different resolution without any loss.

## SVG import

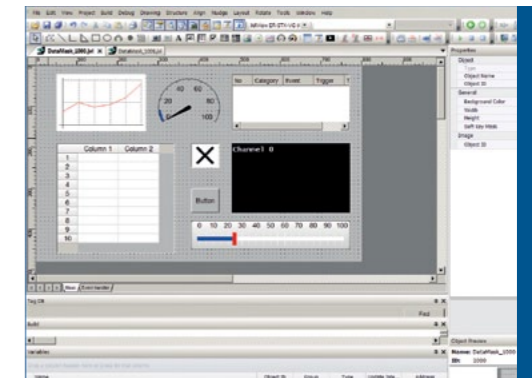
JetViewSoft lets you directly import SVG files from graphics or CAD tools into a visualization application. Cumbersome conversion of CAD drawings into bitmap format is therefore a thing of the past.

## Object-oriented and efficient

The object-oriented approach of JetViewSoft makes generating screens a lot easier. Objects such as buttons need to be defined only once before they can be used as often as they are needed. Making changes to an object property automatically takes effect wherever this object has been applied. Various visualization objects can be dynamically displayed during runtime in the control program by means of pointers.

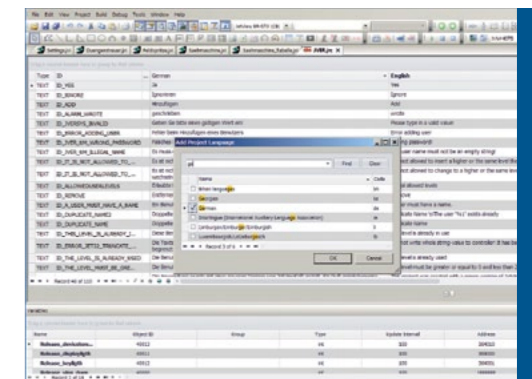
## Configuring objects rather than programming

In JetViewSoft, visualizations can be configured using existing graphic objects. To this end, predefined objects, such as sliders, meters, buttons, lines, circles, ellipses, list boxes, check boxes, symbols, XY graphs, image and video objects are simply arranged by drag and drop in the development environment. These elements can be arranged one upon the other or side by side. They can also be combined to form groups. All elements can be stored in a separate structured object library.



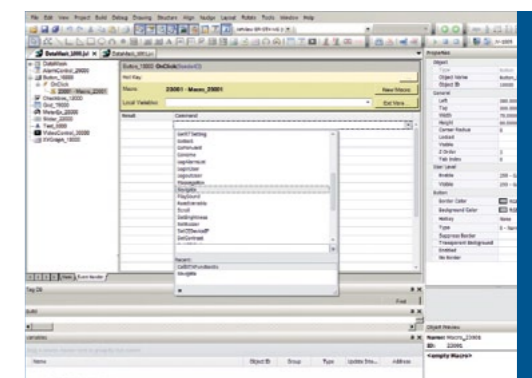
## Editing and managing multilingualism in a central repository

In JetViewSoft, the selected language and optional image fonts are loaded from a central language management pool during runtime. This allows for simple import or export of language resources as CSV files for further editing in MS Excel, for instance. Translation, maintenance and handling of several languages can be carried out quickly and easily.



## Macro and scripting language in perfect unison

For simple processes, JetViewSoft offers programmable macro functions. For complex processes, calculations, or for programming special functions, STX, a programming language based on IEC-61131-3, is available as scripting language. This scripting language is also used to program Jetter controllers. This means, JetViewSoft and STX stand for perfect compatibility.



# ISO-Designer

## Product brief

With the ISO-Designer from Jetter AG, it is simple to create ISOBUS-compliant files. ISO-Designer commands a high-performance graphical editor with a functional scope comparable to graphic programs. Many actions can easily be executed by a few mouse clicks.

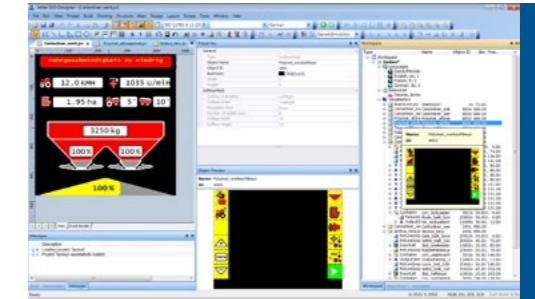
## Product features

- Creating masks to ISO 11783 (.iop files)
- Graphics editor
- Convenient aligning/grouping
- Operating by drag-and-drop
- Zoom function
- Undo/redo function
- Configurable GUI
- Smart copy function
- Object pool with preview function
- Library
- Bookmarks and history
- Supporting standards on all levels
- Automatic color conversion
- Preview function
- Multilingualism is easy to implement



## Clearly designed project management | 100 % ISO-compliant

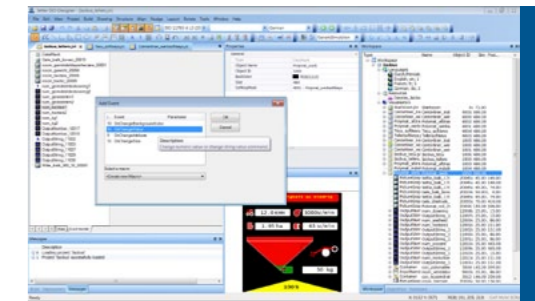
Optimum project management is achieved by presenting the objects in a clear tree structure with a preview function. The ISO-Designer supports all specified levels of the standard. When you create a new project, you are free to choose which specifications should apply. The automatic color space conversion of imported images always ensures compliance with the ISO standard.



Everything at a glance

## Ease of operation leaves no wish unfulfilled

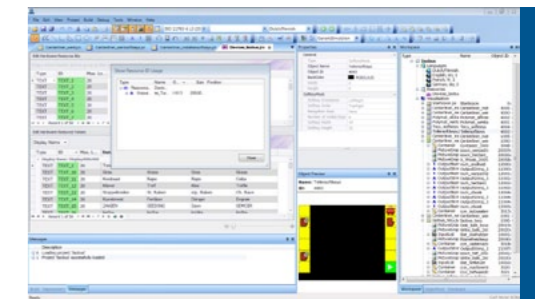
Profit from numerous convenient functions which ease your daily work. This way, even the work interface can be customized to your needs. All functions first go through an intensive practical test before they are finally integrated into the program.



Optimized for the practice

## Multilingualism | More options

With the ISO-Designer, multilingual masks are especially simple to create. A resource file saves all the necessary information. The relevant texts are displayed depending on the active language. The resource file can also be exported as a table and imported again, which substantially simplifies external translation of the texts.



Fast, efficient language management

We are members

CC-ISOBUS



ISO-Designer – Get your license at no cost for an unlimited period.

Register at [www.iso-designer.de](http://www.iso-designer.de) and you will receive your personal activation code. Profit from the benefits:

- Standard-compliant further development with update service
- Full functionality
- Full support
- Full compatibility for every ISOBUS terminal

## Professional Services

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Jetter AG provide professional services for the entire field of mechanical and plant engineering. The choice is yours: You can have us manage your entire project or let us contribute our know-how for specific solutions.



Our services at a glance:

- Consulting | Project management
- Controller programming services
- Creation of visualization applications
- Electrical engineering | Control cabinet production
- Service | Maintenance
- Training
- Retrofit



Take the easy option and let our experts advise you from the very start. As part of our project management process, we'll work with you to identify which system, which partial or complete solution with which device, best suits your needs.

### Consulting and management

- End-to-end project management
- Use of standard project management software
- Conceptual design and project planning (centralized, decentralized), dimensioning of project-specific drive technology
- Path, movement and energy optimization
- Selecting sensors, actuators and motors, as well as suitable automation components
- Procuring all necessary components

### Controller programming

- Structured text programming to IEC 61131-3-(ST)
- Conceptual design and development of software structures
- Development of programming concepts suitable for series production machinery including version management, update functions and variant handling
- Complete function test and acceptance

### Creation of visualization applications

- Visualization using your own or standard visualization software
- Implementation of database integration
- Selection and programming of suitable user interfaces with key, mouse or touch operation
- Complete function test and acceptance

### Electrical engineering and Control cabinet production

- Planning and optimizing production capacity
- Manufacturing control panels and cabinets
- Fabrication in accordance with current EN regulations
- Wire harness manufacturing
- CE certification with risk analysis
- Electrical design with Eplan
- Planning and design according to current standards
- Creating wiring, terminal and cable diagrams



### Service and maintenance

- Hotline | Telephone and e-mail support
- 24/7 stand-by support on request
- On-site repairs and replacements by our own service team
- On-line support with optional remote access
- Remote maintenance
- Compatibility analysis for products and systems
- Maintenance contracts | Preventative maintenance
- Optional enhanced warranty offers

### Training

- STX programming
- Drive technology/MC
- Visualization
- Service staff

### Retrofit

- Upgrading existing machines to create a modern, powerful control system
- Seamless integration with the existing IT structure
- Coordination of conversion work with non-production times

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