



Road Weather Station CrossMet V4

Technical documentation

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INDEX OF KEY DEFINITIONS

Interface RS 232	Standard RS 232 (also referred to as serial port or serial line) is used as a communication interface of personal computers and other electronics. Contrary to a more complex USB (Universal Series Bus), the RS 232 standard only defines how to transfer a specific bit sequence and does not deal with higher communication layers. Three main conductors are used (RxD receiving, TxD transmission and common ground GND), that may further be replenished with more elements serving transmission control. As a standard, the maximum conductor length is 15 m.
Interface RS 485	RS 485 is a specification of a two-wire, half-duplex, multi-point series connection. Bus bar maximum length is 1200 m, maximum number of units is 32. Maximum transmission rate is 200 kb/s.
CCTV cameras	Color camera for observing nearest area around the installation road meteorological station. Camera provides static image and this image send to central. Resolution of each transmited image is ordinarily 1920 1080 pixels. Used compression of image is jpeg.

INDEX OF REFERENCES TO OTHER PRODUCTS

UNR1	Universal stainless steel switchboard [UNR1) is designed for installation of technological components made by company CROSS Zlín, such as road meteorological station CrossMet and road meteorological station Vaisala. UNR1 is produced only in one basic dimension variant with set up of components according to project requirements. It is based on box Conteg. Layout of all parts inside the box is specified in individual project documentation. Documentation is either unique for a single piece, or serves for production of identical units. Wiring of 230V AC power supply part cannot be changed unless the box is connected directly to protected power line. Switchboard UNR1 is designed for use as a part of road infrastructure. It is being dixed on poles, gantries and other appropriate structures.
UPR1	Universal plastic switch board (UPR1) is designed for installation of technological components as from company CROSS Zlín, such as road meteorological station CrossMet and road meteorological station Vaisala, automatic traffic counter ASD3, automatic traffic counter with weight-in-motion ASD5WIM, camera systems, etc. UPR1 is produced in five basic dimensions according to space requirements of uniqueproject of company CROSS Zlín. In t all cases are used boxes SAREL, line Thalassa: 1. SA 59318 430x330x200 2. SA 59323 530x430x200 3. SA 59327 647x436x250 4. SA 59336 747x536x300 5. SA 59357 847x636x300 Layout of all parts inside the box is specified in individual project documentation. Documentation is either unique for a single piece, or serves for production of identical units. Wiring of 230V AC power supply part cannot be changed unless the box is connected directly to protected power line. Switchboard UPR1 is designed for use as a part of road

	infrastructure. It is being fixed on poles, gantries and other appropriate structures. For the biggest installation is used plastic box Sarel Thalassa SA 59357. This box is designed to be mounted using plastic basement.
SW CROSS SERVIS	Service software for all software products as from company CROSS Zlín.
Ultracrete PY5	Flowable Rapid Setting Polyester Resin Mortar Ultracrete PY5 is a polyester resin mortar with a proven track record. It produces a flowable material suitable for anchoring bolts or bars, bedding cats eyes, airport runway lights, backfilling manholes, bridge bearings, balustrades, traffic loops and sensors.

INDEX OF ABBREVIATIONS

EMC	Electromagnetic compatibility	GPRS	General Packet Radio System
GSM	Global System for Mobile communications	LED	Light emitting diode

INDEX OF USED SYMBOLS

	Info This symbol is highlighting important information.
	Danger of electric shock!
	First aid Recommended treatment of injury.
	Waste conditioning information Waste conditioning of this product has to conform to EU directive 2002/96/ES. This symbol denotes that the respective product does not belong to domestic waste and must be carried away to the point of municipal waste separation focusing on electrical devices.
	Troubleshooting Information on feasible solution.
	Warning This symbol emphasizes the possibility of incorrect operation or accident if you will not adhere to the recommended instructions.
	Accredited service Failures labeled with this symbol can be solved by accredited service only.

1 ANOTATION

CrossMet V4 road meteorological station is designated for automatic collection and transfer of current meteorological data in the field of road traffic that are indispensable for maintaining safety and smoothness of traffic and for planning of winter maintenance of roads at the present time.

Measuring of the basic meteorological parameters and monitoring of the status of road surface using a system of sensors is a primary function of the station. The measured values are sent in the assessment centre or they can be used locally with devices for operational information. Data are provided for organizations dealing with winter maintenance of roads in a form of simple to use, tables and diagrams.

Product name CrossMet V4 is a trade name used by CROSS Zlín.

2 CONDITIONS OF USE AND PERSONAL SAFETY

The **CrossMet V4 (road meteorological station)** is a device located in a protective zone of roads and, as such, it can affect the safety of traffic. The device is subjected to certification within the framework of laws and regulations applicable in the country of use.



Designing, installation, programming and maintenance may be carried out only by persons having the appropriate authorization for such activities.

The road meteorological stations are dedicated electrical devices that may be operated only by persons having appropriate qualifications. Some steps require operations performed under voltage (when the cabinet is open) and there is a risk of electric shock when carrying out such work.

2.1 BRIEF SAFETY RULES FOR THE ROAD METEOROLOGICAL STATION OPERATION



- In the station proximity, do not manipulate with open fire and/or other chemicals that might damage the stations.
- Do not leave the station cabinet unattended.
- Do not forget about regular working safety training concerning electrical devices.
- Prior to start of working at the open cabinet, make sure that the cabinet has been disconnected from power supply.
- Do not touch any electrical devices with wet hands.
- Internal cabinet equipment may only be manipulated if voltage is absent
- Do not connect the road meteorological station to a power supply with the voltage higher than specified in this product description.

- In case of fire, extinguish the live CrossMet using a dedicated extinguisher, never with water.

2.2 FIRST AID

First aid in case of an electric shock:



- a) turn off the device
- b) remove the injured person from the reach of electricity (by turning-off the power supply, removing the conductor and dragging the injured person away)
- c) in case the injured person does not breathe, immediately start with artificial respiration
- d) seek a medical assistance

Prior to any resuscitation attempts find out if:



- a) the person is conscious
- b) if he/she is breathing
- c) if his/her heart is beating
- d) if he/she is not involved with arterioragia
- e) if he/she is not burnt by a voltaic arc
- f) if his/her legs/hands are not broken

In case the injured person is conscious, repose him/her into stabilized position, release his/her clothing and, possibly, cover him/her with a blanket.

In all cases doctor must be present whenever electric shock occurs because the injured person must not take pains, neither bodily or mentally.

Do not treat burns but just cover them with a clean sterile bandage available in each first-aid kit.

If the injured person is unconscious and is not breathing, give him/her an artificial breathing using the method “from lung to lung”, whereas the first 10 breaths are carried out always after 1 sec. and each next breath is performed after next 4 – 6 sec. Keep on artificial breathing for as long as the doctor comes to the place.

In case the employee’s heart stopped to beat, give him/her an indirect cardiac massage, namely by pushing the breastbone in the direction to his/her spine, by 5 cm. Repeat the pushing each second. At the time you are breathing air into the person, omit one pushing.

In case of arterioragia (blood is jetting out) put a pressure bandage onto the wound; this pressure bandage also use in case of bleeding from a vein when blood is permanently flowing out from the wound. Apply the bandage above the wound.

Each electric shock causes the entire nervous system incitement in the injured person – the traumatic shock. This circumstance worsens the injured person mental condition and also may be a cause of his/her death in case his/her heart stops to work.

During the traumatic shock, the heartbeat slows down and accelerates. Lips are pale or bluish. The injured person stresses his/her pains for all the time.

The only ways to reduce effects of the shock:



- a) calm down the pain
- b) keep the person in silence
- c) warm conditions
- d) using juices (must not be served in case of an abdomen injury)
- e) careful transportation



During the installation, operation and maintenance the instructions summarized in this document must be kept. The device must not be operated by ordinary persons. The installation and servicing may only be performed by an appropriate manufacturer employee, or by an employee of an organization authorized by the manufacturer within the scope of the authorization. Unprofessional checks on the device

may lead to a significant damaging and also there is a risk of personal injuries. For such consequences the manufacturer does not bear any responsibility.



In case the product is damaged or there is a suspicion of damaging the device internal components (e.g. as a result of the device fall), it is not recommended to connect the device to mains and put it into operation with respect to possible electric shock. In such cases please contact the manufacturer and ask for the device inspection.

Service instructions and general description needed for the device installation and operation are delivered together with the product. An employee performing any activity related to the controller must be familiar with the product documentation; the documentation must be available to him/her at any time.

3 ENVIRONMENTAL PROTECTION

Road meteorological station CrossMet V4 and their components can only be disposed of in compliance with valid legislation for environmental protection, dealing with waste disposal. In the EU territory this is the Directive No. 2002/96/ES about waste electric and electronic equipment. Also, the disposal must be carried out in compliance with the local environmental legislation dealing with waste disposal.



By providing a proper product disposal, you will prevent releasing health-damaging substances from the product into environment that might occur in case the disposal was not carried out properly.

This appliance does not belong to a mixed municipal waste. It is necessary to convey the waste to an appropriate point of collection of electrical and electro technical device waste.

4 BASIC INFORMATION

CrossMet V4 meteorological station is endowed with high reliability and automatic balancing in order to eliminate effects of changes of ambient temperatures. Complex data are transferred in the centre. They are processed, provided for next use in a form of clear tables and diagrams and archived here.

The system of the meteorological station itself is modular. There are options for extension, alternative power supply, etc. Variability in design dimensions of components, different installation requirements, etc. result from this fact.

This documentation describes the basic type of the CrossMet V4 meteorological station. A variant solution of the meteorological station has effect on its parameters, installation and maintenance. The facts resulting from differences of variants of equipment of the meteorological station are listed in the end of this document. (Chapter 11 and Chapter 13 - Figure 8 - Weather Station Interior Equipment Components in the Basic Version and Figure 9 - Weather Station Interior Equipment Components in the Extended Version).

The meteorological station consists of the following constructional units:

- Electronic part of the meteorological station installed in a cabinet on a pole. The meteorological station switchboard is usually in the antivandal variant due to vandalism damage. For more information on stainless steel or plastic enclosures see separate manual CROSS-TD-UNPR1_EN or the datasheet.
- Base part of the meteorological station for pole anchoring.
- Pole with arm and atmospheric sensors.
- Road sensors installed in the road.

5 BASIC TECHNICAL SPECIFICATION

5.1 DIMENSIONS

Meteorological station pole:	height of 4000 - 10000 mm, diameter 114, 76 mm
Meteorological station cabinet:	600 x 600 x 210 mm
Control unit module:	185 x 110 mm
Base ground plan:	800 x 800 mm

5.2 TECHNICAL PARAMETERS

Meteorological station power supply:	230 V AC 50Hz / TN-S
Maximum power input (basic design):	15 VA
Supply cable maximum size:	10 mm ²
Switchboard protection degree:	IP 55
Air humidity range:	0 to 100 % RH, non-condensing
Communication:	serial interface 2 x RS 232, 3 x RS 485 2x RS485, 5x RS232, Ethernet

The following units are installed in the meteorological station cabinet:

- Meteorological station control unit module (more information – see Chapter 11 and Image nr. 8 - Interior equipment components of the meteorological station in a plastic variation and Image nr. 9 – Interior equipment components of the meteorological station in stainless steel variation in Chapter INDEX OF FIGURES AND TABLES
- GSM modem for wireless data transfer
- Power supply
- Power supply protective elements and internal distribution lines

5.3 ROAD SENSORS

They are installed in the top layer of the road surface in the axis of a driving lane of the road. It is possible to use one to four road sensors according to required measurements and surrounding conditions in the place of measurement. Supply cable for them is led in a slot milled in the road. Both the cable and the road sensor are sealed with a special sealing compound on the basis of Ultracrete PY5 polyester resin. They are laid in a cable in accordance with ČSN 33 2000-5-52 ed.2 in free ground.

Tab.No. 1: Technical parameters of road sensor

Sensor dimension:	diameter 120 mm, installation depth 45 mm
Weight:	800 g
Degree of protective:	IP 68
Operational temperature range:	-40°C - +70°C

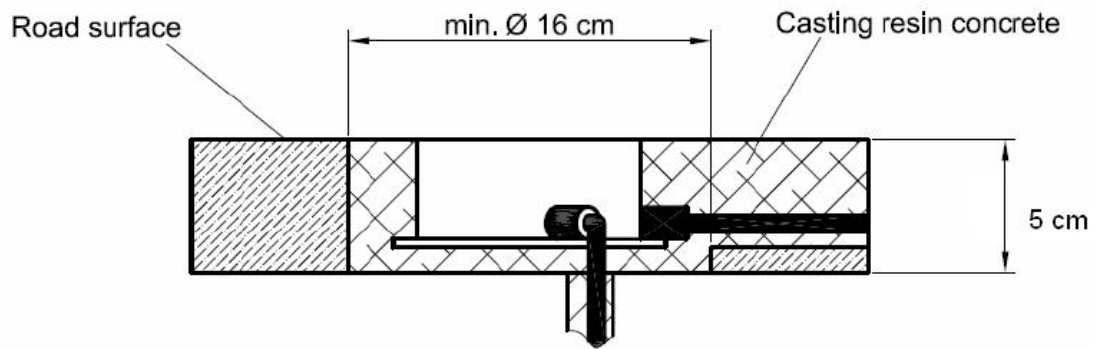


Fig.No. 1: *Installation of the road sensor*

6 BASIC FUNCTIONAL PARAMETERS

6.1 METEOROLOGICAL STATION CONTROL UNIT

Unit module power supply voltage:	12 to 24 V DC with tolerance – 15% to + 20%
Control unit power consumption:	3 VA
Indication of operational statuses:	LED on the module face side
Electromagnetic compatibility:	EMC acc. to ČSN EN 55022, 61000 and 50082-1
Control unit operational temperature range:	-40 to +85 °C
Control unit module protection degree:	IP 44

6.2 ROAD SENSOR

Road surface temperature measuring:	-40 °C – 70 °C ($\pm 0.2^{\circ}\text{C}$; -10 to 10°C), otherwise $\pm 0.5^{\circ}\text{C}$
Freezing point temperature:	-20 °C – 0 °C $\pm 1^{\circ}\text{C}$ for $T_F > -10^{\circ}\text{C}$ (for NaCl and CaCl ₂)
Operational temperature range:	-40 °C – +70 °C
Water layer thickness:	0 to 4 mm (± 0.1 mm + 20 % of measurement)
Supply voltage:	9 – 14 V DC, typical supply voltage 12 V DC
Road surface condition:	7 states (Dry, Damp, Wet, Treated, Snow, Frost, Ice)
Road surface condition	Dry, wet, wet and salt, snow, icing, residual salt

6.3 TEMPERATURE SENSOR

Air temperature measuring:	-40 to +70 °C $\pm 0.2^{\circ}\text{C}$
Relative humidity:	0.8 to 100 % ± 2 % (± 3 % - 90...100 %)
Thermal dependence:	± 0.05 % RH/°C
Operational temperature range:	-40 to +60 °C

6.4 COMBINED DETECTOR

Precipitation detection:	ON/OFF
Precipitation intensity:	0 to 99,99 mm/h
Precipitation category acc. to intensity:	I
Operational temperature range:	-40 to +60°C
Cover	IP 68
Visibility	10 to 2000 m ± 10%
Visibility types	Fog, turbidity, haze

6.5 POSSIBILITY TO CONNECT OTHER SENSORS

- Speed and wind direction
- Barometric pressure, snow depth
- Overview camera with night lighting
- Sun light and others

7 REQUIREMENTS FOR INSTALLATION

Requirements for meteorological station power input in the basic variant: control module, GSM modem, road sensor, temperature sensor, precipitation sensor.

Nominal voltage:	230 V ~ 50 Hz, TN-S
Capacity of circuit breaker before electricity meter:	10 A
Total installed power input:	60 VA
Contemporaneous power input:	15 VA

7.1 METEOROLOGICAL STATION POSITIONING

When selecting a site for CrossMet V4 meteorological station, it is necessary to take into consideration the following requirements in particular:

- availability of power supply for the meteorological station
- climatic conditions in chosen locality with respect to the required measuring outputs such as climatically critical places (bridges, culverts, hoarfrost areas etc.)
- positioning of the meteorological station in connection with the cross section to the road axis considering potential obstacle for road traffic, safety of road traffic, possibility of road maintenance, etc.
- quality of road surface in the place of assumed installation of the road sensors, taking planned reconstructions in the given locality into consideration etc.
- retaining the existing method of road drainage
- availability of GSM/GPRS service for wireless communication within the locality of installation or a possibility to connect via optical cable

7.2 SCHEDULE OF METEOROLOGICAL STATION INSTALLATION STAGES

- a) Installation of the meteorological station electronic system within the installation premises
- b) Debugging, testing operation within the installation premises
- c) Low voltage power supply line establishing

- d) Inspection of the low voltage power supply line and cable insulation condition measuring
- e) Erection of the base part of the meteorological station
- f) Installation of the meteorological station pole
- g) Installation of the road sensors in the road
- h) Power supply line connecting to the distribution system and electricity meter installation
- i) Installation of the atmospheric sensors and meteorological station electronic system
- j) Debugging, pilot operation
- k) Geodetic survey of the real situation
- l) General inspection (without low voltage power supply line)

7.3 METEOROLOGICAL STATION GROUNDING

In case that it is not possible to use a suitable accidental earth conductor, installation of an independent fitted earth conductor with the minimum value of grounding resistance of 5 Ohm in accordance with ČSN 33 2000-5-54 ed.3 is required. The grounding line will be made of FeZn wire with circular cross section of at least 8 mm. The power supply line will be connected to a grounding screw through a grounding terminal of the meteorological station pole in the height of approximately 115 mm above the surface of the base part of the meteorological station. The grounding system must be completed and the wire installed before basic part concreting.

7.4 METEOROLOGICAL STATION BASE PART

The meteorological station pole is fixed to the base part. There are entries, grounding wire and steel weldment to which the pole flange is screwed using nuts in the reinforced concrete base.

The weldment is anchored in the base part with ground plan dimensions of 800 x 800 mm. The base part is made of C30/37 XF4 concrete resistant to chlorides. Standard reinforcement is represented by reinforcing steel wire mesh with aperture of 150 x 150 D5 in accordance

with drawing for a specific base part. The depth of the base part must be obvious from documentation for a specific construction and depends above all on ground conditions in the locality of positioning. A detail of edge modification above the ground is represented by chamfering of 45° within the minimum size of 40 x 40 mm. Before concreting the base part, it is necessary to position protective tubes for the road sensors, low voltage power supply and grounding wire. The protective tubes protrude above the flange of the base part and then continue inside of the pole.

Recommended number and size of the protective tubes: 2 KF09040 tubes can be added to 2 KF09040 + 1 KF09050 as a maximum. Power and communication cables must be installed separately. The grounding wire passes through a hole in the flange outside the pole pipe, in a hole prepared for grounding.

8 METEOROLOGICAL STATION CONTROL MODULE

It is located in a locked cabinet, on the front of the module there are connectors for connecting sensors, a program switch and control LEDs. (Photos see Fig. 8 - Components of the interior equipment of the CrossMet V4 weather station in the switchboard in the plastic switchboard and Fig. 9 - Components of the interior equipment of the CrossMet V4 weather station in the stainless steel switchboard).

8.1 STRUCTURE AND ARRANGEMENT OF THE METEOROLOGICAL STATION CONTROL MODULE

The CrossMet V4 module consists of two printed circuit boards integrated into one unit in a metal housing, which also serves as a heat sink. The unit is designed using a modern component base with an emphasis on high operational stability. It is placed on a DIN rail in a metal box, which serves both for the mechanical assembly of components and also as a protection for electronic components. The unit is primarily designed to be powered by an external power source. On some inputs and outputs it is equipped with internal reversible fuses which protect the unit against the effects of current overload. Overcurrent or short circuit will cause the return fuse to trip (disconnect).

The resettable fuse does not automatically engage itself as long as the holding current flows, which keeps it open. For the fuse to reconnect, it is necessary to remove the cause and the device that caused the fuse activation, ie disconnect the device from the unit.

8.2 EXTERNAL POWER SUPPLY

(this operation is carried out by a service company)

The CrossMet V4 is equipped with its own back-up power supply (internal UPS) made up of Supercapacitors and provides power to the unit for long enough to store data safely in the event of a power failure. The internal UPS does not need any maintenance or special care. However, it is necessary to sufficiently dimension the external power supply so that it can

supply enough current in the short term before the supercapacitors are fully charged. The external power supply should be able to supply at least 3A of current for 1 minute without dropping its output voltage.

After one minute, the Supercapacitors are charged to 90% energy. Over the next 5 minutes, the supercapacitors are charged with less current to 100% energy. If there is a power failure from an external source, the internal UPS can supply power to the unit for at least 3 minutes when the Supercapacitors are 100% charged and the 3W unit is drawn. The operating time on the internal UPS is reduced in proportion to the higher current consumption, ie with the number of active USB devices with the type of installed expansion modules.

8.3 CONNECTION OF CONTROL MODULE

8.3.1 CrossMet V4

Supplied with RSU control module (toradex VF61 / iMX7), it can also be equipped with an expansion wireless communication module (QUEXTTEL) - GPS and GSM / 3G / 4G / LTE. There is only one SW for this type and the settings are made via the WEB interface.

Allows to connect 8 PDZ + ZPI, all shown the same information, only additional tables for PDZ symbol Auto Snowflake, skid typical designation A8 and A24 is configurable from 500 m to 9500 m.

It allows to connect and use the following sensors: HMP155, PWD12, TG68, Lambrecht, Lufft, Vaisala, Biral and other external suppliers. All control elements and wiring connectors are located on the front of the control module. CrossMet V4 allows you to connect and use the following peripherals on communication ports:

DC IN 12-24V	napájení	+	PWR	vstupní napájecí svorka, rozsah napájecího napětí - min. 10 VDC - max. 30 VDC
	napájení	-	GND	společný potenciál RSU
DIGITAL INPUTS	vstup-1	IN1-	I	záporný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
		IN1+	I	kladný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
	vstup-2	IN2-	I	záporný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
		IN2+	I	kladný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
	vstup-3	IN3-	I	záporný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
		IN3+	I	kladný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
	vstup-4	IN4-	I	záporný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
		IN4+	I	kladný potenciál, pracovní rozsah vstupního napětí - 5VDC - 30VDC
DIGITAL OUTPUTS	výstup-1	OUT1	O	výstup otevřený kolektor, max. napětí 24VDC, max. proud 100mA
		GND1	O	záporný potenciál
	výstup-2	OUT2	O	výstup otevřený kolektor, max. napětí 24VDC, max. proud 100mA
		GND2	O	záporný potenciál
	výstup-3	OUT3	O	výstup otevřený kolektor, max. napětí 24VDC, max. proud 100mA
		GND3	O	záporný potenciál

	výstup-4	OUT4	O	výstup otevřený kolektor, max. napětí 24VDC, max. proud 100mA
		GND4	O	záporný potenciál
AUDIO	kanál 1	3.3V	O	napájecí výstup pro externí zařízení - 3.3VDC, max. 200mA (interní DC/DC měnič)
	kanál 1	IN-MIC	I	MONO mikrofonní vstup (vstupní impedance 2,9KOhm-iMX7, 12KOhm-VF61)
	kanál 1	OUT-L	O	sluchátkový výstup (zatížení 16 / 32 Ohm)
	kanál 1	OUT-R	O	sluchátkový výstup (zatížení 16 / 32 Ohm)
	kanál 1	GND	GND	společný potenciál RSU
RS232	linka 1	RXD1	I	vstupní datová linka
	linka 1	TXD1	O	výstupní datová linka
	linka 1 a 2	GND	GND	společný potenciál RSU
	linka 2	RXD2	I	vstupní datová linka
	linka 2	TXD2	O	výstupní datová linka

RS232	linka 3	RXD1	I	vstupní datová linka
	linka 3	TXD1	O	výstupní datová linka
	linka 3 a 4	GND	GND	společný potenciál RSU
	linka 4	RXD2	I	vstupní datová linka
	linka 4	TXD2	O	výstupní datová linka

RS232	linka	GND	GND	společný potenciál RSU
	linka	CTS	I	povolení vysílání
	linka	RTS	O	požadavek na vysílání
	linka	RXD	I	vstupní datová linka
	linka	TXD	O	výstupní datová linka

RS485	linka 1	B1	I/O	obousměrná komunikační linka
	linka 1	A1	I/O	obousměrná komunikační linka
	linka 1 a 2	GND	GND	společný potenciál RSU
	linka 2	B2	I/O	obousměrná komunikační linka
	linka 2	A2	I/O	obousměrná komunikační linka

1-Wire/CAN	1-W	3.3V	O	napájecí výstup pro externí zařízení - 3.3VDC, max. 0.3A (interní vratná pojistka)
	1-W	1-W	I/O	obousměrná komunikační linka
	1-W a CAN	GND	GND	společný potenciál RSU
	CAN	CAN-L	I/O	obousměrná komunikační linka

	CAN	CAN-H	I/O	obousměrná komunikační linka
ETH 10/100	ethernet	ETH 10/100	I/O	RJ-45 - komunikační síť - 10 Mbit/s a 100 Mbit/s
ETH 1000	ethernet	ETH 1000	I/O	RJ-45 - komunikační síť - 1 Gbit/s
USB-1	USB 2.0	 1	I/O	USB-A - univerzální sériová sběrnice 480 Mbit/s , 5V výstup - proudové omezení na 0,5A
USB-2	USB 2.0	 2	I/O	USB-A - univerzální sériová sběrnice 480 Mbit/s , 5V výstup - proudové omezení na 0,5A
USB-3	USB 2.0	 3	I/O	USB-A - univerzální sériová sběrnice 480 Mbit/s , 5V výstup - proudové omezení na 0,5A
USB-4	USB 2.0	 4	I/O	USB-A - univerzální sériová sběrnice 480 Mbit/s , 5V výstup - proudové omezení na 0,5A
USB-5	USB 2.0	 5	I/O	USB-A univerzální sériová sběrnice 480 Mbit/s , 5V výstup - proudové omezení na 2A
HDMI	HDMI-A	HDMI OUT	I/O	HDMI-A - multimedialní komunikační port
CAN-bus	CAN	CAN-bus	I/O	systémový konektor - obousměrná komunikační linka (interně propojeno s CAN-L a CAN-H)
SIM	SIM	SIM		Mini SIM (2FF) - vstup pro účastnickou identifikační kartu do sítě GSM
MicroSD	MicroSD			MicroSD - vstup pro paměťovou kartu (VF61 - SDHC - max. 32GB, iMX7 - SDHC, SDXC - max. 2TB.)
GPS, GSM	GPS, GSM	GPS GSM		anténní vstupy modulu QECTEL EC25-E pro připojení antén GPS a GSM
LED indikace	signalizace	1 , 2 , 3 , 4		4x LED indikátory provozních a poruchových stavů

9 CrossMet V4 (Expansion Module)

All inputs and outputs are galvanically isolated.

9.1 RTD SENSOR

- connection of PT100 or PT1000 temperature sensors
- (2 inputs) operating voltage at the terminals - up to 5VDC from the internal driver
- surge protection on PCB - 8x ESD diodes 6VDC
- ESD and lightning protection - electrostatic discharge + -8kV (IEC 61000-4-2 level 4) and Ipp 20A (61000-4-5)
- HBM - 4kV (MIL-STD-883 class3)
- galvanically isolated - 3000VDC (1 minute) 'Hi Pot Test'

9.2 ANNALOG INPUTS

- operating voltage and current at terminals - -10V to + 10V or -25mA to + 25mA (choice by DIP switch)
- (IN1) PCB surge protection - 1x TVS diode 15VDC
- ESD, EFT and lightning protection - electrostatic discharge + -8kV (IEC 61000-4-2), (61000-4-4) and (61000-4-5)
- HBM (human body model) - 2.5 kV
- galvanically isolated - 3000VDC (1 minute) 'Hi Pot Test'

9.3 ANNALOG INPUTS

- operating voltage and current at terminals - IN2-V and IN3-V = 0V to 10V, IN2-mA and IN3-mA = 0mA to 25mA
- (IN2, IN3) with surge protection on PCB - 2x ESD diode 12VDC for IN-V and 2x ESD diode 6VDC for IN-mA
- ESD and lightning protection - electrostatic discharge + -8kV (IEC 61000-4-2 level 4), and Ipp 20A (61000-4-5)
- HBM (human body model) - 4kV (MIL-STD-883 class3)

- galvanically isolated - 3000VDC (1 minute) 'Hi Pot Test'

9.4 RS485-ISO

- max. input voltage to A and B - -9V to 14V
- (4 lines) surge protection on PCB - 4x TVS diode -7V to + 12V
- ESD, EFT and lightning protection - electrostatic discharge + -8kV (IEC 61000-4-2), (61000-4-4) and (61000-4-5)
- HBM (human body model) - + -12kV
- galvanically isolated - 4000VDC (1 second)

9.5 RELAY

- max. switching voltage - 30V AC / DC
- (2x switching) max. Continuous current - 3A (resistive load)
- -fitted overvoltage protection on PCB - 4x varistor 30VAC, 38VDC (extinguishes sparking on contacts)
- -ESD protection - IEC 61000-4-2, MILSTD 883C Method 3015.7
- -galvanically isolated - 4000Vrms



Fig.No. 2: *CrossMet V4 front view*

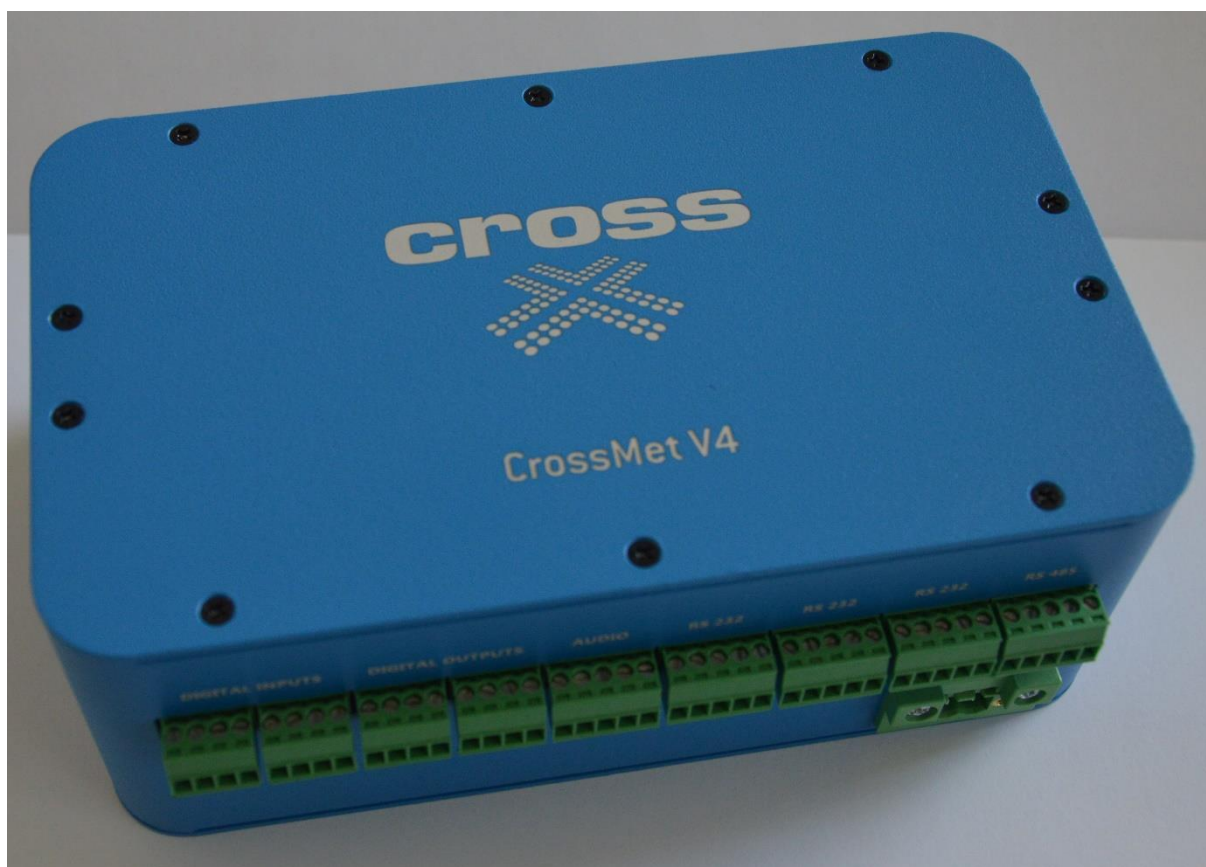


Fig. No. 3: *Rear view of the CrossMetV4 control unit*



Fig. No. 4: *CrossMet V4 control unit with display variant*

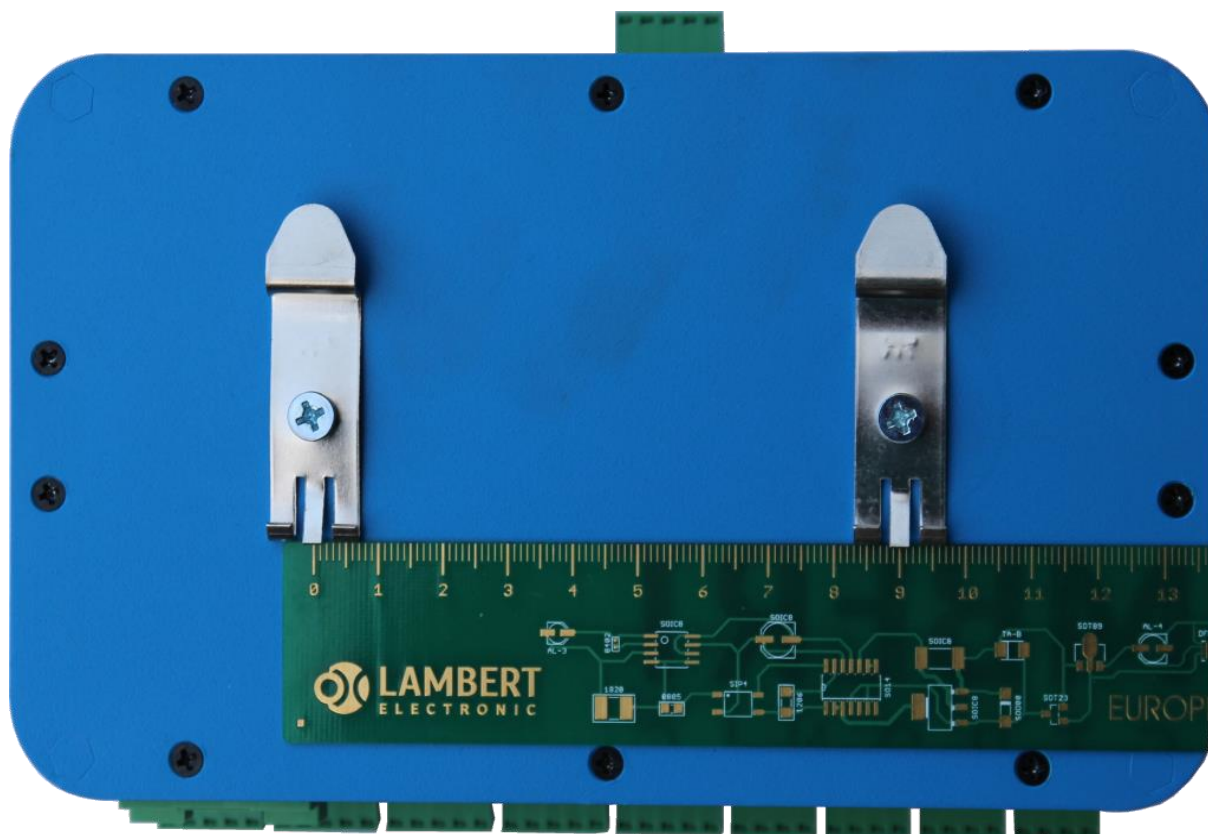


Fig. No. 5: *CrossMet V4 control unit bottom view with DIN connection*

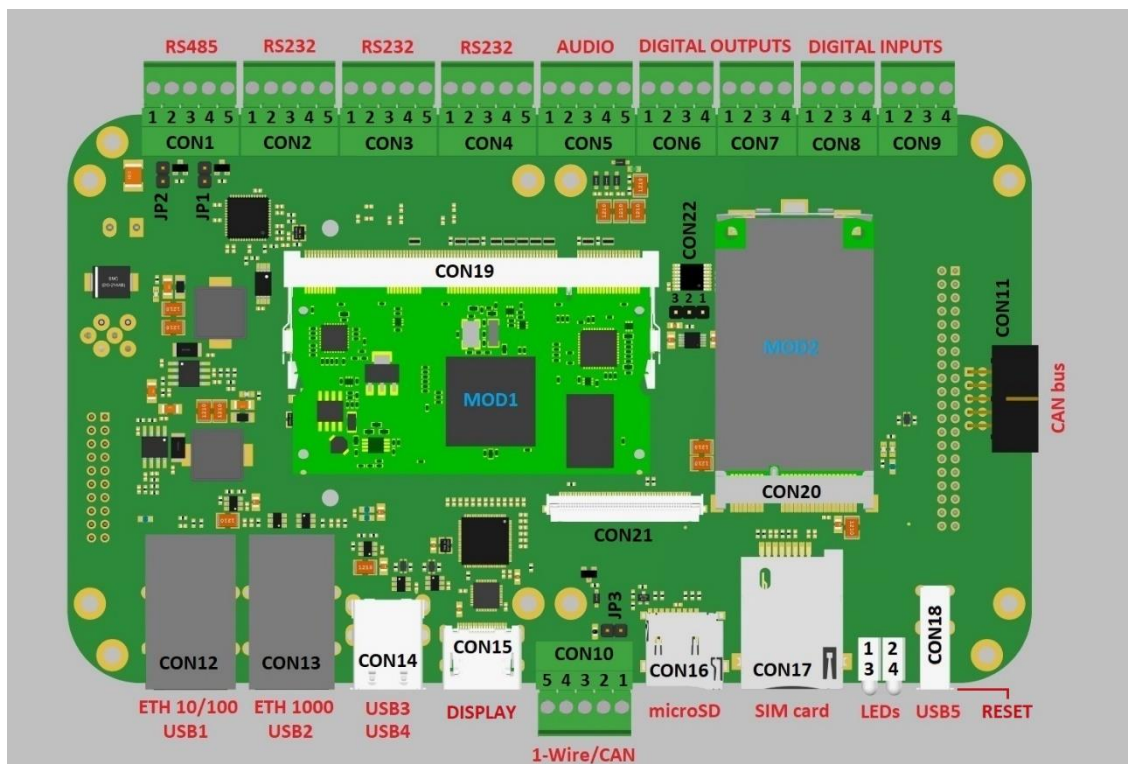


Fig. No. 6: Top detail view of DPS-CrossMet V4

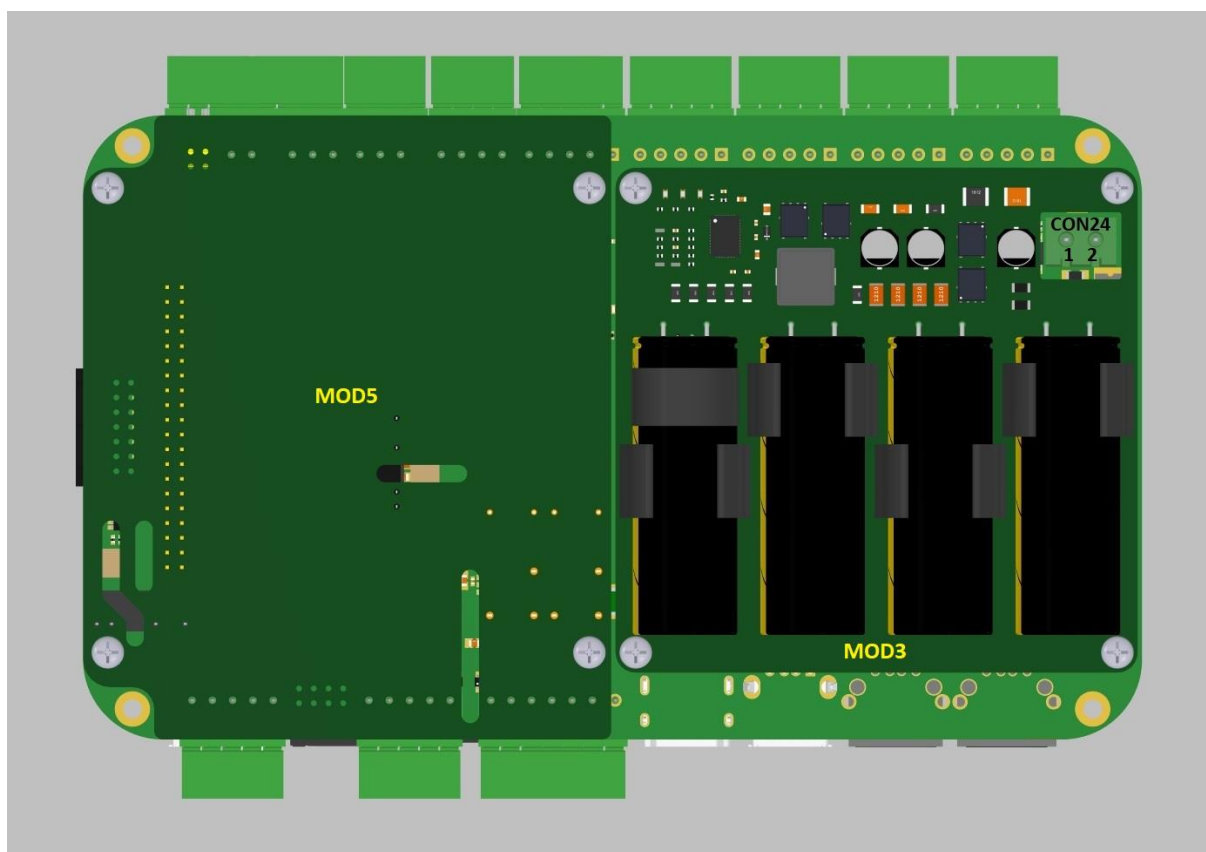


Fig. No. 7: Bottom Detailed view of the CrossMet V4 PCB with UPS and expansion external board

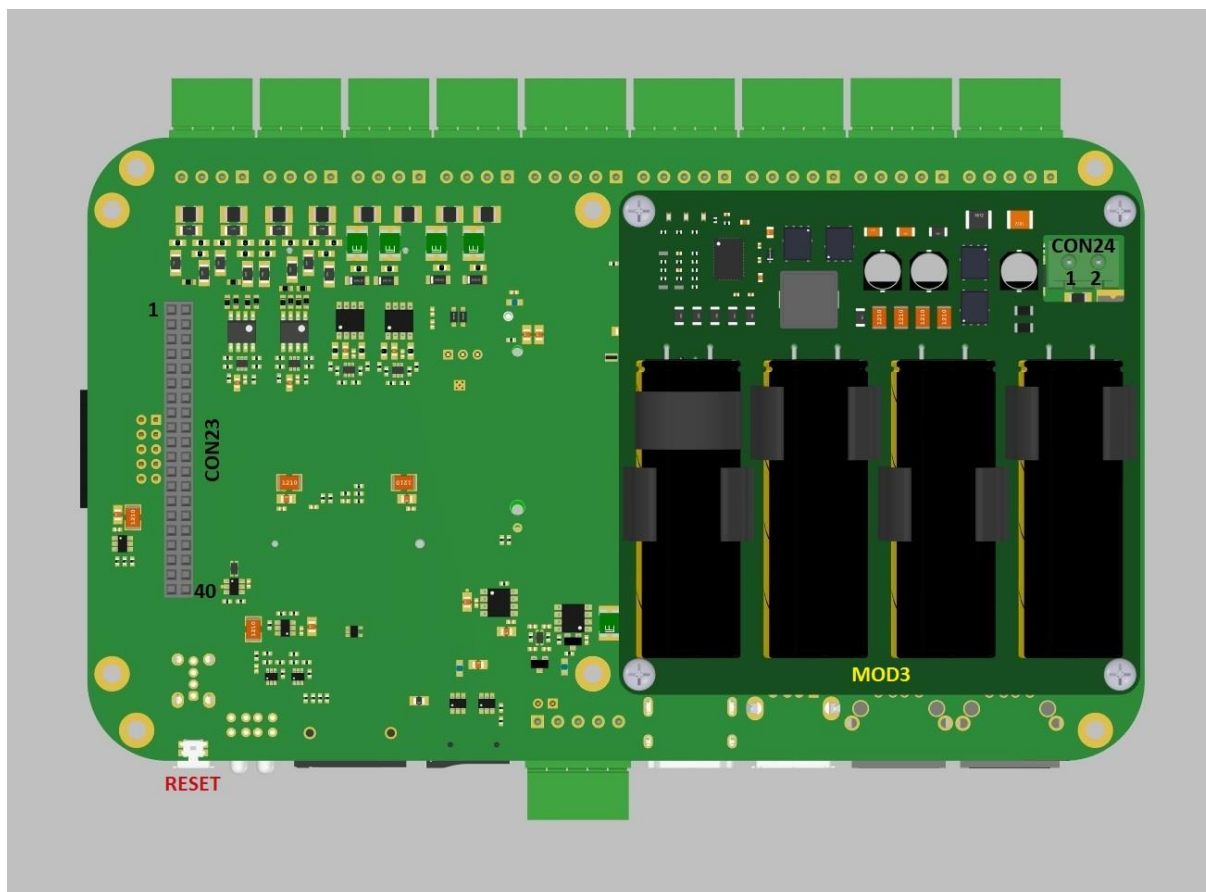


Fig. No. 8: *Bottom Detailed view of the CrossMet V4 PCB with UPS*

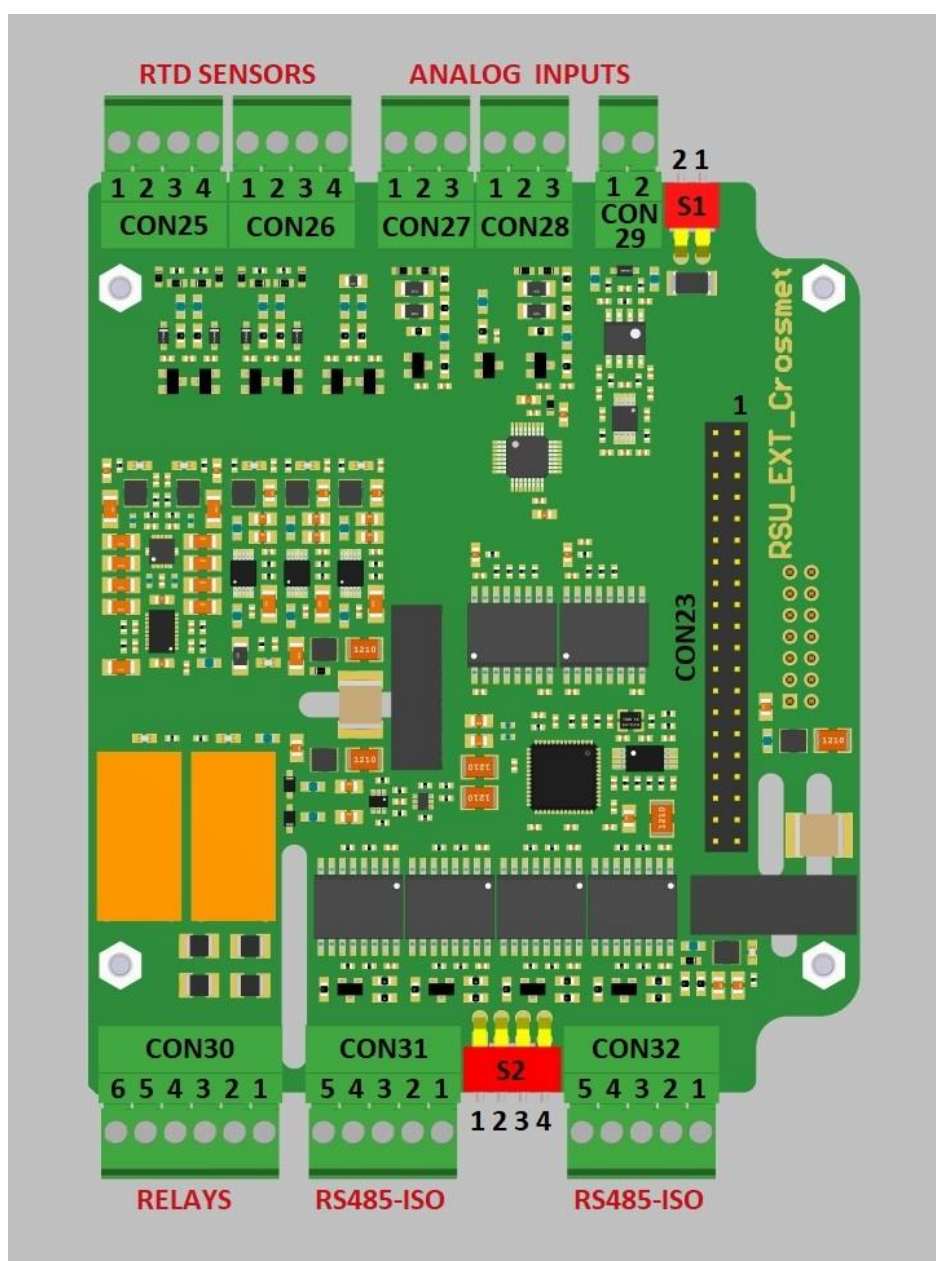


Fig. No. 8: External expansion board for CrossMet V4

Tab. No. 2: Wiring table of the module

No.	Indication	Wire color	Note
Ivozovkový senzor IRS31 pro			
1	RS485 A1	Green	Lufft UMB ISOCON Lufft UMB Surge Arrester
2	RS485 B1	Yellow	Lufft UMB ISOCON Lufft UMB Surge Arrester

3	V+	Brown	12V isolated
4	GND	White	
Temperature sensor, HMP155E			
5	RS-485 A2	Pink	
6	RS 485 B2	Brown	
7	+V	Blue	
8	GND	Red	
Precipitation detector PWD12			
13	+V heating	White/green Green/brown	
14	GND heating	White/yellow..yellow/brown	
15	RS-485 A2	Brown	
16	RS-485 B2	White	
17	24V V+	Red	
18	GND	Black	
senzor směru a rychlosti větru Lufft WS200			
19	V+ heating+	Red	
20	GND heating	Blue	
21	V+	Brown	
22	GND	White	
23	RS485 A1	Green	Lufft UMB ISOCON
24	RS485 B1	Yellow	Lufft UMB ISOCON
IP Relay and ZPI/PDZ			
25	IP Relay RE1		Crossmet V4 dataloger
26	IP Relay RE2		Power 12/24V, ISOCON
27	IP Relay RE3		IP camera + dim
28	Extending module RS485 A (A1)	Blue /white	ZPI/PDZ
29	Extending module RS485 A (B1)	Modrá	ZPI/PDZ
30	ETH1		communication with Microtic
31	PWR +		input power terminal, range 10,2...28,8 VDC

32	GND		common negative potential of CrossMet V4

9.6 COMMUNICATION PROTOCOL FOR SELECTED SENSOR TYPES

CrossMet 4 weather station (CROSS RSU) with the following sensors:

- Lufft IRS31Pro
- Lufft WS600
- Lufft SHM31
- Biral SWS-200

9.7 COMMUNICATION

Communication with the station is realized via the address:

[https:// \[HOSTNAME\] /api/2.0/data/meteo](https://[HOSTNAME]/api/2.0/data/meteo)

The station returns the last measured data in the JSON text format as specified below.

9.8 PROTOCOL

The Liberec stations transmit data in JSON text format, protocol version 1.2.0. A sample file is attached below. The file meteo.schema.json, which contains the protocol scheme, is also sent as a separate attachment.

9.8.1 Structure of values

Each value consists of the status, timestamp, and value elements.

Status	Status of the given value: Ok - valid value Invalid - invalid value NotAvailable - not available
--------	---

The timestamp in the header.version parameter corresponds to the current device time at the time of the call. This time can be used as the time of recorded data.

However, each measured quantity also has its own timestamp, which corresponds to the time of data acquisition from the respective sensor. If the sensor fails, it is possible that the status of the value will be Ok, but the value will be, for example, 8 hours old. When reading the data, it is necessary to check the timestamps of all individual values against the current time, respectively. the current time of the device.

9.8.2 Values

Most values are numeric, the range of other text or status values is shown later in this section.

Values provided:

- Air
 - temperature – air temperature [°C]
 - dewPoint - dew point temperature [° C]
 - relativeHumidity [%]
 - absolutePressure - absolute pressure at a given altitude [hPa]
 - relativePressure - relative pressure converted to sea level [hPa]
- Precipitation
 - intensity - current precipitation intensity [mm / h]
 - nws - NWS code, type of precipitation [enum]
 - about nwsIntensity - additional information to the type of precipitation [enum]
 - visibility [m]
 - wmo - WMO code Table 4680, weather type [enum]
- Surface
 - freezingTemperature - freezing point [° C]
 - roadTemperature - road surface temperature [° C]
 - state - road surface condition [enum]
 - waterThickness - water height [mm]

- about snowThickness - snow depth [mm]
- Subsurface
 - baseTemperature - temperature below the road surface [° C]
- Wind
 - averageDirection - average wind direction in 10 minute interval [°]
 - averageSpeed - average wind speed in 10 minute intervals [m / s]
 - maximumDirection - wind direction at max. speed in 10 minute interval [°]
 - maximumSpeed - maximum wind speed in 10 minute interval [m / s]
- Alert
 - ice - icing [true / false]
 - skid - danger of skidding [true / false]
 - fog - fog [true / false]
 - wind [true / false]

nws	Undefined – nedefinovaný C – without precipitation P – precipitation L – drizzle ZL – freezing drizzle R – rain ZR – freezing rain S – snow IP – rain with snow, ice floes H – hailstones
-----	--

nwsIntensity	- (dash) – low intensity (empty string) – middle intensity + (plus) – high intensity
--------------	--

wmo	Ranging WMO Table 4680. according to Biral SWS-200 sensor: XX Not Ready (first 5 measurement periods from restart) 00 No Significant weather observed 04 Haze or smoke 30 Fog 40 Indeterminate precipitation type 51 Light Drizzle 52 Moderate Drizzle 53 Heavy Drizzle 61 Light Rain 62 Moderate Rain 63 Heavy Rain 71 Light Snow 72 Moderate Snow 73 Heavy Snow 89 Hail
-----	---

State	Dry MoistAndChemical – residual salt Moist Wet PossibleFrost WetAndChemical Frost Snow Ice SnowOrIce CriticallyWet Slush Undefined – Status.Invalid Error – Status.Invalid Unknown – Status.Invalid
-------	---

9.8.3 Value chaining

The visibility and wmo values are listed in the data output as an array of two values, the first from the Lufft WS600 sensor and the second from the Biral SWS-200 sensor. The Lufft WS600 sensor does not provide visibility, so the visibility value status will always be NotAvailable.

9.9 EXAMPLE FILE

```
{
  "header": {
    "version": {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:31.560302+02:00",
      "value": "1.2.0"
    }
  },
  "air": {
    "temperature": [
      {
        "status": "Ok",
        "timestamp": "2018-08-30T14:49:25.556+02:00",
```

```
"value": 25.6
```

```
    },
  ],
  "dewPoint": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.556+02:00",
      "value": 11.7
    }
  ],
  "relativeHumidity": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.556+02:00",
      "value": 55.58
    }
  ],
  "absolutePressure": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.556+02:00",
      "value": 858.8049
    }
  ],
  "relativePressure": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.556+02:00",
      "value": 1007.67
    }
  ]
},
"precipitation": {
  "intensity": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.556+02:00",
      "value": 0
    }
  ],
  "nws": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.511+02:00",
      "value": "C"
    }
  ],
  "nwsIntensity": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.492+02:00",
      "value": ""
    }
  ],
  "visibility": [
    {
      "status": "NotAvailable",
```

```

        "timestamp": "2018-08-30T14:49:25.542+02:00",
        "value": 0
    },
    {

```

```

        "status": "Ok",
        "timestamp": "2018-08-30T14:49:25.542+02:00",
        "value": 2000
    }
],
"wmo": [
    {
        "status": "Ok",
        "timestamp": "2018-08-30T14:49:25.466+02:00",
        "value": 0
    },
    {
        "status": "Ok",
        "timestamp": "2018-08-30T14:49:25.466+02:00",
        "value": 0
    }
]
},
"surface": {
    "freezingTemperature": [
        {
            "status": "Ok",
            "timestamp": "2018-08-30T14:49:26.035+02:00",
            "value": 0
        }
    ],
    "roadTemperature": [
        {
            "status": "Ok",
            "timestamp": "2018-08-30T14:49:25.957+02:00",
            "value": 40.73260073260073
        }
    ],
    "state": [
        {
            "status": "Ok",
            "timestamp": "2018-08-30T14:49:26.189+02:00",
            "value": "Dry"
        }
    ],
    "waterThickness": [
        {
            "status": "Ok",
            "timestamp": "2018-08-30T14:49:26.113+02:00",
            "value": 0
        }
    ],
    "snowThickness": [
        {
            "status": "Ok",
            "timestamp": "2018-08-30T14:49:26.113+02:00",
            "value": 0
        }
    ]
}
]

```

```

},
"subsurface": {
  "baseTemperature": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:25.957+02:00",
      "value": 20.73260073260073
    }
  ]
},
"wind": {
  "averageDirection": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:07.025+02:00",
      "value": 195.95104853479853
    }
  ],
  "averageSpeed": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:07.016+02:00",
      "value": 4.0785256410256414
    }
  ],
  "maximumDirection": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:07.055+02:00",
      "value": 171.56771367521367
    }
  ],
  "maximumSpeed": [
    {
      "status": "Ok",
      "timestamp": "2018-08-30T14:49:07.046+02:00",
      "value": 9.3074633699633704
    }
  ]
},
"alert": {
  "ice": {
    "status": "Ok",
    "timestamp": "2018-08-30T14:49:07.046+02:00",
    "value": false
  },
  "skid": {
    "status": "Ok",
    "timestamp": "2018-08-30T14:49:07.046+02:00",
    "value": false
  },
  "fog": {
    "status": "Ok",
    "timestamp": "2018-08-30T14:49:07.046+02:00",
    "value": false
  },
  "wind": {
    "status": "Ok",

```

```

        "timestamp": "2018-08-30T14:49:07.046+02:00",
        "value": false
    }
}

```

9.10 ATTACHEMENTS

meteo.1.example.json – vzorový soubor

meteo.schema.json – schéma protokolu

9.11 DESCRIPTION OF THE OPERATING CONDITION OF THE METEOROLOGICAL STATION

When working inside the cabinet and on the equipment of the meteorological station, it is necessary to work with the power supply switched off. The work may be performed by a knowledgeable employee according to §5 under the supervision of a knowledgeable worker with higher qualifications according to §6, §7, §8 of Decree No. 50 resp. 50/1978 Sb.

The operation of electrical equipment also means an inspection of the equipment in the sense of ČSN 343100 and ČSN EN 50110-1,2, which may not be performed by a person without the appropriate electrical qualification. Only a knowledgeable person may access the meteorological station, as there is a risk of touching live live parts after opening the door.

The functional status of the weather station is indicated by the following output lights on the control module.

Tab. 3 – LEDs on the CrossMet V4 control unit

LED č.1 red	lit - indicates a fault / flashes - warning
LED č.2 red	it is not predefined, it is user configurable
LED č.3 green	lit - operating status / flashing - operation on the internal UPS
LED č.4 green	it is not predefined, it is user configurable

In addition to the above checks, it is possible to perform:

- Check the 230 VAC supply voltage at the input terminals, or 12 VDC at the supply terminals of the CrossMetV4 DC IN 12-24V module

- Visual inspection of the correct function of the GPRS modem. The modem must flash green. Flashing or simultaneous flashing of the red LED on the GPRS modem signals problems with the GPRS signal, or problems on the central server at the mobile operator.
- Switching circuit breakers, circuit breakers on and off

A blown fuse is usually the result of an overvoltage in the network, which is also accompanied by damage to the overvoltage protections (instead of the standard green window, a red window appears on the overvoltage protection on one, the other or both overvoltage protections).

10 OPERATION AND MAINTENANCE REQUIREMENTS

10.1 INITIAL REVISIONS AND TESTS

The initial revision is performed according to ČSN 33 1500 and ČSN 33 2000-6-ed.2. During the initial inspection, the following inspections and tests are performed. Revisions of points 1 to 4 will be performed by an inspection technician.

- a) inspection of electrical installations, cable distribution, installation boxes, fastening of installed elements and equipment
- b) inspection of the connection point of the protective and phase conductors measurement:
 - supply impedance loops for the meteorological station
 - insulation state of cable resistance
 - the continuity of the protective conductor and the inanimate parts of the meteorological station
 - earth resistance of the earthing switch
 - measurement and control of circuit breakers
 - measurement of protective connection of masts
- c) functional tests of electrical installations
- d) control - comparative measurement (performed by the worker responsible for the tests)
- e) connection to the meteorological communication system and communication control

10.2 PERIODIC REVISION

Performed by an inspection technician every 2 years according to ČSN 33 1500 and ČSN 33 2000-6-ed.2. During the periodic inspection, the following inspections and tests are performed:

- a) inspection of electrical installations, cable distribution, installation boxes, fastening of installed elements and equipment

- b) check the connection point of the protective and phase conductors
- c) measurement:
 - supply impedance loops for the meteorological station
 - insulation state of cable resistance
 - the continuity of the protective conductor and the inanimate parts of the meteorological station
 - earth resistance of the earthing switch
 - measurement and control of circuit breakers
 - measurement of protective connection of masts
- d) functional tests of electrical installations

10.3 POST - SEASON AND PRES - SEASON INSPECTION

The inspection is performed twice a year. Post-season is performed in the period from the 4th to the 6th calendar month. Pre-season is performed in the period from the 9th to the 10th calendar month. During these inspections, the following parameters are checked, for which a control report is issued. The inspection includes the following works:

- complete inspection of equipment for mechanical or electrical and electronic damage
- local reading of measured meteorological values and their informative comparison with portable meteorological instruments
- local reading of all setting parameters
- checkup of data transmission to the headquarters
- sensor cleaning

10.4 METEOROLOGICAL STATION MAINTENANCE

Regular maintenance consists only in cleaning the rain sensors. In the period before the winter season (usually performed by a service company) and then, depending on the

intensity of operation at the installation site, it is necessary to clean the rain sensors. For the precipitation sensor, clean the glass detection plate with a damp cloth.

10.4.1 Comparative measurement and setting of temperature and humidity probes HMP155E

(performed by the service company)

Regular maintenance consists only in cleaning the rain sensors. In the period before the winter season (usually performed by a service company) and then, depending on the intensity of operation at the installation site, it is necessary to clean the rain sensors. For the precipitation sensor, clean the glass detection plate with a damp cloth.

The temperature outputs of the HMP35 / 45D probes are only compared using two standards, the results are shown in the table below. The temperature parts of the probes cannot be adjusted. If the deviation is greater than 0.3 ° C, the Pt100 sensors are replaced and the probes are returned for re-comparison. The results shown in the table are therefore already after a possible replacement. Unrepairable probes are discarded.

11 METEOROLOGICAL STATION ORDERING

The **CrossMet meteorological station** is assembled on the basis of a project specifically for a specific measured locality. When ordering, it is necessary to specify the number and type of sensors, optional equipment of the station and the method of communication. It is necessary to take into account the conditions for station installation in association with its required equipment.

12 AUXILIARY EQUIPMENT OF THE CrossMet METEOROLOGICAL STATION

12.1 DESCRIPTION OF THE METEOROLOGICAL STATION WITH EXTENDED OUTFIT

Adding a CCTV camera to the meteorological station improves the information from the atmospheric sensors on climatic conditions in the locality of interest considerably.

The camera provides view even in poor light conditions as the device is equipped with an IR reflector. This reflector emits light invisible for human eye with respect to which the camera sensing element is sensitive. In order to ensure unobstructed view of the camera, the system is installed on a steel pole with minimum height of 6,000 mm.

A combined sensor of visibility distance, type and quantity of precipitation, contributes to information on atmospheric conditions in a given locality. This detector combines functions of the light back reflection sensor and current weather condition sensor. Besides the data on viewing distance and quantity of precipitation, the user is provided with information on the type of precipitation. The sensor detects the following types of precipitation: rain, snowfall, rain with snow, snow, fog and smoke.

The depth temperature sensor informs usually about temperature in the depth of 300 mm under the road surface; the supply cable is installed in the road like in case of the basic type of the road sensor. The sensor itself is represented by a body installed in hole in the road with diameter of 15 mm.

The wind speed and direction sensor is installed in the highest part of the pole; for this reason, a pole with minimum height of 6,000 mm is used. The sensor utilizes its own heating system in case of low operational temperatures. It provides information on the maximum and average values for the last 10 minutes. Use of the sensor is beneficial in particular in the areas where snow banks are created during the winter period.

12.2 BASIC OPERATION PARAMETERS

The CrossMet V4 meteorological station can be provided with the following sensors or a CCTV camera as required:

12.2.1 Wind direction and speed sensor

Wind speed (ten minute average):	0 to 70 m/s $\pm$ 3% FS (Fixed Scale), (resolution 0,1 m/s)
Wind direction (ten minute average):	0 to 360° $\pm$ 1% (resolution 2,5°)
Wind speed (ten minute maximum):	0 to 75 m/s $\pm$ 2% FS (resolution 0,1 m/s)
Wind direction (ten minute maximum):	0 to 360° $\pm$ 1% (resolution 2,5°)
Operational temperature:	-30 to +70 °C

12.2.2 Road body temperature depth sensor

Temperature measuring:	-80 to +80 °C $\pm$ 0,2 °C
Operational temperature:	-80 to +80 °C

12.2.3 Combined viewing distance and precipitation type and quantity sensor

When using this sensor, the precipitation detector of the standard modification is unnecessary.

Viewing distance measuring:	10 to 2000 m $\pm$ 10 %
Precipitation quantity:	0 to 99,99 mm
Precipitation type:	rain, drizzle, rain/snow, snow
Visibility types:	Fog, mist, haze (smoke, sand)
Operational temperature:	-40 to +60 °C

12.2.4 Overview camera

Type:	8M pixel dual camera, sensitivity 0,006 lux
Power supply voltage:	12V DC, PoE
Operational temperature:	-30 to +60 °C
Protection degree:	IP 67

12.2.5 Infrared reflector

Type:	wave length 870 nm
Angle / range:	30° / 70 m
Power supply voltage:	12 V
Operational temperature:	-50 to +70 °C
Degree of protection:	IP 67

12.3 BASIC TECHNICAL PARAMETERS

12.3.1 Dimension

Meteorological station pole:	Height of 6 000 mm (10 000 mm acc. to conditions)
Meteorological station cabinet:	600 x 600 x 210 mm
Control unit module:	70 x 240 x 85 mm
Ground plan dimensions:	800 x 800 mm (1200 x 1200 mm acc. to conditions)

12.3.2 Technical parameters

Meteorological station power supply voltage:	230 V AC 50Hz / TN-S
Maximum power input:	acc. to outfit (max. 445 VA)
Maximum supply cable cross section:	10 mm ²
Station cabinet protection degree:	IP 55
Air humidity range:	0 to 100 % RH, non-condensing
Communication:	Ethernet 10/100 Mb/s or 1Gb/s, GSM/3G/LTE,GPS

12.4 REQUIREMENTS FOR INSTALLATION

In the configuration of the basic design CROSSMET V4 supplemented by: wind sensor (direction and speed), combined visibility sensor, surveillance camera with heated cover, IR reflector, video encoder with heating, depth temperature sensor, radiation sensor. Temperature, humidity and pressure sensor.

Nominal voltage:	230 V ~ 50Hz, TN-S
Capacity of circuit breaker before electricity meter:	10 A
Total installed power input:	360 VA
Contemporaneous power input:	215 VA

12.5 METEOROLOGICAL STATION POSITIONING

It is identical with the basic variant, however, it is necessary:

- To take into account viewing conditions for overview cameras (if requested) with respect to road curving radius, road height profile and surrounding obstacles.
- In connection with installation of the wind speed and direction sensor, to select positioning with respect to potential obstacles (trees, buildings, ground conditions etc.)

- In case of installation of the combined sensor of viewing distance and type and quantity of precipitation, to select positioning in particular with consideration of potential disturbing reflections from surrounding objects and weather conditions for objective measuring (it is necessary to avoid proximity of trees and buildings and to install the sensor with respect to passing traffic – ideal positioning is along the road, with receiver in the direction of passing vehicles in the closest driving lane). The positioning of the sensor in Fig. 7 serves only as an example; positioning may change according to conditions.

12.6 OPERATION AND MAINTENANCE REQUIREMENTS

They are identical with the meteorological station in the basic variant. In case of installation of the combined sensor of viewing distance and type and quantity of precipitation, it is necessary to clean with a damp cloth both the detection board on the top part of the receiving part and both lenses installed in the tubes of the transmitter and receiver. The detection board (precipitation sensor) should be cleaned using the following method:

- At first ground your hand through a contact with an iron part in order to remove excessive static charge from your body.
- Clean the rain sensor with soft and clean damp cloth carefully.
- Check whether there are no ice or snow deposits on the detector.
- It is suitable to clean the camera and IR reflector case using the same method.

13 MEANING OF STANDARDS, ACTS, PROMULGATIONS AND EU DIRECTIVES

13.1 STANDARDS

ČSN 33 2000-5-52 ed.2	Electrical equipment and installation. Part 5: Selection and erection of electrical equipment. Chapter 52: Wiring systems.
ČSN EN 55022 ed.3	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
ČSN EN 61000-1-2	Electromagnetic compatibility (EMC).
ČSN 33 1500	Electrotechnical and engineering regulations. Inspection and testing of electrical installations.
ČSN 33 2000-6 ed.3	Electrical installations of buildings - Part 6-61: Verification - Initial verification
ČSN 33 2000-5-54 ed.3	Electrical equipment. Part 5: Selection and erection of electrical equipment. Chapter 54: Earthing arrangements and protective conductors.
ČSN EN 50110-1 ed.3	Operation of electrical installations.
ČSN EN 50110-2 ed.2	Operation of electrical installations (national annexes).

13.2 ACT AND PROMULGATION

§5, §6, §7, §8 promulgation 50/1978 Sb.	Vyhláška Českého úřadu bezpečnosti práce a Českého báňského úřadu ze dne 19. května 1978 o odborné způsobilosti v elektrotechnice.
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13.3 EU DIRECTIVE

2002/96/ES	European union directive about waste electrical and electronic equipment (WEED).
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14 Dimensions of road meteorological station CrossMet V4 in the base part

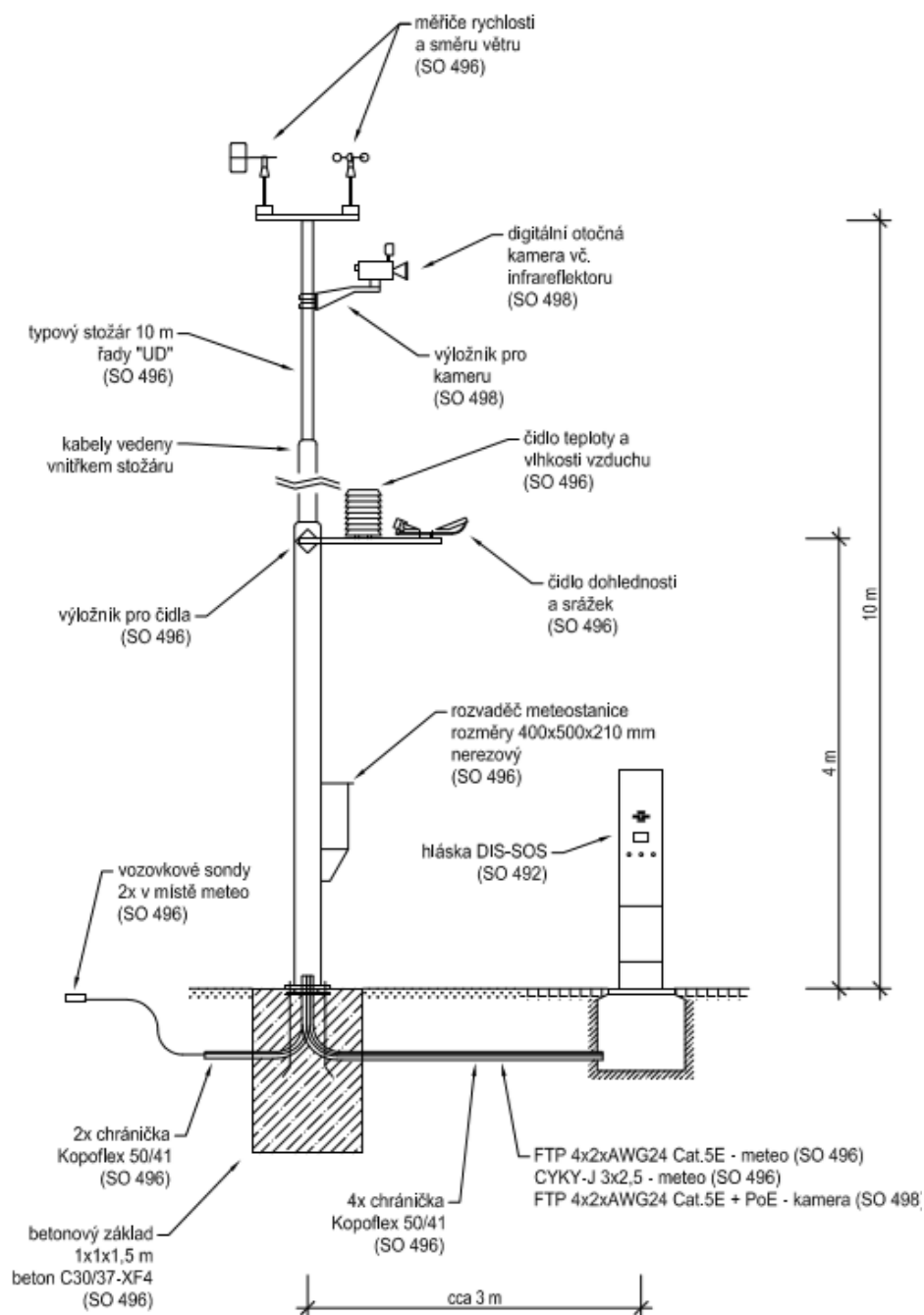


Fig.No. 2: Basic dimensions of the CrossMet V4 weather station, including the basic part and connection to DIS-SOS

14.1 BLOCK DIAGRAM OF CROSSMET V4 METEOROLOGICAL STATION BASIC MODIFICATION

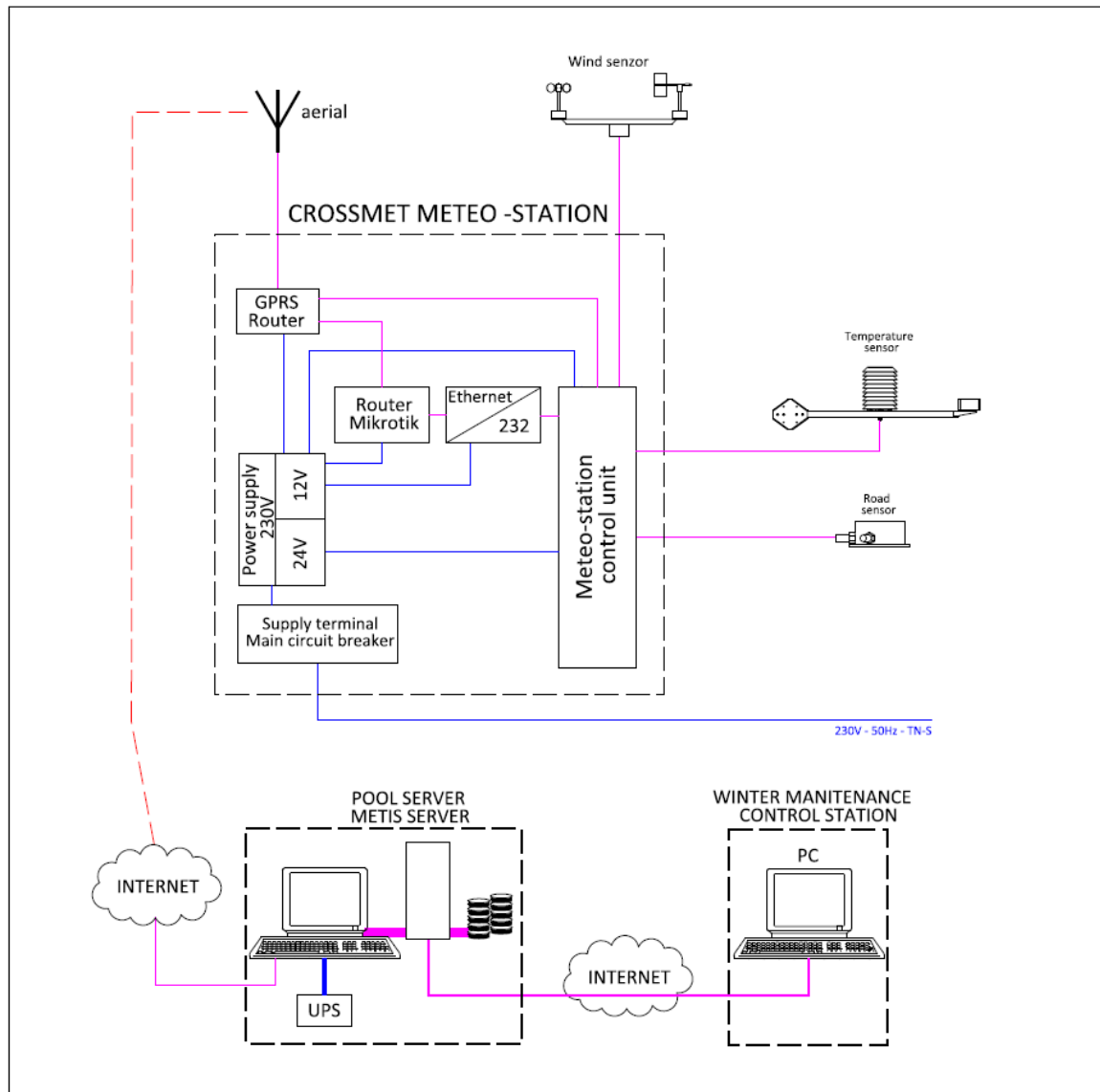


Fig.No. 3: CrossMet V4 meteorological station basic modification block diagram – will be replaced

14.2 BLOCK DIAGRAM OF CROSSMET METEOROLOGICAL STATION IN THE EXTENDED VARIANT

Fig.No. 4: CrossMet meteorological station block diagram in the extended variant

14.3 BASE PART OF THE METEOROLOGICAL STATION CROSSMET

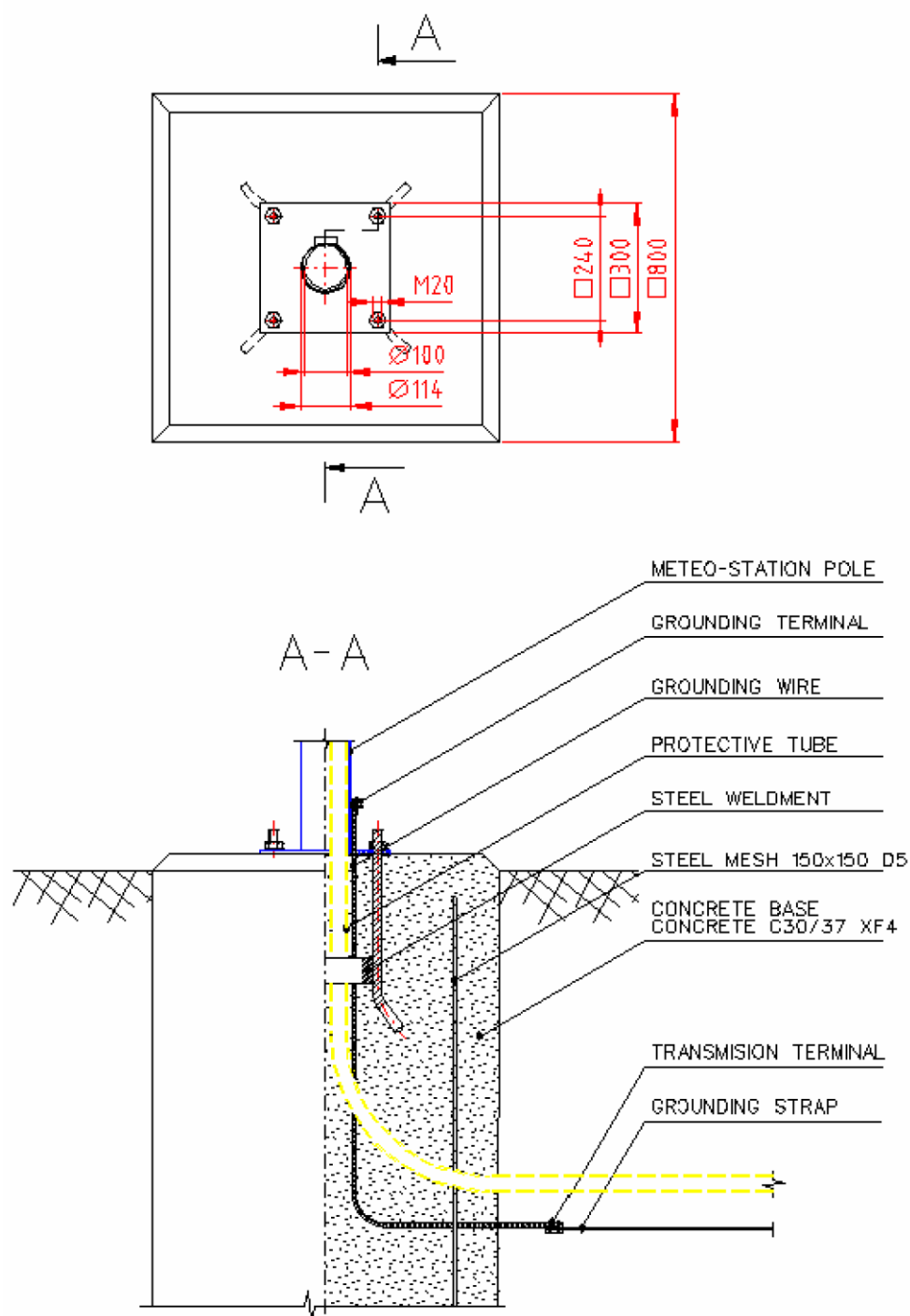


Fig.No. 5: Base part of the meteorological station

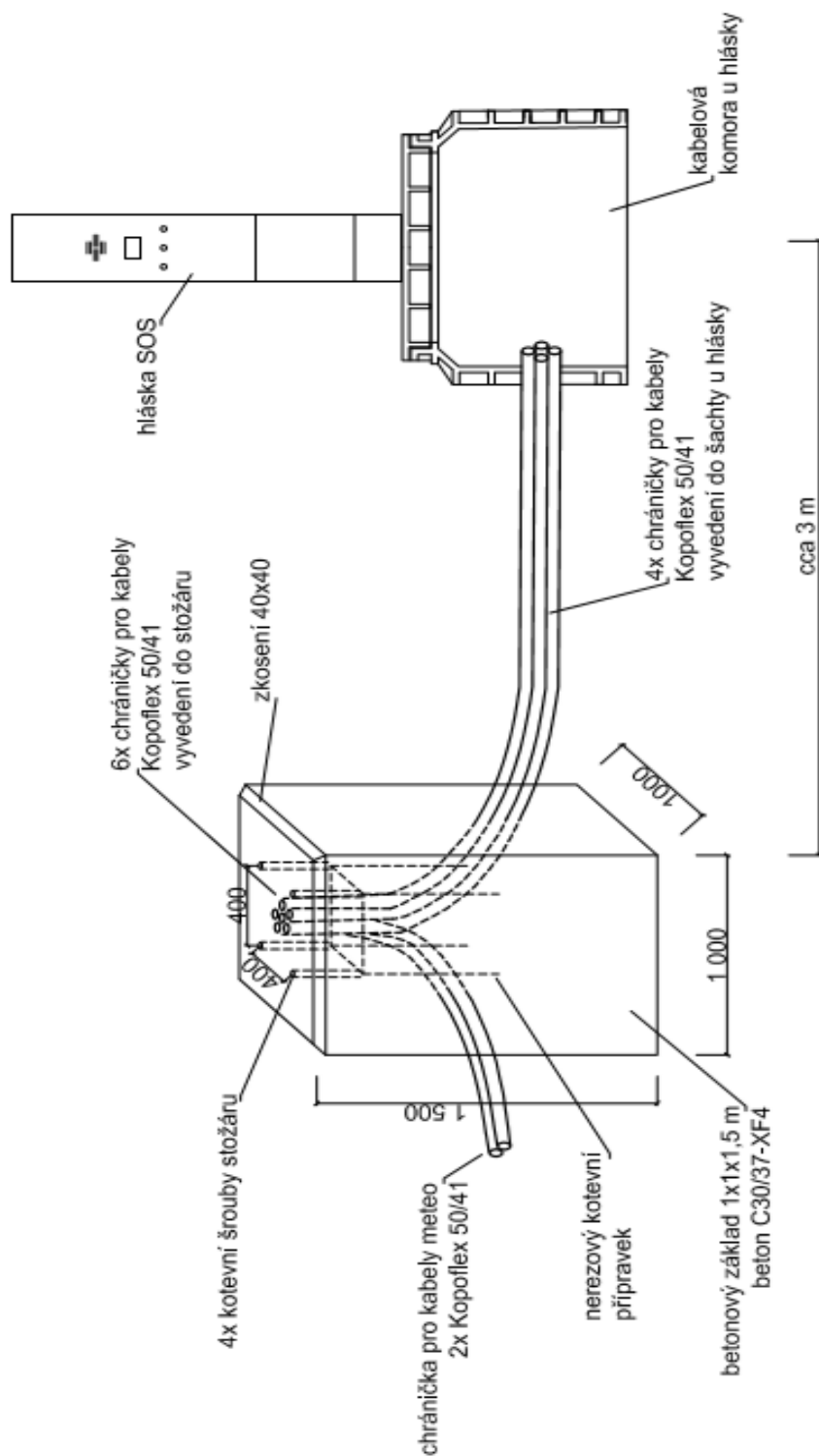


Fig. No. 8: The basic part of the meteorological station at the SOS voice

14.4 COMPONENTS OF INTERNAL EQUIPMENT OF THE CROSSMET V4

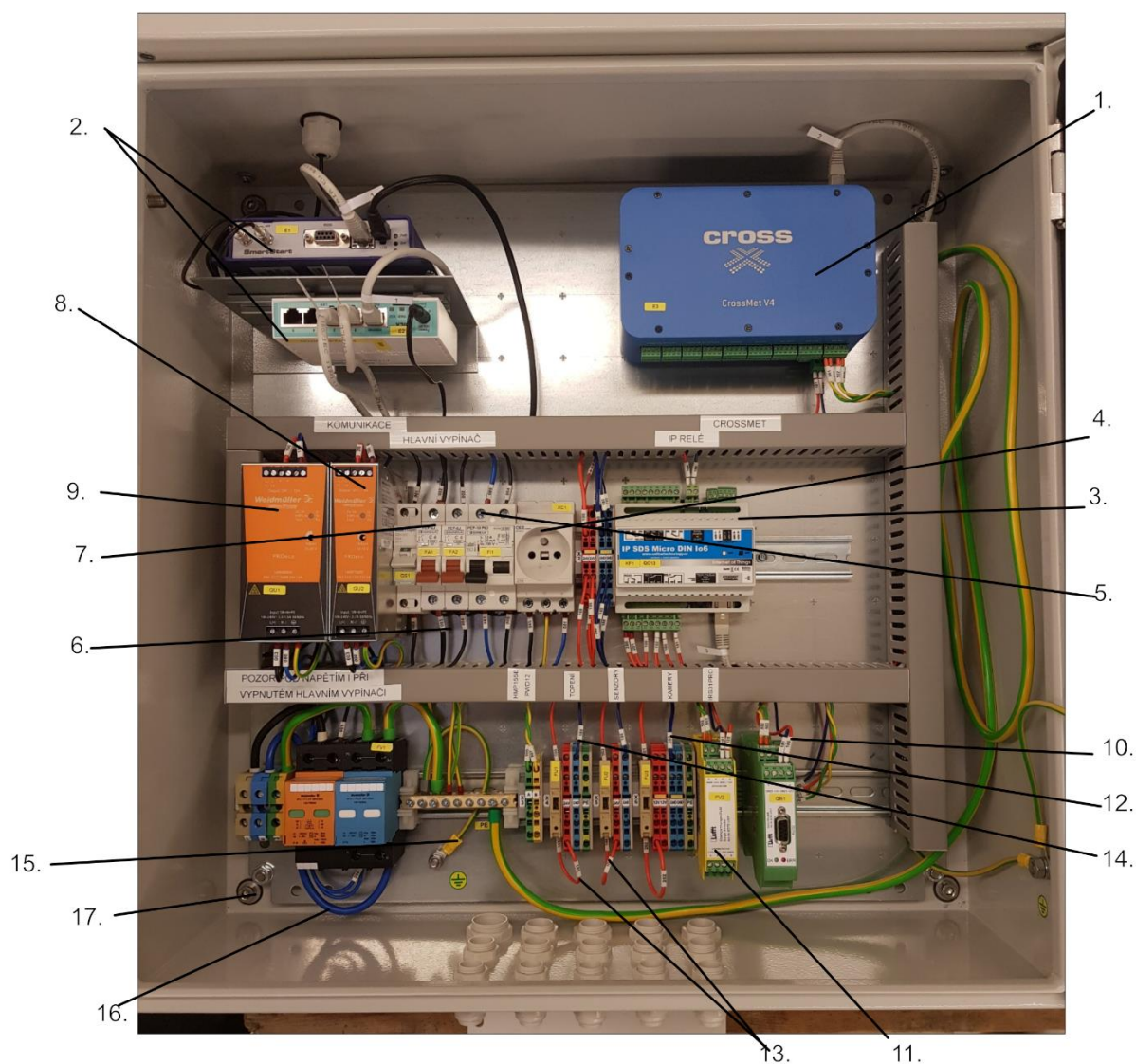


Fig. No. 13: Meteorological station interior equipment components

Components of the interior equipment of the meteorological station (in the extended version).

Legend:

1. Meteorological station unit control module
2. Communication - GPRS router and microtike
3. IP relay

4. Service socket 230V
5. Current protector 32A / 30mA char.B
6. Circuit breaker for indoor sources of switchboards and meteorological stations, for outdoor cameras
7. Main switch 25A
8. DC power supply 12V / 6A
9. DC power supply 24V / 10A
10. Lufft UMB ISOCON converter
11. Lufft UMB surge protection
12. Connection terminals for cameras
13. Connection terminals for sensors
14. Heating and RS485 connection terminals
15. Earthing bridge
16. Combined arrester FLP-B + C MAXI / 1 + 1
17. Main supply terminal (230 V 50Hz L / N / PE)

14.5 SAMPLE PHOTOGRAPHS OF ROAD METEOROLOGICAL STATIONS



Fig. No. 14: Road meteorological station Rohov (Moravian-Silesian region)



Fig. No. 15: *Example of installation of road sensors for 2L with weather station and DIS SOS*

Možnost napájení meteostanice v základním provedení pomocí solárního panelu nebo větrné elektrárny.



Fig. No. 16: *Road meteorological station Korouhev (Pardubice region)*