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DPY351

Monitor and Control Panel for ADELBus Network devices

Instruction Manual

Thank you for having chosen one of our products for your work.
We are certain that it will give the utmost satisfaction and be a notable help on your job and application.

Product Description

The DPY351 is a robust and versatile multifunction display that allows monitoring, configuring and managing ADELSystem connected devices in an ADELBus network. It is equipped with a high-brightness and wide viewing-angle 3.5'' TFT screen which guarantees an optimum visibility in any operating condition. The user interface is clear, intuitive and allows configuring and managing the ADELBus network through its Ethernet interface by remotely monitoring the connected devices, using the SNMP, Modbus TCP and MQTTs protocols. The configuration of the Ethernet connection is very straightforward and can be done by means of the embedded webserver or the intuitive user interface. The device IP addressing can be static or dynamic using the DHCP protocol. This makes the connection of a DPY351 to a LAN very easy. It is possible to connect several devices in chain together, up to 32.

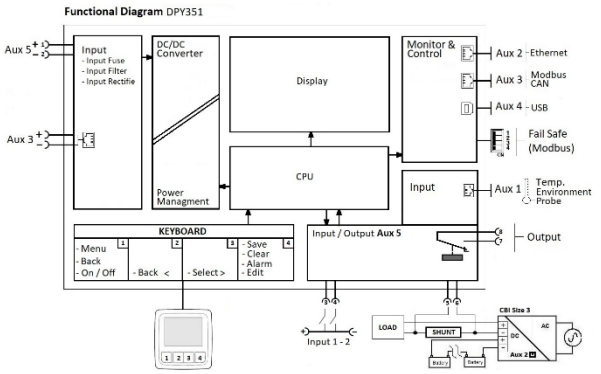


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1 Safety and warning notes

WARNING – Explosion Hazard Do not disconnect Equipment unless power has been switched off or the area is known to be non-hazardous.
WARNING – Explosion Hazard. Substitution of components may impair suitability for class I, Division 2.

WARNING – Switch off the system before connecting the module. Never work on the machine when it is live. The device must be installed in according to EN61010 or EN62368-1. The device must have a suitable isolating facility outside the power supply unit, via which can be switched to idle. Danger of fatal Injury!

WARNING – The device is equipped whit an internal fuse. If the internal fuse blow Up (fails opens), it is most probable that there is a fault in the device. If this failure occurs, the device must be returned to the factory.

2 How to Install

2.1 Dimensions

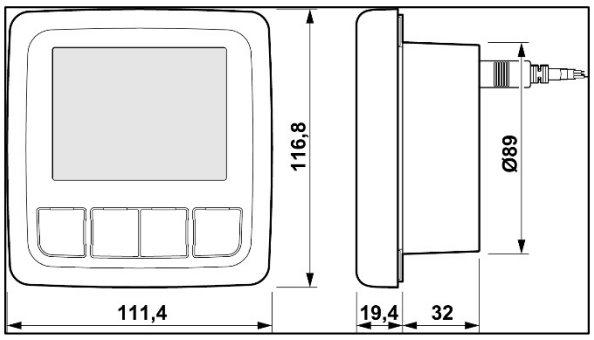


Fig. 1 – Dimensional drawing of the DPY351

2.2 Panel Mounting

Fig. 1 shows a dimensional drawing of the DPY351 .It is possible to mount the DPY351 through a 90mm hole on the panel and fix it by 4 screws 2.9x16. There is no limit for the Panel thickness. A mounting template at the end of this instruction manual is provided.

Note: In conditions of extremely vibrations, mount the device on suitable anti-vibration mounting.

2.3 How to Supply DPY351

The DPY351 can be powered from the ADELBus network. There must be an ADELBus (AUX3) powering devices available to provide sufficient power to the network. If there is no ADELBus powering device or the available power is not sufficient, the DPY351 must be connected to a 12/24/48 V battery or Output Load via the supplied connector (AUX5).

2.4 Device Connection (Fig.2)

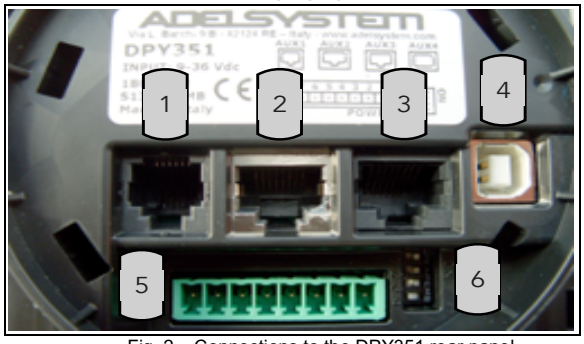


Fig. 2 – Connections to the DPY351 rear panel

Reference	Description
1	Temperature Probe (AUX1)
2	Ethernet LAN (AUX2)
3	ADELBus: CANBUS, ModBus (AUX3)
4	USB (AUX4)
5	Auxiliary Power, I/O port (AUX5)
6	Dip-switches (Hardware Config. (AUX6)

2.4.1 Auxiliary temperature sensor (AUX1)

Auxiliary temperature sensor connection *(RJtemp accessory probe)* to measure the environmental temperature where needed.

2.4.2 Ethernet Connection (AUX2)

"HUB" collector function of the connected devices to the ADELBus network, to transport via Ethernet. The available protocols are the Modbus TCP/IP, the SNMP protocol and the MQTTs. An internal password-protected HTTP server allows to configure the network connection, to enable the network protocols, to remotely control the DPY351 and to download the data log and event log.

2.4.3 PowerBus Connection (AUX3)

Automated RJ45 cable connection for Modbus and CANBUS protocols. The Display must be powered via the AUX5 connector if the power provided from a power device connected to AUX3 is not enough.

2.4.4 USB Connection (AUX4)

USB Connection for software updates via PC.

2.4.5 Auxiliary Input Power (AUX5)

Connect the positive wire to terminal 1, the negative wire to terminal 2 of the connector a 3mm flat blade screw driver to push in the Spring Connect to supply the DPY351 from a CBI Size3, it is necessary to connect the Output Load + and – to Aux 5 since these devices cannot provide power through the AUX3 connector

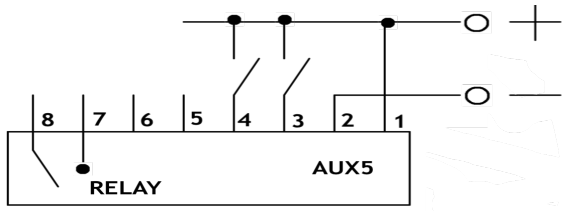


Fig. 3 – AUX 5 connector pinout

2.4.6 Input / Output State Terminal 3,4,7,8 (AUX5)

The device is equipped with two digital inputs (terminal 3,4) suitable to reading external conditions. They can be used for the most various
checks. For example: the control of opening doors, presence of protective earth, verification of presence of Light, gas, pressure, etc...

The two inputs can accept any voltage between 0 and 70V with respect to the DPY351 ground reference (AUX5, pin 2). Voltages lower than 3V are read as a "0" or "logic-low" level; voltages higher than 7V are read as "1" or "logic-high" level. A logic-high or logic-low level on either input can be configured to trigger an alarm: to perform such configuration the *Menu* > *Display Configuration* > *Advanced Configuration* > *Input/output* > *Input* menu page must be accessed. It is then possible to configure, separately for each of the two inputs, which logic level should trigger an alarm, if enabled, or no-alarm.

The Output relay (terminal 7,8) can be activated according to the state of the inputs by means of an "Event" function or when the environmental temperature measured by the sensor connected to AUX1 is higher or lower than user-configurable alarm thresholds, or when any alarm is standing. The configuration of the output relay behavior can be done at the page *Menu* > *Display Configuration* > *Advanced Configuration* > *Input/Output* > *Output (relay),* where it can be configured to be always open, always close, close when there is an alarm on the inputs, close when there is an alarm on the environmental temperature (or both), on alarms or on notifications.

- Output Relay Free Switch Contact (NO)
  Max. current that can be switched (EN60947.4.1):
  Max. DC1: 30 Vdc 1 A; AC1: 60 Vac 1A
  Min.1mA at 5 Vdc (Min Resistive load)

2.4.7 How to connect the shunt in CBI Size 3

To display the load current on CBI "SIZE 3" it is necessary to add an external shunt device, as explained in Fig.4. Consequently, it is possible to add this parameter on the Dashboard or the monitoring panel. The supported shunt ratings are 75mV/30A and 75mV/50A.

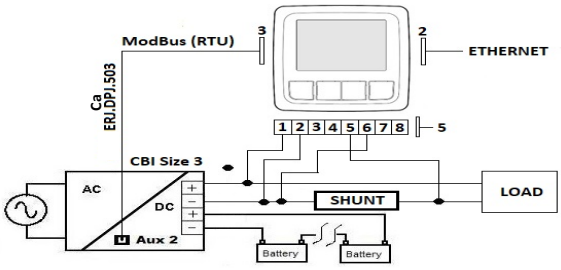


Fig. 4 – External Shunt connection for CBI Size 3

Shunt must be installed low-side in series between the Output Load - of the CBI Size 3 and the "negative" of the load.

CAUTION: NEVER install the shunt in series with the high-side of the load or the battery! There is the risk of damaging the DPY351. Any damage resulting from such wiring will void the warranty.

CAUTION: NEVER connect the CBI Load or battery outputs across the Shunt+ and Shunt- inputs of the DPY351! There is the risk of damaging the DPY351. Any damage resulting from such wiring will void the warranty.

In order to get accurate measurements from the external shunt, the correct shunt rating must be configured on the DPY351. This can be done in the *Menu* > *Display Configuration* > *Advanced Configuration* > *Input/output* > *External shunt sensor* menu. In the Sensor type page it is possible to select the shunt rating. The setting done in this page must match the rating of the installed shunt. In the Sensor calibration page it is possible to perform a one- or two-point calibration to improve the measurement accuracy in the end-application. With a single-point calibration only the zero-current calibration is performed. With a two-point calibration both the offset and gain calibration is performed. In the latter case the display prompts the user to specify the reference current provided so that the DPY351 can compute the correct calibration constants. The Sensor calibration is managed as a wizard that guides the user through the calibration process. It is also possible to set a high-current alarm threshold. If such current magnitude is exceeded, an alarm is triggered which, in turn, can be used to activate the output relay, if its setting is "Close on alarm".

2.4.8 Cabel Connections (AUX5)

Use appropriate wire size to connect the AUX5 power supply to the battery. Fuse: Insert a 1A fuse in the positive battery line. For cable size see Technical Data section.

2.5 Power On Configuration

2.5.1 Automatic Power On Display (AUX6)

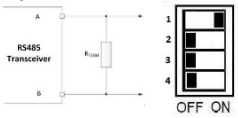
Dipswitch 4 is in position OFF, the Power On button must be pressed to Turn ON the device. When the dipswitch 4 is in the ON position, the DPY351 Turn ON automatically when power is provided. In both cases the device can be subsequently powered off by pressing the front panel Power On button for more than 3s. The automatic power on feature is useful in the case of supply outages: the DPY351 automatically powers on when power becomes available again.



2.6 Hardware configurations RS485 and CAN bus

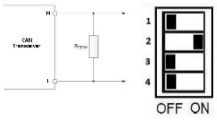
2.6.1 RS 485 Terminations (AUX6)

Modbus (RTU) standard protocol. Termination 120 Ω for the CBI's connection if DPY351 is the last device.
It is necessary put in position ON dipswitch 1.



2.6.2 Can Terminations (AUX6)

For CAN bus protocol. Used for the new CBI's connection need, termination 120 Ω if DPY351 is the last device.
It is necessary put in position ON dipswitch 2.



2.7 Keyboard



Fig. 5 – Keyborard Display

3 ADELBus Connections

ADELBus is the ADELSystem network to interconnect devices via Modbus and CANBUS protocols.
ADELBus is used as power management system for all connected equipment, such as the DC-Ups, Battery Charger, Power Supply. Every compatible device with ADELBus is equipped with one or two data ports. The devices are simply chained together, forming a local data network. Monitoring panels such as the DPY351 can be used for monitoring and control all connected ADELBus equipment.
CAUTION: Never connect a non ADELBus device to the ADELBus network directly! This will void the warranty of all the ADELBus devices connected.

3.1 Event based commands

With the ADELBus, a device can be programmed to initiate an action at another connected device. This is done by means of event-based commands.

3.2 How to set up an ADELBus network

Connections between the devices are made by standard straight ADELBus cables. ADELSystem can supply these cables. These (CAT5) cables are also commonly available at computer supply stores. For the CAN connection in some devices it is recommended to use twisted pair cable with shield.
Up to 32 ADELBus devices can be connected together.
The power for the network can be provided directly the connected devices through the ADELBus cable. Otherwise, if that is not sufficient, it is necessary to connect the device by the + and – terminals of connector AUX5 as described in section 2.5.3
ADELBus needs a terminating impedance on both ends of the network: for that purpose a switch termination on the Device, which can be enabled by means of the dipswitch 1 (for the Modbus) and 2 (for the CAN Bus) of Ref. 6 is available

3.3 How to set an ADELBus network with more than one DPY351 (Modbus View Mode)

In a Modbus network there can only be one master. Normally the DPY351 is the master, it polls the network and it receives information from other ADELSystem devices, which are the slaves. If it is necessary to connect *N* DPY351 in the same ADELBus network, then *N-1* displays shall be configured in View Mode. In this case only one DPY351 is a master and it polls the devices, the other DPY351s receive the data from the Bus and they take the information into consideration only if these parameters are originated from a device in their list, otherwise they ignore the information.
View Mode is useful also when the master of the network is an external device as a PC but there is the need to monitor the status of the network from several places
To configure the DPY351 in View Mode it is necessary to go in:
Menu>Menu Config>Other Settings>Modbus View Mode.

4 Ethernet Configuration

Configuration of the Ethernet interface by HTTP server via the Web browser:

4.1.1 Connect HTTP server for the first time

To connect DPY351 to a network a standard CAT5e or higher LAN cable must be connected to the AUX2 connector (RJ45) on the back of the unit, as shown in Fig.2. The DPY351 is configured to operate with a fixed IP address (192.168.1.100) and to reply at the standard HTTP port (number 80) by default.

A different static IP address can be assigned to the DPY351 or a dynamic IP address can be assigned using the DHCP protocol. The network configuration can be effected from the Network menu page: *Menu>Display Configuration>Network.* See section 3.4. 2. The address assigned to the DPY351 by the DHCP server can be read on the display at the page:
Menu>Display Configuration>Information.
he same configurations can be done using the internal webserver, which in addition allows remote controlling the display and downloading the data and event logs. Type the IP address of the DPY351 into any browser's address bar (as an example "192.168.1.100") then the login page appears requesting the username and the password .
To access the internal webserver, at the login page, the following credentials must be used:

Username: *admin*
Password: *admin*

4.1.2 Customizing the ethernet interface and services

In the setup page, the following groups of parameters are displayed:

- Account
- TCP/IP Configuration
- SNMP v2c
- Other settings/actions

Account:

The Account group (Fig. 6) allows the customization of the data for the HTTP server login page.

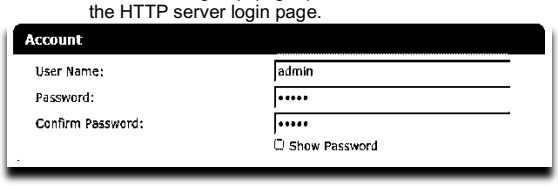


Fig. 6 – Account settings

TCP/IP Configuration
Fig. 7 shows the TCP/IP Configuration group of parameter default values. They allow unique identification of the unit in the network.

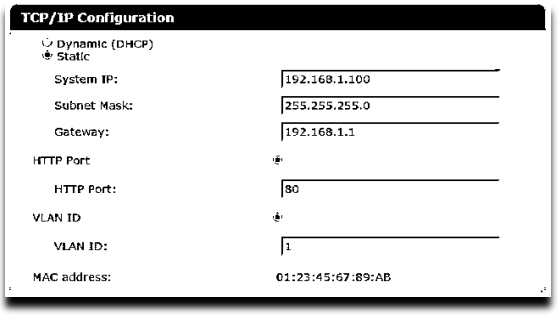


Fig. 7 – IP settings

If "Dynamic (DHCP)" is selected, the IP address is automatically assigned by a DHCP server, that must be active on the network, and the System IP, Subnet Mask and Gateway textboxes are not available.
HTTP Port allows redirecting the HTTP traffic to a port different than the TCP port 80, which is the one devoted to HTTP. In the case "HTTP Port" checkbox is not selected, the HTTP protocol will be run on port 80 and the "HTTP Port" textbox will be hidden. If "HTTP Port" checkbox is selected, then the "HTTP Port" textbox should be populated with the TCP
port number the HTTP traffic must be redirected to. In such a case, access to the HTTP server from a browser must be made according to the following syntax: http://ipaddress:portnumber.
As an example, if the IP address is 192.168.1.100 and the selected HTTP port is 5678 then the following IP string should be entered in the browser http://192.168.1.100:5678.
The DPY351 supports access using the Virtual LAN protocol. In the case "VLAN ID" checkbox is not selected the "VLAN ID" textbox will be hidden and DPY351 will not operate in the VLAN. If "VLAN ID" checkbox is selected then the "VLAN ID" textbox should be populated with the ID. The VLAN ID can be set in the range 1 thru 4094 and it must match that of the VLAN the unit is operating in.
SNMP v2c
The DPY351 can act as a gateway between an ADELsystem power device (such as the CBI Size 3 and 4) and a SNMP manager. An ADELsystem MIB table is provided which consists of a list of parameters of the connected power device that can be remotely read, or read-written through the SNMP. Each parameter, (OID), is mapped one-to-one to a Modbus RTU holding register. Refer to the document Adelsystem parameter table for the description of each power device parameter and the corresponding OID for the SNMP.

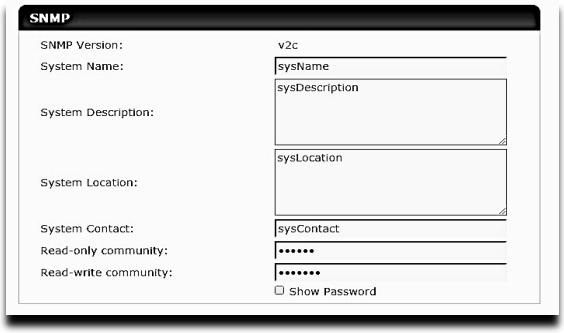


Fig. 8 – SNMP settings

All the fields in the SNMP group of settings allow a maximum of 32 characters, except "System Description" and "System Location", which allow 255 characters maximum. The "Read-only community" and "Read-write community" values must match those of the SNMP environment the unit operates in, otherwise the device management using SNMP will not be possible.

Other settings/actions

In this group of settings it is possible to synchronize the internal clock of the DPY with that of the PC it is controlled by or download the event log and the data log. Another important feature is the remote control option, which can be enabled from here. As shown in Fig. 9 this feature displays a live replica of the display screen. By left-clicking on the button labels on the displayed screen it is possible to move through the display pages by remote control instead of clicking the buttons on the display front panel.

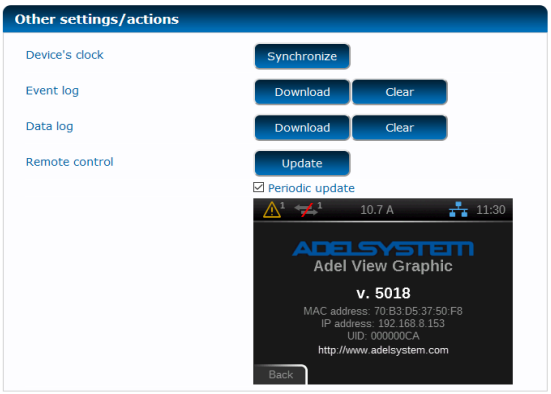


Fig. 9 – Other settings/actions of parameters with the remote control active

4.1.3 Saving / resetting the customized ethernet parameters

To save the changes into the DPY351 non volatile memory press the "Apply" button at the top or at the bottom of the page. Changes will take effect at the following DPY351 power up.

To clear all the ethernet parameters press the "Reset" button, then re-enter the data.

Modbus TCP

DPY351 parameters can be remotely controlled via Modbus TCP on Modbus address 247. DPY351 works as a gateway for the other devices connected to ADELBus. Refer to the Parameters table of every device for more information.

5 Features for Managing

Through the ADELBus network, the DPY351 manages all the ADELSystem connected devices. Data from all the devices connected can be viewed together for a better understanding of the status of the whole system. Two internal loggers, one for the monitoring data and one for the events occurred allow to remotely download the time-course of the whole system status in an easy-to-use spreadsheet file.

5.1 Monitoring

It is possible the monitoring of input and output data, peak current, peak voltage, all the battery parameters such as temperature, State of Charge, etc.…

5.1.1 Display Configuration"Welcomepage"

- Welcome Page
- Customize Dashboard
- Customize "Six Values"
- Customize "Two Values"
- Customize "Single Value"
  - Video: https://youtu.be/0RYVq5XcVPM

5.1.2 Display Configuration "Network menu"

- Network menu
  - Video: https://youtu.be/p22VfOwjIP8

5.2 Configuration

With the DPY351, it is possible to modify the parameters of any ADELSystem device connected: DC-Ups, Power Supply and Battery Charger. In term of:

- Battery Performance
- Load Performance
- Device Configurations
- Advanced Configuration: Primary PW:1234
  - Video: https://youtu.be/BzRc8YJ8F4Q

5.3 Configuration

With the DPY351, it is possible to modify the parameters of any ADELSystem device connected: DC-Ups, Power Supply and Battery Charger. In term of:

- Battery Performance
- Load Performance
- Device Configurations
- Advanced Configuration: Primary PW:1234
  - Video: https://youtu.be/BzRc8YJ8F4Q

5.4 Daisy Chain

It is possible connect up to 32 device in series together.

- Devices "Add new devices"
  - Video: https://youtu.be/tDJz8g9uQIM

5.5 Alarms management

All the alarms from all the connected devices are immediately reported.

- Notification / Alarm
  - Video: https://youtu.be/slre7lztX1c

5.6 History

The history parameters are recorded inside each device. The DPY351 allows inspecting all the historical parameters of each single device.

- Event Log: last situations happened; up to 30 recording
- Data Log: 10 dais recording about the devices selected in terms of Voltage, Current, Time, etc…
  - Video: https://youtu.be/slre7lztX1c

5.7 Event

Actions that are coordinated among the devices connected can be programmed, thus automating the system. The action well be defined better in next few month

6 Technical Data

6.1 Input Data

DC Input Voltage range (Vdc)	9-72
Power from:	Aux3
Power from:	Aux5: Pin 1 - 2
External Recommended Fuse	3 to 10 A max
Current consumption ON typ. (backlight 30%, MODBUS* on, relay off)	0.13A (12VDC, Ethernet off) 0.17A (12VDC, Ethernet on) 0.08A (24VDC, Ethernet off) 0.1A (24VDC, Ethernet on)
Current Consumption	0mA; Aux6 Switch4 pos. OFF
Current Consumption Sleep mode	< 1 mA;Aux6 Switch4 pos. ON
Maximum current consumption with backlight 100%	0.32A (9VDC, MODBUS*, Ethernet and relay on) 0.10A (72VDC, MODBUS*, Ethernet and relay on)
Maximum current consumption with backlight 0%	0.22A (9VDC, MODBUS*, Ethernet and relay on) 0.07A (36VDC, MODBUS*, Ethernet and relay on)

6.2 User Interface

6.2.1 Display Screen

Type	TFT LCD display, 16bit color (64k colors)
Resolution	320 x 240 pixels 3.5 Inch
Brightness	800 cd/m^2
Orientation	Landscape
Backlight (life time)	LED, white (>20000h)

6.2.2 Controls

Keyboard	4 tactile buttons, backlight

6.3 Data Connection

Aux1: Input temperature sensor	ADELSystem RJ Temp temperature probe
Aux2: Ethernet	10/100M. VLAN is supported.
Protocols:	SNMP, DHCP, MODBUS TCP, HTTP webserver
Aux3: CAN Communications	SAE J1939
Aux3: RS485 : MODBUS lines fully loaded with 32 unit loads.	MODBUS RTU (RS 485) terminated at both ends with 120-ohm resistors.
Aux4: USB 2.0 device, full speed	1 x USB B connector
Aux5:	N° 2 Digital Input N° 1 Analog Input N° 1 Output
Aux6:Data lines termination (individually activated to dipswitches)	120 ohm for RS485, 120 ohm for CAN bus

6.3.1 Modbus Communication RS485

Aux3:	RJ45
Supported Protocols	MODBUS RTU
Supported Baud Rate (Factory setting: 38400)	2400, 4800, 9600, 19 200, 38400
Internal Terminating Resistor (120 Ω) (Factory Setting OFF)	Configurable by Switch Aux6 (Section: Hardware configurations RS485)

6.3.2 CAN Communication

Aux3:	RJ45
Supported Protocols	J1939 Raw CAN

	Can Open
Supported Baud Rate (Factory setting: xxxxxx)	50 Kbit/s, 100 Kbit/s, 125 Kbit/s, 250 Kbit/s, 500 Kbit/s, 800 Kbit/s, 1 Mbit/s,
Internal Terminating Resistor (120 Ω) (Factory Setting OFF)	Configurable by Switch Aux6 (Section: Hardware configurations Can)

6.4 Ambient Conditions

Ambient Temperature operation	-25 up to +70 °C
Ambient Temperature Storage	-40 up to +85 °C
Humidity at 25 °C, no condensation	95 % to 25 °C
Vibration (operation) IEC 60068-2-6	<15 Hz, amplitude ± 2.5mm<15Hz-150Hz, 2.3G 90 min.
Shock IEC 60068-2-6	30g in all directions

6.5 General Data

Protection Class (EN/IEC 60529)	Front panel only IP65; Rear IP22
Reliability: MTBF IEC 61709	> 700.000 h (Automatically Switch Off Beck Light after 30 sec)
Aux5 Connection Terminal Blocks Push Button Type	Wire diameter Ø: 0.05 mm (30AWG) - 1.5 mm (14AWG)
Protection class	II
Housing material	Polycarbonate
Dimension (w-h-d) mm	112 x 117 x 52
Weight	0.35 kg approx.
Hole	90 mm
Available Languages	English
Automatic Power ON	Deep Switch 4 ON (Aux6)

6.6 Accessory

Connector Cable RJ45/RJ45 1m for CBI Size 4	RJCONN45
Connector Cable RJ45/RJ45 1m for CBI (Device Size 3)	DPYCONN500
RJTEMP111 or 113	Temp. Environment Sensor
Shunt 50 (for Device Size 3)	Measure the Load current

6.7 Hardware Port

6.7.1 Digital Input ports "Aux5"

Input:	N° 2
Application Pins	Pins 3,4
Minimum Voltage for Low Level:	0-72 V, user-configurable
Minimum Voltage for High Level:	0-72 V, user-configurable

6.7.2 Analog Input ports "Aux5"

Input:	N° 1
Application Pin	Pins 5,6
For Shunt connection	50 A

6.7.3 Output port "Aux5"

Output	N° 1
Application Pin	Pins 7,8
Output Type	Dry Contact (NO)
Max. current can be switched (EN60947.4.1): Max. DC1: 30 Vdc 1 A; AC1: 60 Vac 1A (Resistive Load) Min.1mA at 5 Vdc (Min. Load)	

6.8 Software Port

6.8.1 Remote Monitoring "Ethernet Connection"

IP (Static)	192.168.1.100
User	admin
PW	admin

6.8.2 Web Server

User friendly operation trough monitoring and configuration on one page
Independent identification of individual modules, a system configuration it is not necessary
Integrated access management: access can be individually determined locally and centrally
Integrated data storage, each modification and each error can be recorded

6.9 Norms and certifications

6.9.1 Immunity and Emission

The CE mark in conformity to EMC 2014/30/EU: Electromagnetic Compatibility Directive; 2014/35/EU: Low Voltage Directive; ROHS 2011/65/EU: Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS), as amended by 2015/863/EU

- EMC Immunity: EN61000-6-2
- EMC Emission: EN61000-6-3

6.10 Electrical Safety for mounting

According to:

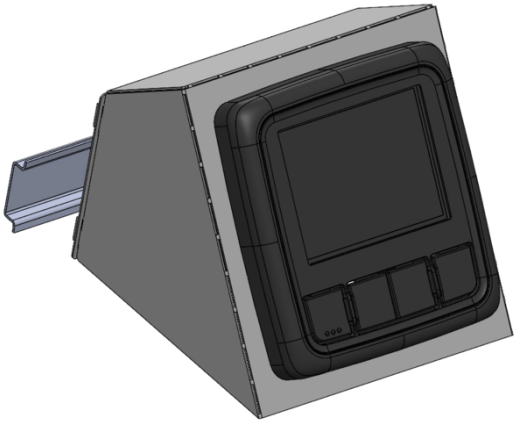
- Electrical Equipment for Machinery EN 60204
- Electrical safety (of information technology equipment) IEC/EN EN62368-1.
- Safety requirements for electrical equipment for measurement, control and Laboratory use IEC/EN 61010

6.10.1 Environmental Norm Conditions

- Degrees of protection provided by enclosures IEC/EN 60529 IP65:
  - First Digit: Protection against ingress of durst (durst tight). Complete protection against contact.
  - Second Digit: Protection against water projected from a nozzle against the equipment (enclosure) from any direction. There must be no harmful effect (water jet)
- Environmental Testing IEC/EN 60068

6.11 Accessory

6.11.1 DINDPY351



7.1 Annex 1: Mounting template

