ADVANCED USER MANUAL

DMC Advanced Display and DMC Lite Display

Modification History:

Revision	Issue Date	Author	Changes
1.0	08/09/2021	SM	First development
1.1	31/01/2022	SM	Proper part numbers and introduction

Contents

1 About this manual

This manual can be used for a better understanding of Display's features, installation and settings. A detailed description of every page and parameter is reported.

1.1 References

[1]   SuperSigma2 AN 160105 - Can DMC Protocol V2.0
[2]   DMC Display AN 190702 – Lite Display V1.3
[3]   SuperSigma2 AN 200228 - Dual motor functionalities V1.0
[4]   SuperSigma2 AC Manual V1.0
[5]   SuperSigma2 PMS Manual V1.0
[6]   SuperSigma2 IPM Manual V1.0
[7]   SuperSigma2 AN 180618 - CAN Open Compatible protocol V2.12
[8]   SuperSigma2 AN 160208 - Flash Programmer Demo Description V1.0
[9]   DMC PC Interface Manual V16
[10]   SuperSigma2 AN 201021 - CAN Open Compatible BMS support V1.0

2 Product overview

The new DMC instrument panel displays are studied for applications where flexibility of information and high performance are needed.

Two variant of display are available: DMC Advanced Display (touch screen, advanced graphic camera view, high graphic performance) and DMC Lite Display (compact and cost effective).

The DMC displays are compatible with all DMC controller's software variants.

Both displays show a basic set of information and have common features:

- Stated Of Charge indication
- Fault Code and Subcode (warning and error status of controllers)
- Drive Hour Counter
- Mileage
- Vehicle speed or RPM display (Lite display has further options)
- Fault logger
- Information Page
- Basic warning and error Icons

DMC Lite Display is indicated for basic vehicle application where the compact size and cost effectiveness are very important.

DMC Advanced Display is meant to be a real vehicle Dashboard.

On DMC Advanced display the following advanced features are available.

- Rear view PAL camera connection
- Battery power bar graph indicator
- Charger indication
- Lights icons (active according to digital input signals)
- Direction lights indicator icons (active according to digital input signals)
- Data and Time
- Service Timer
- Touch screen
- Status information detailed up to 8 DMC controllers
- Icons for Controller and Battery warning and error.
- Monitoring of 12-24V auxiliary supply or battery.

Both display can indicate warning and error message of Battery BMS compatible with DMC controllers.

2.1 Display variants

Available models

Model Nr.	CAN protocol	Details
DMC Lite Display		
SV125-0001	CAN Open Compatible	125 Kbit/s baudrate
SV250-0001	CAN Open Compatible	250 Kbit/s baudrate
SV125-0101	DMC CAN	125 Kbit/s baudrate
SV250-0101	DMC CAN	250 Kbit/s baudrate
SV125-3001	CAN Open	125 Kbit/s baudrate
SV250-3001	CAN Open	250 Kbit/s baudrate
SV500-3001	CAN Open	500 Kbit/s baudrate
DMC Advanced Display		
ST125-0001	CAN Open Compatible	125 Kbit/s baudrate
ST250-0001	CAN Open Compatible	250 Kbit/s baudrate
ST125-3001	CAN Open	125 Kbit/s baudrate
ST250-3001	CAN Open	250 Kbit/s baudrate
ST500-3001	CAN Open	500 Kbit/s baudrate

3   Display wiring and installation

This section will take care of describing the display installation and connections.

The picture below should be taken as reference for the naming of the available terminals and connectors present on any DMC Display.
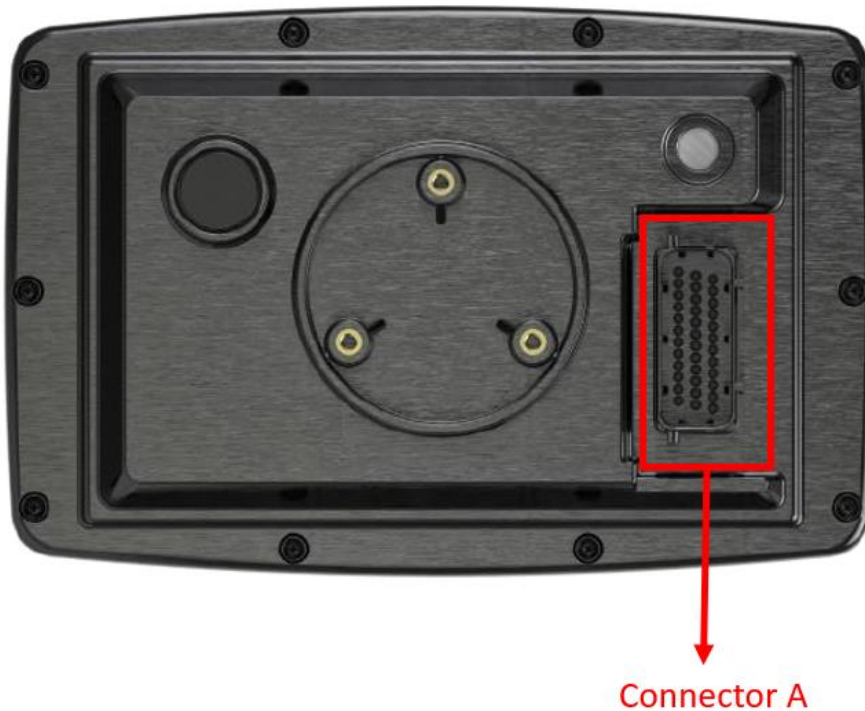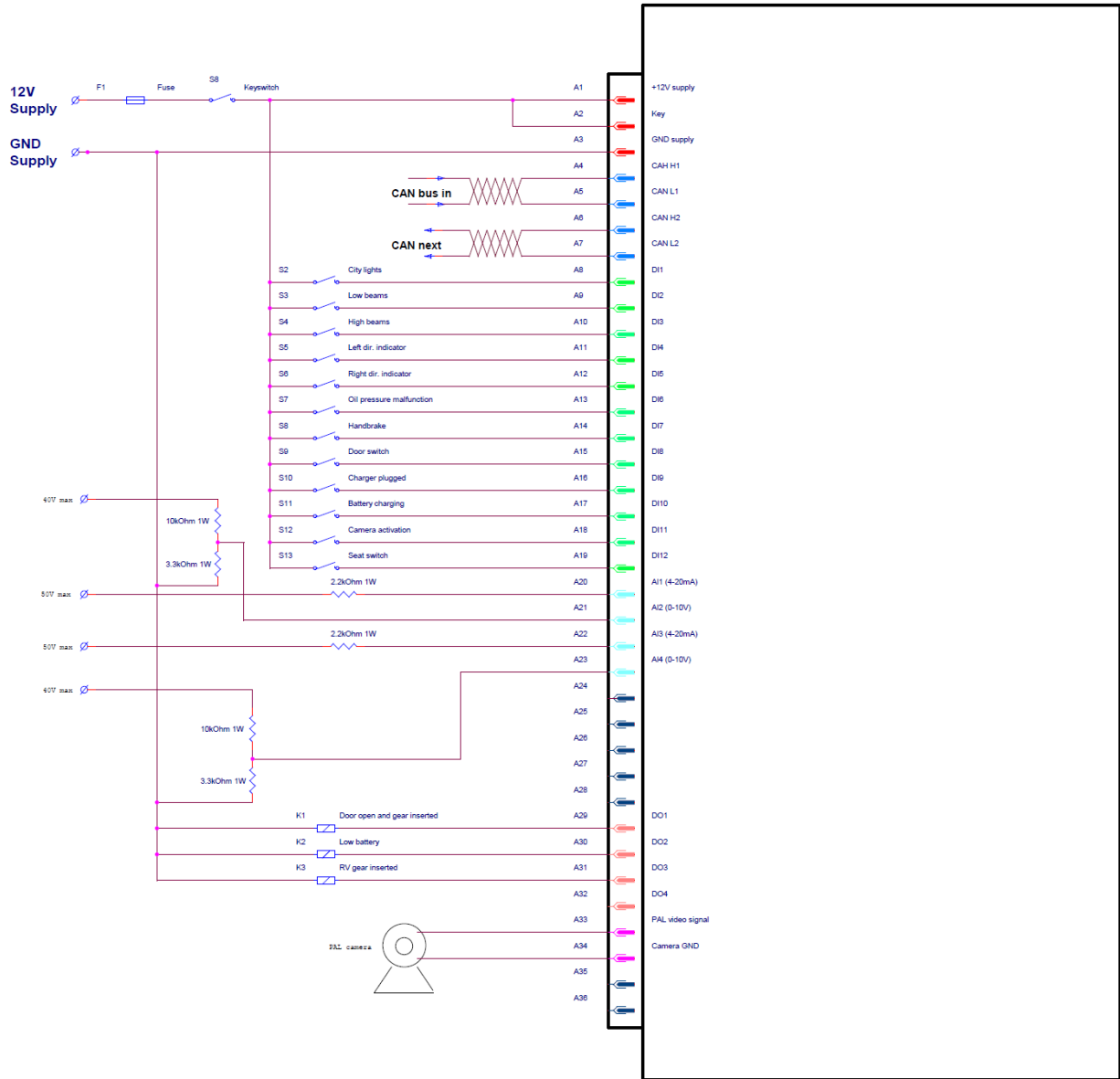

Connector A

3.1   Light wiring

The DMC Display may be supplied with 12V as a stand-alone unit or pre-wired onto a base-plate with contactors etc. Control wiring connections should be made using 0.56mm² (AWG#20) or equivalent stranded wire. The correct pressure release crimping tools MUST be used for long term connection reliability.

The DMC Displays and equipped with a 36-way J.S.T connector used to carry the power and input/output signal. The plug housing is an J.S.T 39ZRO-B-1A and the contactor pins are J.S.T SZRO-A021T-MO.64. The J.S.T. connector will accept wires within the range 1.6 to 1.7 mm.

The J.S.T. connector holds the functions for interfacing with the vehicle and the CAN communication. The signals, associated to the pins of the connector, are digital inputs, analogue inputs, communication inputs and digital outputs
In this section the functions and features associated to each pin of the J.S.T. 36-way connector, used for the Display light wiring will be described in details.

3.1.1 Light wiring example of DMC Advanced Display

12V Supply	F1 Fuse — S8 Keyswitch	A1 +12V supply
		A2 Key
GND Supply		A3 GND supply
		A4 CAH H1
	CAN bus in	A5 CAN L1
		A6 CAN H2
	CAN next	A7 CAN L2
	S2 City lights	A8 DI1
	S3 Low beams	A9 DI2
	S4 High beams	A10 DI3
	S5 Left dir. indicator	A11 DI4
	S6 Right dir. indicator	A12 DI5
	S7 Oil pressure malfunction	A13 DI6
	S8 Handbrake	A14 DI7
	S9 Door switch	A15 DI8
	S10 Charger plugged	A16 DI9
	S11 Battery charging	A17 DI10
40V max	S12 Camera activation	A18 DI11
10kOhm 1W	S13 Seat switch	A19 DI12
3.3kOhm 1W	2.2kOhm 1W	A20 AI1 (4-20mA)
50V max		A21 AI2 (0-10V)
	2.2kOhm 1W	A22 AI3 (4-20mA)
50V max		A23 AI4 (0-10V)
40V max		A24
		A25
10kOhm 1W		A26
		A27
3.3kOhm 1W		A28
	K1 Door open and gear inserted	A29 DO1
	K2 Low battery	A30 DO2
	K3 RV gear inserted	A31 DO3
		A32 DO4
		A33 PAL video signal
	PAL camera	A34 Camera GND
		A35
		A36

3.1.2 Pin assignment of DMC Advanced Display

Pin	Function on DMC Advanced Display	Description
A1	+12V supply	Provided supply to display
A2	Key input	Powers up the display
A3	GND	Provider GND reference to display
A4	CAN H	
A5	CAN L	
A6	CAN H	
A7	CAN L	
A8	DI1 – City lights	Makes symbol "⊐☐⊏" appear on display
A9	DI2 – Low beams	Makes symbol "☰D" appear on display
A10	DI3 – High beams	Makes symbol "☰D" appear on display
A11	DI4 – Left direction indicator	Makes symbol "⇦" appear on display
A12	DI5 – Right direction indicator	Makes symbol "⇨" appear on display
A13	DI6 – Oil pressure malfunction	Makes symbol "(!)" appear on display
A14	DI7 - Handbrake	Makes symbol "(P)" appear on display
A15	DI8 – Door open	Used to trigger DO1 output
A16	DI9 – Charger plugged	Makes symbol of a white charger appear on display
A17	DI10 – Battery in charge	Makes symbol "⊂" appear on display
A18	DI11 – Camera activation	Used to trigger the camera displaying
A19	DI12 - Seatbelt	Makes symbol "" appear on display
A20	AI1 – Voltage supply monitoring	4-20mA. Used to measure a voltage up to 50V.
A21	AI2 – Working light	Makes symbol "" appear on display
A22	n/a	
A23	AI4 – Rotating beam	Makes symbol "" appear on display
A24	n/a	
A25	n/a	
A26	n/a	
A27	n/a	
A28	n/a	
A29	DO1 – Door open and gear inserted	High side, 0.5A max
A30	DO2 – Low battery	High side, 0.5A max
A31	DO3 – RV gear inserted	High side, 0.5A max
A32	n/a	
A33	Input Video Signal	Provides the PAL video signal
A34	GND video	Provider the GND for the video signal
A35	n/a	
A36	n/a	

3.1.3 Light wiring example of DMC Lite Display

Terminal	Signal
A1	+12V supply
A2	+12V supply
A3	GND supply
A4	GND supply
A5	
A6	
A7	
A8	
A9	
A10	
A11	
A12	
A13	
A14	
A15	
A16	
A17	
A18	
A19	CAN L
A20	CAN H
A21	
A22	
A23	
A24	
A25	
A26	
A27	
A28	
A29	
A30	
A31	
A32	
A33	
A34	
A35	
A36	

12V Supply — F1 Fuse — S8 Keyswitch

GND Supply

CAN bus in
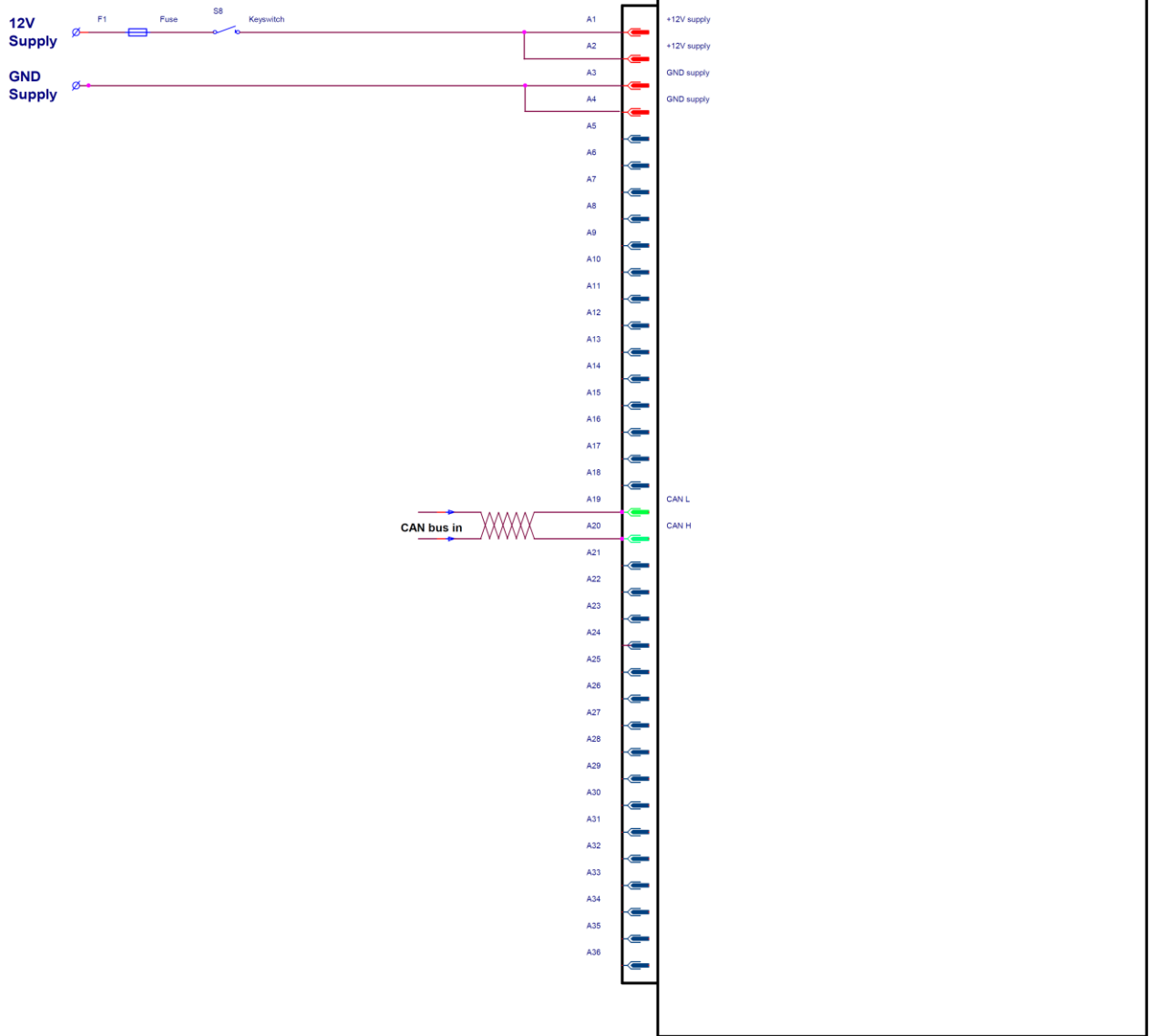
3.1.4 Pin assignment of DMC Lite Display

| Pin	Function on DMC Lite Display	
A1	+12V supply	Provided supply to display
A2	+12V supply	Provided supply to display
A3	GND	Provider GND reference to display
A4	GND	Provider GND reference to display
A5	n/a	
A6	n/a	
A7	n/a	
A8	n/a	
A9	n/a	
A10	n/a	
A11	n/a	
A12	n/a	
A13	n/a	
A14	n/a	
A15	n/a	
A16	n/a	
A17	n/a	
A18	n/a	
A19	CAN L	
A20	CAN H	
A21	n/a	
A22	n/a	
A23	n/a	
A24	n/a	
A25	n/a	
A26	n/a	
A27	n/a	
A28	n/a	
A29	n/a	
A30	n/a	
A31	n/a	
A32	n/a	
A33	n/a	
A34	n/a	
A35	n/a	
A36	n/a	

3.1.5　Wiring of digital inputs

+12V supply

Switch

Large
display

DI1-12
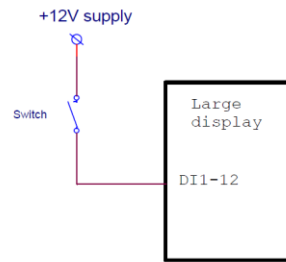
The DMC Displays only embed the possibility to have active high digital inputs. Inputs should be supplied at 12V max.

3.1.6　Wiring of analogue inputs

There are 2 kinds of analogue inputs used on the DMC Advanced Display.

MAX 50V

2.2kOhm 1W

Large
display

AI1/AI3
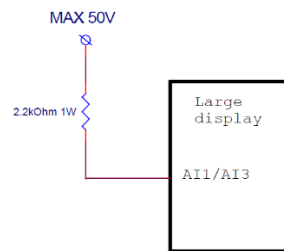
AI1-3 are meant to measure a voltage in the range 0-48V. To this mean, the input should be wired to the desired supply with a 2kOhm resistance in series. The resistance should hold at least 1W.

MIN 10V
MAX 40V

Switch

10kOhm 1W

Large
display

AI2/AI4

3.3kOhm 1W

GND
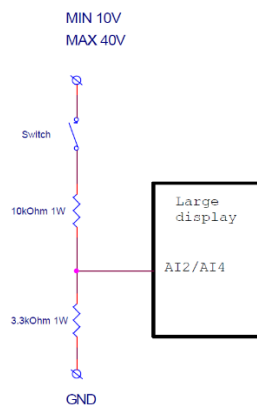
AI2-4 are meant to be used as digital input. To this mean, a voltage divider should be wired as in the example above. The divider should be composed of a 10kΩ resistor (connected to the swich) and of a 3.3kΩ resistor (connected to GND). Resistors should be at least 0.25W.

3.1.7 Wiring of the CAN bus

CAN bus communication wires should be terminated at both ends with a 120Ω resistor.
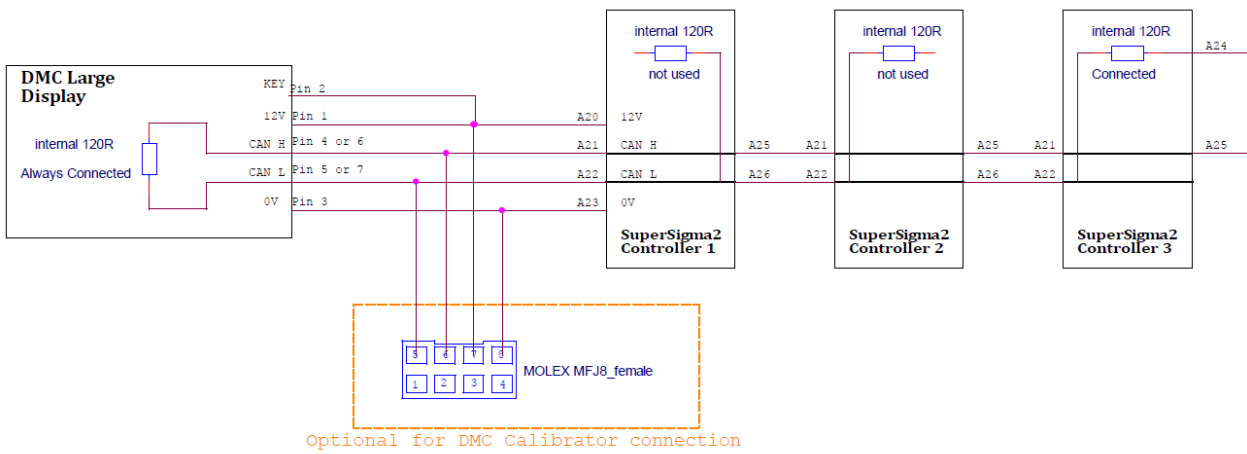
All DMC Displays have a 120Ω termination resistor installed, which is not removable.

If a CAN bus network is installed in a machine, special care should be taken which two CAN nodes should have the build-in termination resistor connected. Make sure that only 2 termination resistors are active.

Below 2 examples of a CAN bus network, with DMC Display, with and without isolated CAN bus.
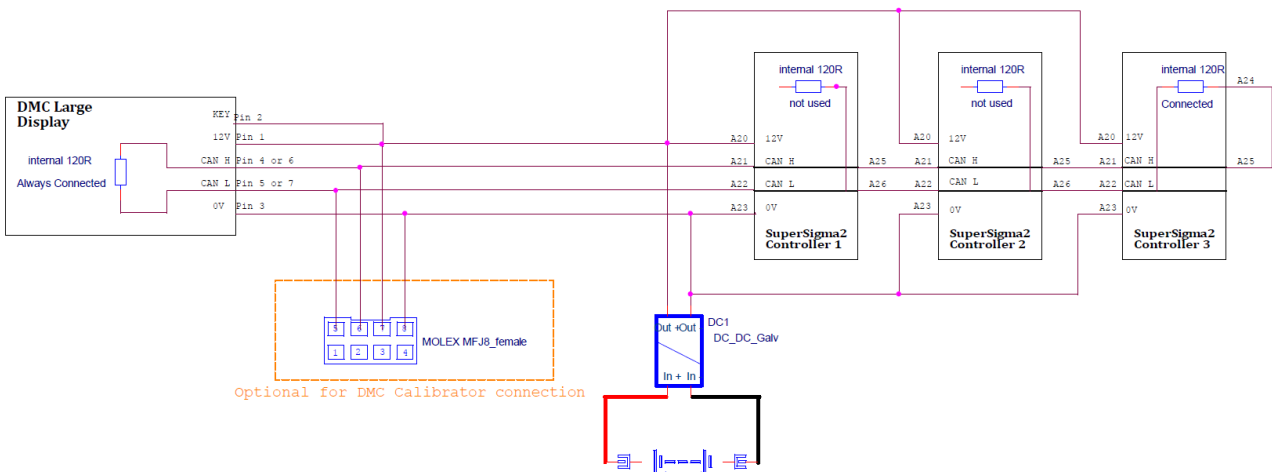
Non-isolated CAN bus wiring example with DMC Advanced Display:

The DMC Advanced Display has a CAN bus termination resistor installed. This resistor is fixed installed and cannot be disconnected. The schematic below shows how the CAN bus termination should be wired when a DMC Advanced Display is part of the CAN bus installation and the CAN lines are **not** isolated. The schematic also shows the optional wiring of a 8-way female Molex Minifit connector which could be used to plug the DMC Calibrator.
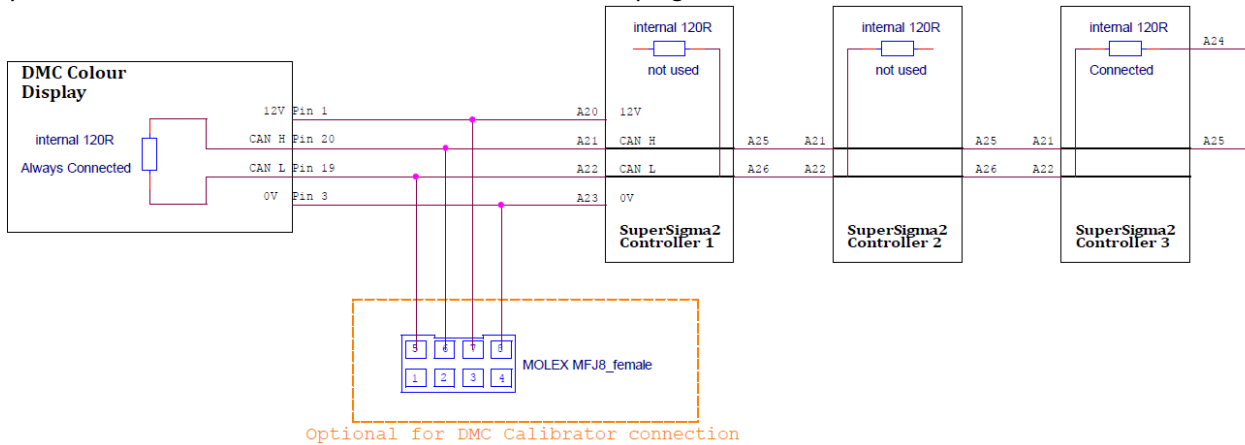
Isolated CAN bus wiring example with DMC Advanced Display:

The DMC Advanced Display has a CAN bus termination resistor installed. This resistor is fixed installed and cannot be disconnected. The schematic below shows how the CAN bus termination should be wired when a DMC Advanced Display is part of the CAN bus installation and the CAN lines are isolated. The schematic also shows the optional wiring of a 8-way female Molex Minifit connector which could be used to plug the DMC Calibrator.

Non-isolated CAN bus wiring example with DMC Lite Display:

The DMC Lite Display has a CAN bus termination resistor installed. This resistor is fixed installed and can not be disconnected. The schematic below shows how the CAN bus termination should be wired when a DMC Lite Display is part of the CAN bus installation and the CAN lines are **not** isolated. The schematic also shows the optional wiring of a 8-way female Molex Minifit connector which could be used to plug the DMC Calibrator.
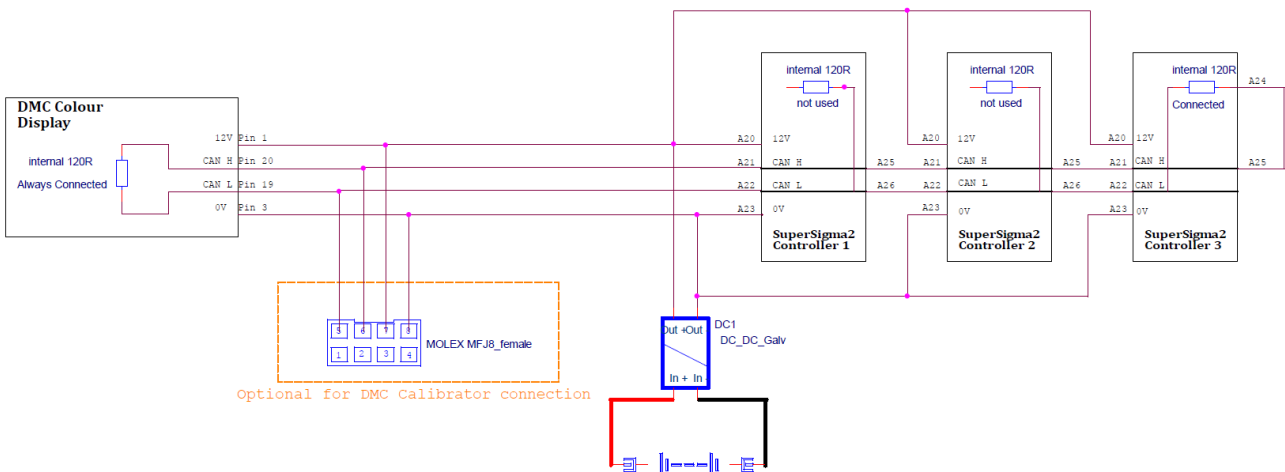

Isolated CAN bus wiring example with DMC Lite Display:

The DMC Lite Display has a CAN bus termination resistor installed. This resistor is fixed installed and cannot be disconnected. The schematic below shows how the CAN bus termination should be wired when a DMC Lite Display is part of the CAN bus installation and the CAN lines are isolated. The schematic also shows the optional wiring of a 8 -way female Molex Minifit connector which could be used to plug the DMC Calibrator.

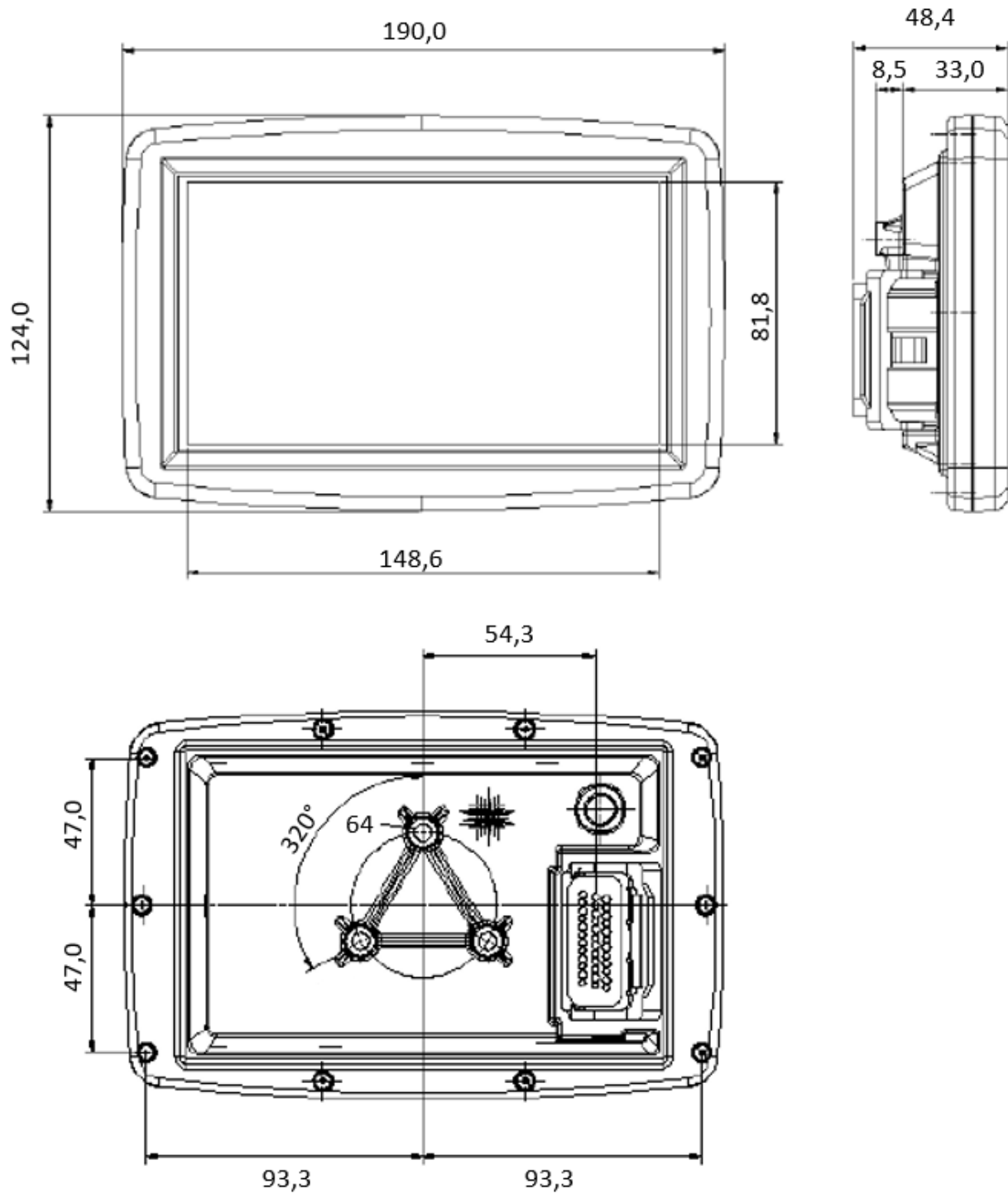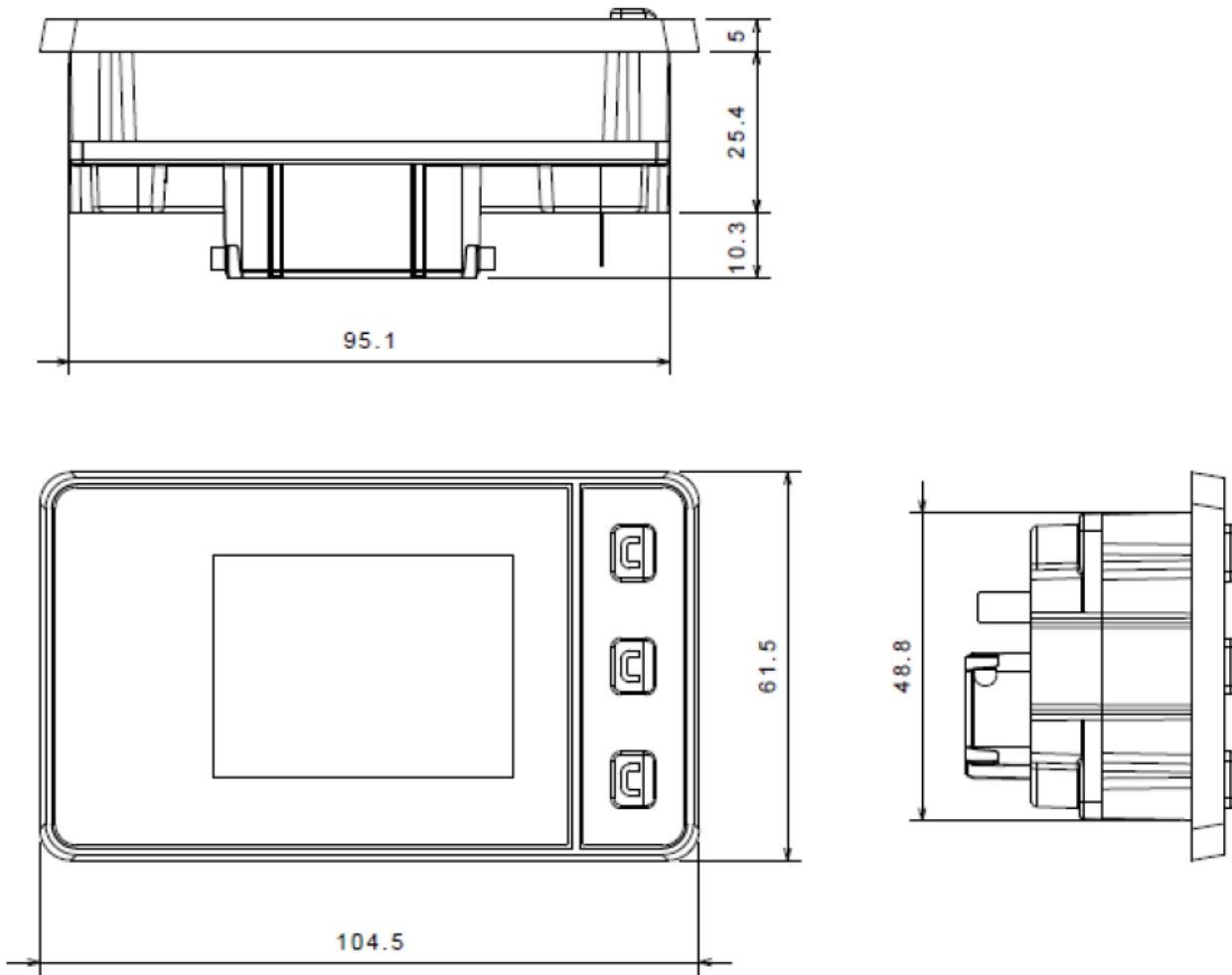
NOTICE!

In isolated-CAN version of the Supersigma2 Controller, when supplying the CAN bus with external 24V, pay attention when plugging the DMC Calibrator. Only DMC Calibrators later than serial number D20340439 and without RS232 and Switch on the back can be supplied with more than 12V.

3.2   Mechanical installation

3.2.1   DMC Advanced display

3.2.2 DMC Lite display
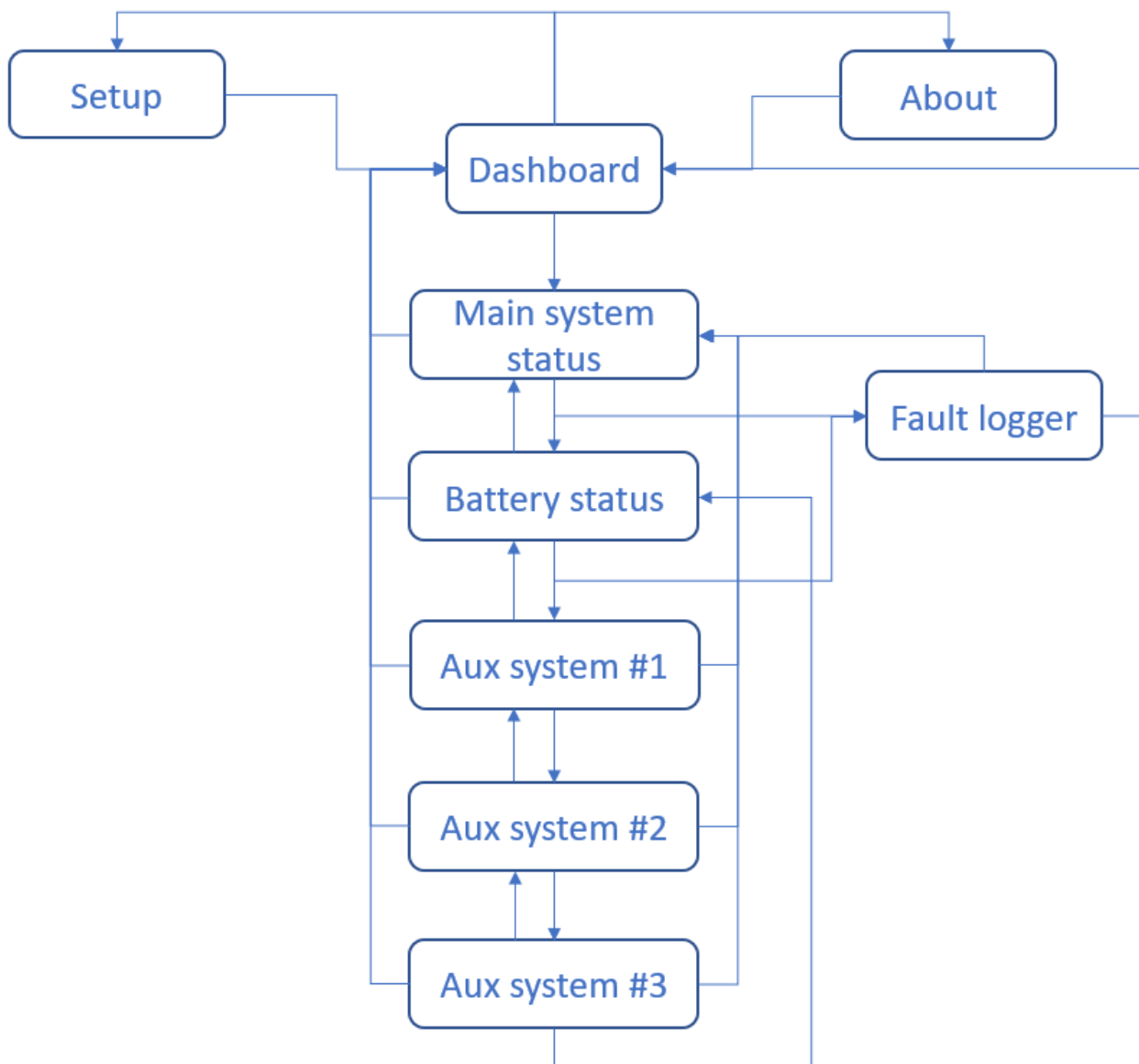
4 DMC Advanced Display

4.1 Main features

A DMC Advanced Display is designed to work with at least one DMC SuperSigma2 Controller. The Controller which is mastering the Display (i.e. send the main drive information), should be the one providing power to the main traction/pump motor of the system. In case of a Dual Motor application, it is suggested to set the "Dual motor master" the same as the Display master. To activate the mastering of the display in a SuperSigma2 Contoller, please set parameter "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) between 1 and 6.

ALL other SuperSigma2 Controllers in the network must have this parameter either to 0 (to send to the Display their status information) or 7 (to not appear on Display).

The DMC Advanced Display will recognize automatically the Supersigma2 Controllers connected and it will show their status in the appropriate page (see "4.4 Main controller(s) status page" and "4.5 Auxiliary controllers status pages").

The DMC Advanced Display has the capability to show on video the signal coming from a PAL Camera. This feature gets active when the Pin A18 (DI11) is activated (active high).

4.2 Navigation

4.3 Dashboard

At powerup the DMC Advanced Display will show the drive dashboard.

In this page it is shown:

- The SOC of the battery, displayed as a bargraph on left side of the Display. The Lite of the bargraph (green-orange-red) will vary according to the BDI/SOC configuration of the SuperSigma2 Controller mastering the Display. The threshold level at which the bargraph turns orange is defined by parameter "M8-5 BDI warning level", while the threshold level at which the bargraph turns red is defined by parameter "M8-6 BDI cut level". Additionally, in case the "charging" state is recognised by the display (either Via CAN or Via Digital input 10), the bargraph will turn green and show a lightning symbol.
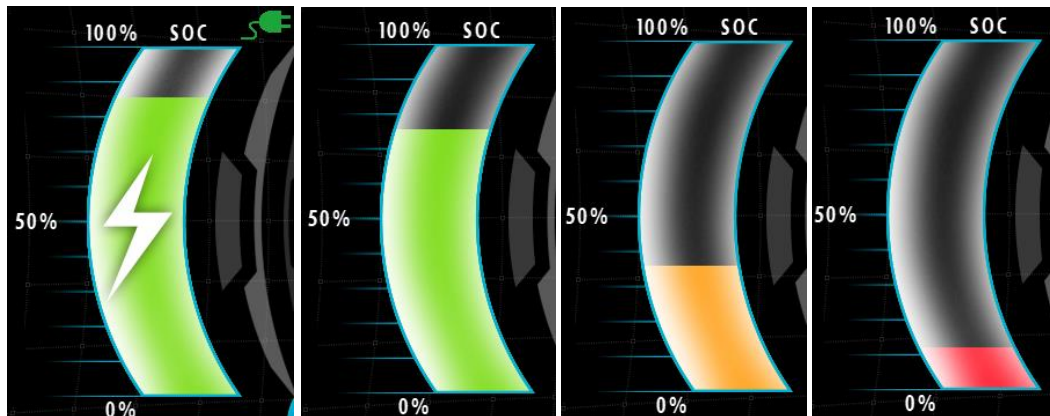
- The speed (in Km/h) of the vehicle or the speed (in RPM) of the motor. This information is retrieved exclusively from the Supersigma2 Controller which is mastering the Display. In case the Display is being mastered by a pump controller, the vehicle speed will not be available. The displayed information will be configured in the SuperSigma2 Controller, by setting parameter "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) to 3 or 4 for vehicle speed or motor speed, respectively. Setting that parameter to 1, 2, 4 or 5 will result in a non-possible configuration and the Display with show "NOT SET".
  Notice that in case of vehicle speed selected, the display will also show a Km counter.
  Please notice that for correct vehicle speed calculation, parameter "M1-86 Speed ratio" of the SuperSigma2 Controller which is mastering the display should be set correctly, according to gear reduction and wheel diameter.

- The information of how much power is being absorbed/regenerated by the SuperSigma2 Controllers.
  This data only refers to the Controllers belonging to the "main system", i.e. the Controller mastering the Display and, if the Display Master is also the Dual Motor Master, the Dual Motor Slave.
  In order to have this information correctly scaled, it is necessary to set up in the SuperSigma2 Controller that is mastering the Display parameter "M8-19 Maximum battery current" ("M8-15" for pump applications).
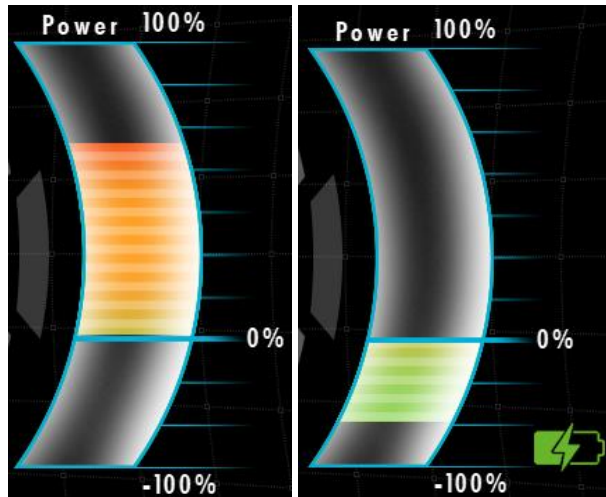
- The indication of actual time and date, further than the indication of the elapsed drive and key hour of the vehicle.
  In case a fault is present on one or more SuperSigma2 Controllers, these indication will momentarily disappear and the actual faults will be shown instead. The fault will be displayed blinking and they will cyclically rotate.

- In the bottom right corner, the inserted gear (D for FW, R for RV, N for neutral), the park brake symbol and the speed limit indication.
- In the bottom left corner the indication of the expired maintenance timer (see "4.8 Settings menu" for details).

4.4 Main controller(s) status page

In this page the information about the "main system" (i.e. the Controller mastering the Display and, if the Display Master is also the Dual Motor Master, the Dual Motor Slave) is shown.
This configuration is retrieved directly from the SuperSigma2 Controllers and the user does not need to set up anything specifically for this page. It is sufficient that the Display Master has parameter "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) set to 2 or 3 and that the Slave Controller (referring to the Dual Motor function, if needed), has that parameter set to 0.

4.5   Auxiliary controllers status pages

The DMC Advanced Display features 3 pages of "Auxiliary Controllers". Those are the Supersigma2 Controllers that are not part of the "main system", but are used for other purposes. As far as they have parameter "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) set to 0, the DMC Advanced Display will automatically recognize them and add them to a Auxiliary system page. The nodes are ordered automatically from the lowest to the highest node number, no matter on their startup time. A maximum of 6 auxiliary nodes can be displayed.

4.6   Battery/BMS status page

In this page the battery status is displayed.

In case a BMS is connected in the CAN bus and any SuperSigma2 Controller is setup as "BMS master", this page will show the information coming from the said BMS.

In case no BMS is connected on the CAN bus of no Supersigma2 Controller is setup as "BMS master", this page will be filled with the information coming from every Supersigma2 Controller that are showing info on the Advanced Display. To do so, <u>make sure EVERY SuperSigma2 Controller has parameter "M9-3 CAN messages "CanMsg" set to 10 or 11</u>.

4.7   Fault logger

This page shows the 10 latest fault that happened in the SuperSigma2 Controllers and BMS connected in the CAN Network.

Please notice that BMS will always be identified as "node 16".

To reset the fault logger refer to "4.8 Settings menu".

4.8   Settings menu

In the settings menu the user is allowed to change the date and time of the internal Display's internal RTC.

Advanced user can also insert a password to change the vehicle number, reset the fault logger and setup/reset a maintenance timer. The procedure for performing every action will be reported below.

4.8.1   How to change the date

1. Navigate with "up" and "down" arrow to the Date line.
2. Press "OK" and the day starts blinking.
3. Change the number by means of "plus" and "minus" buttons.
4. Press "OK" when the correct digit is inserted. The months starts blinking.
5. Change the number by means of "plus" and "minus" buttons.
6. Press "OK" when the correct digit is inserted. The year starts blinking.
7. Change the number by means of "plus" and "minus" buttons.
8. Press "OK" when the correct digit is inserted

Notice! If the date change procedure was started and "up" or "down" button is pressed before the procedure is finished, the changes will be saved anyway. If the "exit" button is pressed at any time before the procedure ended correctly, the procedure will be cancelled.

4.8.2   How to change the time
1.   Navigate with "up" and "down" arrow to the Time line.
2.   Press "OK" and the hour starts blinking.
3.   Change the number by means of "plus" and "minus" buttons.
4.   Press "OK" when the correct digit is inserted. The minutes starts blinking.
5.   Change the number by means of "plus" and "minus" buttons.
6.   Press "OK" when the correct digit is inserted

Notice! If the time change procedure was started and "up" or "down" button is pressed before the procedure is finished, the changes will be saved anyway. If the "exit" button is pressed at any time before the procedure ended correctly, the procedure will be cancelled.

4.8.3   Hot to insert a pincode
1.   Navigate with "up" and "down" arrow to the pincode line.
2.   The underline of first digit starts blinking.
3.   Change the number by means of "plus" and "minus" buttons.
4.   Press "OK" when the correct digit is inserted.
5.   Restart from 2 until all digits are inserted. After having inserted the fourth digit, if the pin is correct, it resets to 0, the locker icons disappear and it is possible to access the advanced settings. If the pin was not correct the selection goes back to first digit.

Notice! The default value of the pincode is 1994.

4.8.4   How to change the pincode
1.   Insert the correct Pincode to gain access to advanced parameters.
2.   Navigate with "up" and "down" arrow to the new pincode line.
3.   Insert the new pincode following the same procedure described above.
4.   When the fourth digit is selected and OK is pressed, you will be asked to reinsert the same pin.
5.   Reinsert the pin and a confirmation message will appear.

Notice! You can only cycle forward by pressing the OK button, so be careful of having inserted the desired value before pressing "OK".

Notice! If the pin change procedure was started and "up" or "down" or "exit" button is pressed at any time before the procedure ended correctly, the procedure will be cancelled.

Notice! If the pincode is changed from default value and the new pincode is lost, there is no way to reset it. DMC Advanced Display should be sent to back to DMC for recovery.

4.8.5   How to reset the fault logger
1.   Insert the correct Pincode to gain access to advanced parameters.
2.   Navigate with "up" and "down" arrow to the reset logger line.
3.   Set the parameter to 1 and press "OK". The logger resets and the parameter goes back to 0, meaning that the procedure is correctly executed.

4.8.6   How to setup a maintenance timer
1.   Insert the correct Pincode to gain access to advanced parameters.
2.   Navigate with "up" and "down" arrow to the "Timer option" line.
3.   Change the option by means of "plus" and "minus" buttons:

>   0: Disabled
>   1: Enabled on key hours
>   2: Enabled on drive hours

4.   Press "OK" and the timer gets activated.
5.   Navigate with "up" and "down" arrow to the "Maintenance timer" line.
6.   Change the timer value by means of "plus" and "minus" buttons.
7.   Press "OK" and the timer gets activated.
8.   Press "RESET" to make sure the timer is reset to the actual value.

4.8.7 How to reset the maintenance timer
1. Insert the correct Pincode to gain access to advanced parameters.
2. (OPTIONAL) Navigate with "up" and "down" arrow to the "Maintenance timer" line.
3. (OPTIONAL) Change the timer value by means of "plus" and "minus" buttons.
4. Press "RESET" to reset the timer.

4.9 Fault icons

When a fault is active in one of the SuperSigma2 Controllers meant to communicate with the DMC Advanced Display, it is shown both under its information and in first page. In addition to this, a set of icons can appear in first page to help the user to understand the nature of the fault. The set of possible icons is reported hereafter.

| Icon	Fault
CAN	F29 Sxx, F12 S-17
(icon)	F28
(battery icon)	F17
(battery icon)	F2 (or BMS-dependent)
(battery icon)	F22
(battery icon)	F4 (or BMS-dependent)
(operator icon)	F11
(motor icon)	F31, F32, F33, F34, F35, F39, F40
(icon)	F21
(motor icon)	F5
(icon)	F25
(icon)	BMS-dependent
(icon)	BMS-dependent
(icon)	F10, F12 S2-3, F12 S9-10
(icon)	F12, F13
(icon)	F18, F23, F27
(icon)	F6
A↑	F21 (or BMS-dependent)
BMS	F3 (only if BMS times out)
RPM	F30

5 DMC Lite Display

5.1 Main features

A DMC Lite Display is designed to work with at least one DMC SuperSigma2 Controller. The Controller which is mastering the Display (i.e. send the main drive information), should be the one providing power to the main traction/pump motor of the system. To activate the mastering of the display in a SuperSigma2 Contoller, please set parameter "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) between 1 and 6.

ALL other SuperSigma2 Controllers in the network must have this parameter either to 0 (to send to the Display their status information) or 7 (to not appear on Display).

5.2 Navigation

5.2.1 Button usage
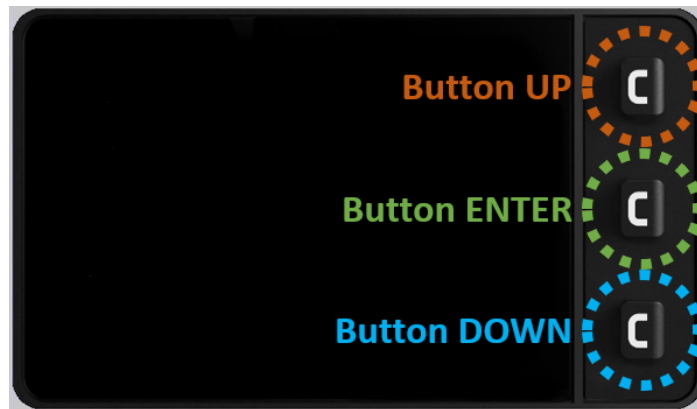
The DMC Lite display has 3 buttons available. From the one on top they will be hereafter called "button UP", "button ENTER" and "button DOWN".

Scrolling between pages is possible by keeping the UP or DOWN button pressed for 1 seconds. Fast scrolling is possible if the button is kept pressed.

If no button is pressed within 30 seconds, the Display will return to Main Page automatically.

To access the setup menu it is necessary to press the ENTER button for more than 3 seconds. Once the menu has been accessed, the user can navigate the indexes with the UP and DOWN button, just by looking at the arrow on the side of the desired index voice. When the desired position has been reached, the ENTER button must be pressed and the value selection is possible. This is also indicated by the flashing arrow. The UP and DOWN buttons can be used to modify the desired value until the user is satisfied. To modify another parameter press ENTER, the arrow stops blinking and another voice index can be selected. In no further modification is needed, keep the ENTER button pressed for at least 3 second to return to the Main View.

5.2.2 Page transition
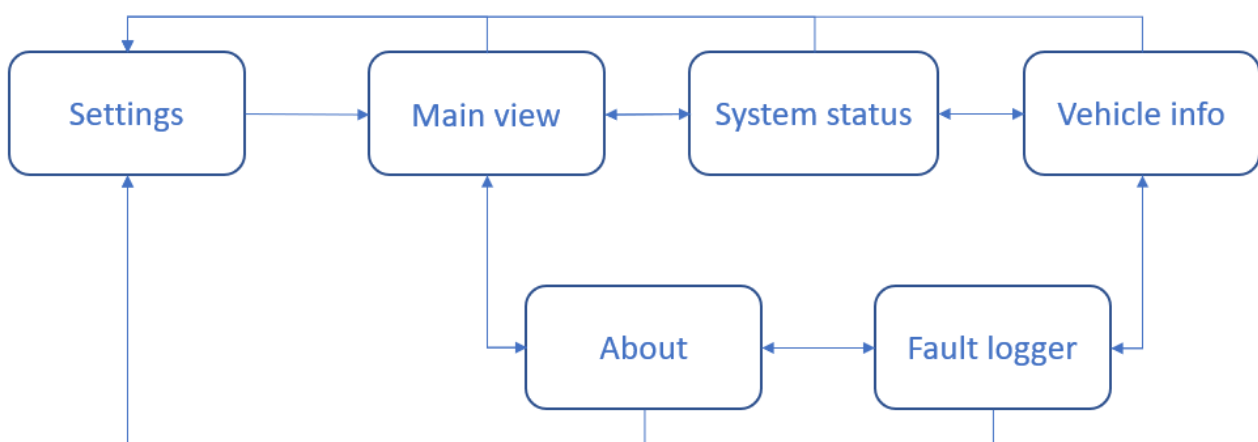
5.3 Main View

This is the default screen displayed on the DMC Lite Display and contains driving information, further than a quick glance at fault affecting the system. Below all the features are described in detail:

- Numeric field and unit. It contains the magnitude of the chosen quantity according to setting "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) of DMC Supersigma2 Controller. The numbers that can be represented vary from -9999 to 9999, without decimal separator. This information is received from the Display Master.

- Bargraph. It is a bar filling up while the Numeric field is increasing. The closer it is to its maximum value, the more full the bargraph will be. Notice that with "maximum value" is not intended ± 9999, but the relative maximum value for each available setting. If "Str" setting is chosen from the DMC Calibrator, the bargraph will change is a two-sided bar filling up towards right or left (starting from the center) basing on the amount of steering physically actuated.

- Distance counter. If the Display Master is set to send out vehicle speed, below the bargraph a distance counter will appear. It shows the kilometers that the vehicle has been ridden for. Notice that this information is not available if the vehicle speed is not selected to setting "M3-11 Display status info "DispInfo"" ("M3-6" for pump applications) of DMC Supersigma2 Controller, thus the distance counter will neither be displayed or count ridden kilometers. The counter will update every 100 meters.

- Distance counter measurement unit. This field displays "Km" of "mi" information weather the user has set a metric of imperial measurement system from the SETUP menu (see 5.8 SETUP menu).

- Icons. Six icons can appear on the display under particular conditions: a turtle symbol means that some speed limit is active and its cutting the driving power; a parking symbol represents that the handbrake has not been released; a seat icon advice the driver that the acceleration pedal has been pressed without anyone sitting on the seat; a foot icon warns the user that the acceleration pedal was pressed before starting the machine. A white charger means that there is a battery charger plugged in, while a green charger indicates that the battery is actually charging.

- BDI/SOC indicator. On the left side of the screen a BDI/SOC indicator is displayed and it is managed by means of the information coming from the Display Master. It is a bargraph that fills up as much energy is stored into the vehicle battery. The Lite of the bargraph (green-orange-red) will vary according to the BDI/SOC configuration of the SuperSigma2 Controller mastering the Display. The threshold level at which the bargraph

turns orange is defined by parameter "M8-5 BDI warning level", while the threshold level at which the bargraph turns red is defined by parameter "M8-6 BDI cut level".

Additionally, in case the "charging" state is recognised by the display, the bargraph will turn green and show a lightning symbol

- Fault field. The last information that is displayed on the Main View of the DMC Lite Display is a fault alarm. If **any** node in the network undergoes a fault, this will be displayed on the bottom of the screen flashing every 2 seconds for recalling attention (if a fault occurs while the unit "KPH" is selected, the distance counter will disappear but the distance calculation will still be performed). The fault will be displayed as follow: Nxx Fxx Sxxx, indicating respectively the Node in fault, the Fault code and the fault Subcode, for an immediate comprehension of the issue. If more than one node is undergoing a fault, they will be displayed one at a time, with a cycle time of 5 seconds.

If a BMS is connected and DMC a DMC Controller is managing it, BMS fault can also be displayed. This will be done in the format "BMS Fxx *icon*", where *icon* will be one of the following:

Icon	Meaning
	Low voltage warning
	Low voltage error
	High voltage warning
	High voltage error
	Overcurrent detected
	BMS internal error
	BMS low temperature
	BMS high temperature
	BMS internal wireoff
	Battery chanrge failure
	Generic fault

5.4   Fault summary
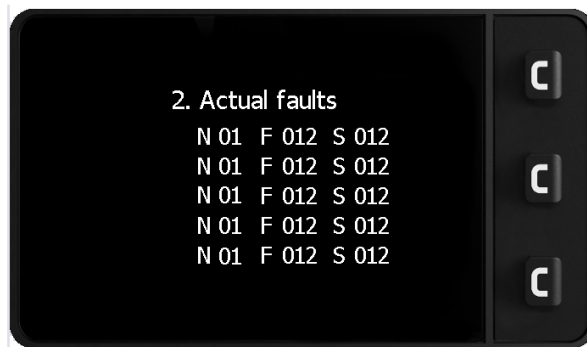
The second page of the DMC Lite Display is made up as a fault summary. In this page the user can see all the simultaneously active faults. Faults of nodes with lower number will be displayed on top. If one or more faults are solved, those will automatically disappear from the list without the need of a refresh. The display method is the standard adopted also in the Main View: Nxx, Fxx Sxxx, indicating Node in fault, Fault code and fault Subcode. The fault information is sent on the CAN network by the node which has an issue, so it is very important to remember to sett ALL the nodes to have a transmission rate of 125 kbit/s in order to have their fault displayed. Notice that all the active nodes (up to 5) are displayed in this page, even if they are not in fault: in this case they will be displayed with fault number 0. This helps understanding if a node is actually connected in the network and a successful communication is established.

5.5   Vehicle information
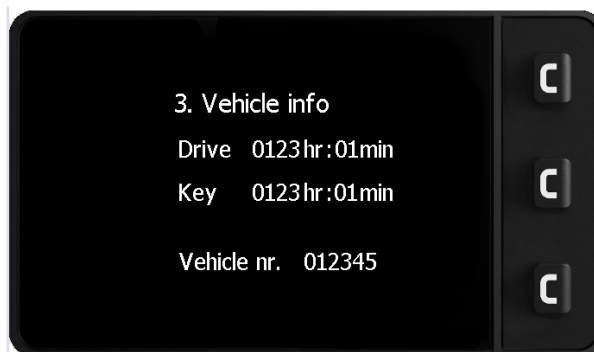
The third page of the DMC Lite Display shows information about the vehicle. Those are Drive hours, Key hours and Vehicle number.
Drive hours represent the actual time that the vehicle has been driven, being it forward or reverse.
Key hours represent the time which the vehicle has been switched on for and a CAN communication was enabled.
The Vehicle number is a setting for the user which can select the desired value for identifying the vehicle (see SETUP menu for detailed information).

5.6   Fault logger
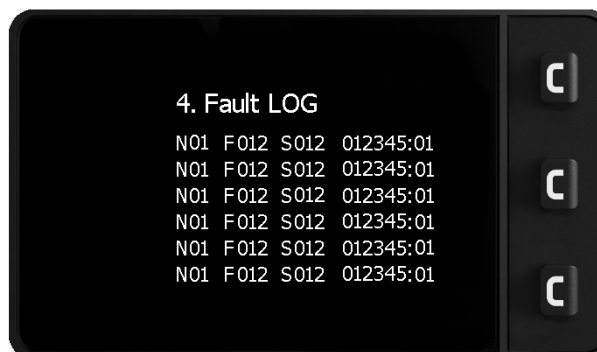
The fault logger of the DMC Lite Display is a resume of the last 6 faults that happened in the CAN network. Faults are displayed from the most recent to the older one, together with their time of occurrence. Notice that only significative faults are stored, thus fault codes from 1 to 15 are not included in this list.

Please notice that is a BMS is present, it will always be displayed as "node 16".

5.7 About page

This page shown information about the firmware installed on the display and can be useful if support about the display is needed.

5.8 SETUP menu

In the setup menu the user can set several preferences for the display.

The first setup available is the measurement unit for displaying of the speed and distance counter. Those can be either in KPH/Km or MPH/Mi. This will affect the only the displayed units on the Main View, not the data manipulation (i.e. if the number of 10 is displayed for KPH, this will not be automatically scaled to 6, which is the corresponding MPH value). Remind that a correct scaling factor MUST be set by means of the DMC Calibrator in the master node (node 0) for outputting the correctly scaled value. A value of 0 selects the standard metric system, while the setting 1 represents the imperial system.

The second setup available is the previously mentioned "Vehicle number". This can be set arbitrarily from 0 to 99999 using the UP and DOWN buttons (keep pressed for faster scrolling) and confirmed by pressing the ENTER button. Please notice that to gain access to this setting the user must first insert the pincode.

To insert the pincode, scroll to the appropriate line and increase the value using the UP and DOWN buttons. Press the ENTER button when finished. If the pin is entered correctly, the locker aside of the "Vehicle nr" setup will disappear. The pincode of the display is 1994 and can not be modified.

6 Software updates

DMC reserves the right to issue Software Updates without prior notice.

Software Updates are intended to introduce new functionalities, update existing ones or fix bugs in the application.

In case an update has to be performed on a DMC Display, it has to be sent back to DMC.