Olsbergs

means total control

Control system MultiDrive 2 with D3 joysticks

Technical description

olsbergs

D3 joysticks and Display ...

With their comfortable pistol grips and ergonomic design, D3 joysticks provide full control and are a joy to operate.

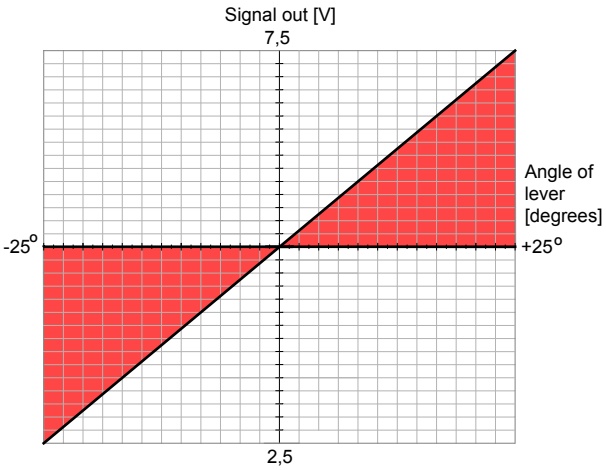
Driver display

Up to five individual drivers can be configured in the system to suit different driver styles.

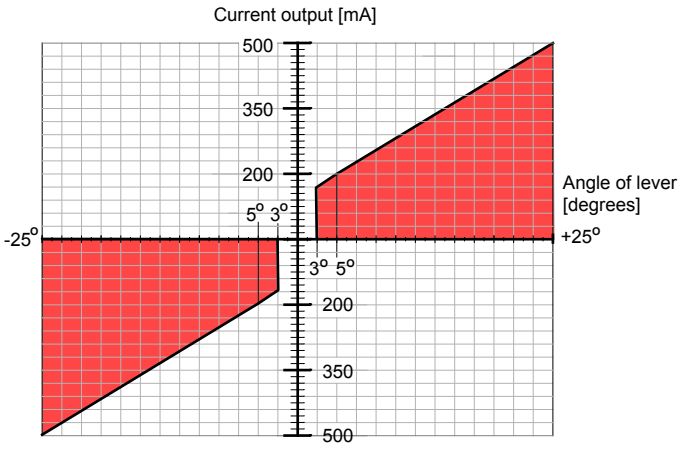
Top quality in every part

MultiDrive 2 has been developed and fine tuned over 30 years to provide the systems' unique driving and control characteristics.

All electronics and hydraulics component manufacturing takes place at Olsbergs' factories in Sweden, enabling full control over the entire manufacturing chain.



The graph shows output signal linearity in relation to the degree of D3 joystick actuation



The graph shows the DA module's control current to the the positioner solenoid in relation to the degree of D3 joystick actuation.

... in the MultiDrive 2 system

Productivity and driver convenience are at the heart of the Olsberg MultiDrive 2 control system. The system responds to driver inputs with speed and precision. Sometimes there's a need to creep slowly forward before quickly switching, under controlled conditions, to full speed.

With its 3-way proportional joysticks, an ergonomic design and a special feel combined with Olsbergs' new generation Q300 and Q200 load-sensing valves, the company has created a system to satisfy even the most demanding driver.

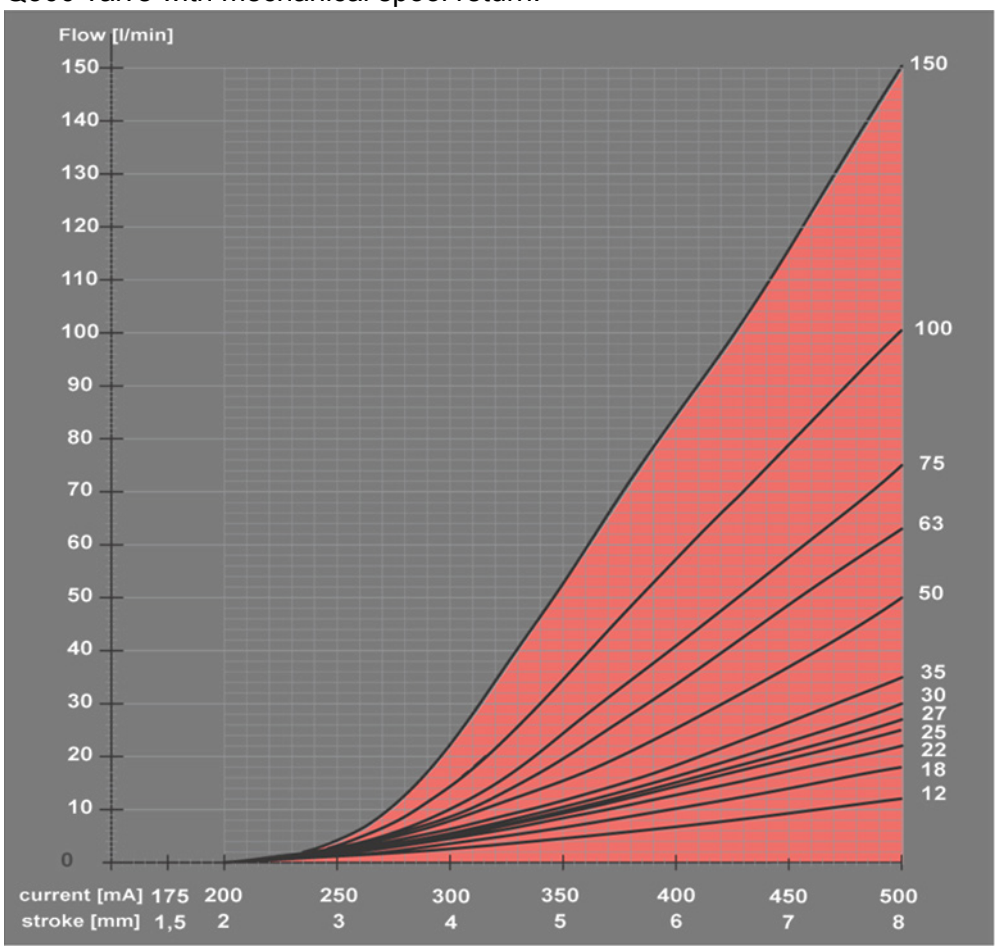
By using buttons located on the 3-way joysticks and clear, graphic symbols on the system display, up to five individual driver profiles can be easily set up to create optimal conditions for each one to work efficiently in.

Drivers set their own preferences regarding maximum speed and damping (delay) not only for each direction of the crane's various functions, but also with different settings for e.g. raising and lowering movements. Damping determines how softly the crane responds to the 3-way joystick's movements.

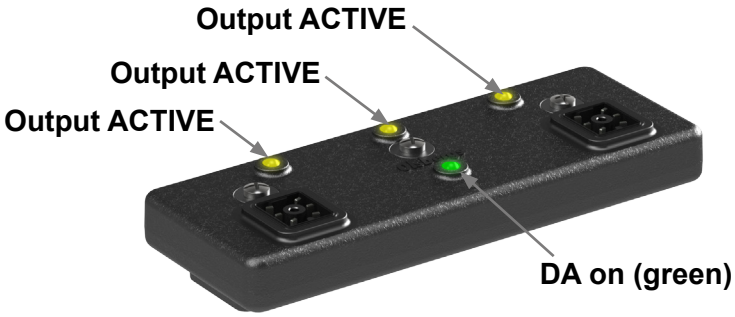
Drivers can easily limit crane speed to 20% or 50% of maximum by activating the Micro button on the joystick chassis.

MultiDrive 2 uses tried-and-tested CAN bus digital technology for communicating between units in the control system. The CAN bus cable, which runs through the system, provides power and data protocols. Depending on the degree and angle of joystick actuation, the DA module supplies the valve solenoid with proportional current from 0 to 500mA.

Graph: Proportional flow from Olsbergs' load-sensing, pressure-compensated Q300 valve with mechanical spool return.



The graph shows various flow curves as a function of spool position and control current.



D3 joysticks are a driver's tools for controlling the crane. The joysticks have ball bearing joints that provide a special control feel, and they use contactless technology for long service life. Each joystick has a microprocessor that constantly senses its position and converts this information to a data protocol for transmission via the CAN bus.

There are buttons on the joysticks for selecting MENU and MICRO. These buttons act on the entire system regardless of the joystick in use. The driver profile buttons FUNCTION, CHANGE and SET only apply to the joystick the keypad belongs to.

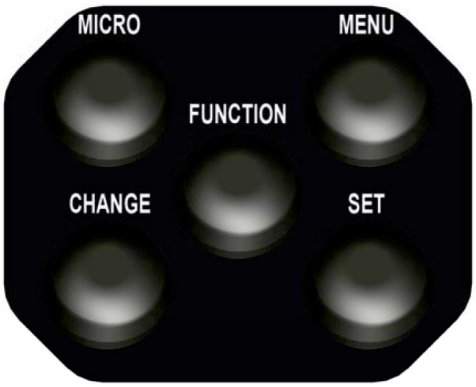
DA modules are available in two models – DA13 and DA14 – and they constitute the interface between system electronics and hydraulics. Data is transmitted to the DA modules located on the positioner solenoids via the CAN bus. The DA modules convert the data to pulse-width modulated control current.

Control current acts on the positioner solenoids which in turn control valve spool position in direct proportion to the degree of 3-way joystick actuation. Each DA13/DA14-module controls three or four valve functions respectively in one direction.

Function settings
All DA modules are delivered factory aligned. A configuration program – OCS – determines the functions the respective modules will control and the menu in which they are active.

MICRO
Precision operating mode. All crane functions run at 50% or 20% of normal speed at full joystick actuation. Pressing the button once gives 50%; twice gives 20%

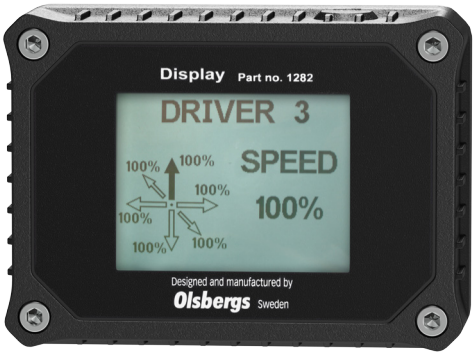
CHANGE
Only active in the configuration menu. Press CHANGE to select a submenu and to select a value or driver.



FUNCTION
Only active in standby mode. Press FUNCTION to reach the configuration menu, tuning and to scroll between the different main menus.

MENU
For switching operating menu from e.g. crane mode to outriggers or other extra functions.

SET
Only active in the configuration menu. Press SET to confirm a selected driver or value and to scroll out of a submenu or main menu.



In normal operations the display provides information on the selected operating mode, whether MICRO is active or if there is a fault.
The display provides a visual presentation of selections made when configuring driver profiles and selecting drivers.

Various operating modes and diagnostic alerts

If MICRO is selected, the chosen micro mode is shown at the bottom left corner of the display in the driver menu.

Start-up safety check

The system senses if a joystick is not in the neutral position at start-up. This is shown in the display by a warning triangle and flashing symbols for the functions actuated. After 10 seconds, only the warning triangle is shown.

Functions actuated at start-up are automatically disconnected. If the joystick is not actuated at the next start it will function normally again.

If a button is depressed or short circuited at start-up it is indicated in the same way.
The button remains inactive until it is no longer short circuited.

Status information

If the system loses contact with a joystick this is also shown in the display.

Power box PB.F2

Joysticks /Decoder /Controller /Selection Box

DA modules /Relay Box

Power Box, PB.F2, which acts as the system control centre, is powered by a 24V supply from the vehicle battery.

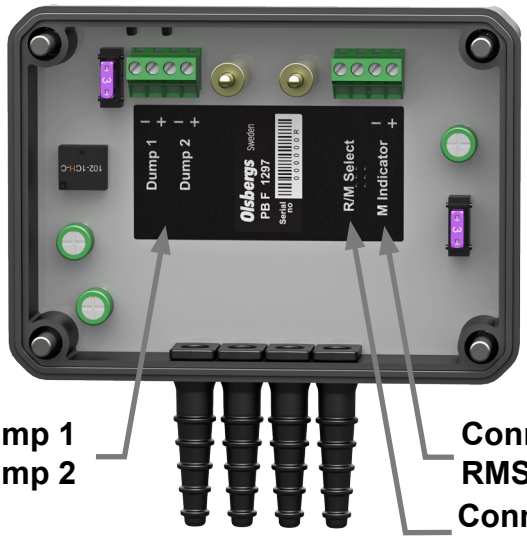
The PB.F2 has three LEDs that indicate different operational modes, statuses, errors, etc. There are means for connecting remote control (radio, controllers or joysticks) and outputs to the DA modules or RMS box.

PB.F2 houses many safety-related functions in respect of both hardware and software. The box has robust input protection on the 24V supply that protects the rest of the system from dirty power.

The system has full functionality between 16V and 32V. Olsbergs control system circuit breakers are located in the PB.F2.
The PB.F2. is designed for systems that have no requirement for emergency stop integrated in the power supply.

An optional RMS box can be connected that includes an emergency stop and a push button for selecting remote or manual system control. The LED in the button lights up when the dump valve is activated in manual mode.

Cover



Dump 1
Dump 2

Connection RMS

Connection RMS

Bottom

Power from battery +24V

+24V to misc. units

System start-up

System activation

When power to the PB.F2 is activated, e.g. when the power take-off on the truck is engaged, the PB.F2 starts up in standby and the system is ready for remote control. (Figures 1 and 3).

When the control system is activated by the switch button installed in the crane cab, the PB.F2 and the system switch to crane mode. In this mode the machine or crane is operated by the D3 joysticks in the cab.

When the system is energized it is possible to directly select manual crane operation by activating the - button on the RMS box (Figure 2). The led in the button lights up when the dump valve is activated and the machine or crane can be operated manually via levers on the valve. Return to Stand by mode by pressing the - button again and the led turns off.

When an extra function e.g. outriggers must be run from the crane cab, press the menu button on the joystick chassis once; EXTRA will be shown in the display. (Figures 4a and 4b)

If drivers forget to switch off at the switch button when they leave the cab, RESTART will be shown in the display. The system must be switched off and on again using the switch button in the crane cab in order to restart. (Figure 5).

Figure 1

Figure 2

Figure 3

Figure 4a

Figure 4b

Figure 5

Settings

DRIVER - selection

1. Put the system in STANDBY
2. Press the FUNCTION button on one of the joysticks; DRIVER is the first main menu. **(Figure 1)**
3. Press CHANGE to select the highlighted menu.
4. Using the CHANGE button, scroll until the correct driver is shown in the display. Top speed and whether or not any function has a changed direction appears under each driver. **(Figures 2 and 3)**
5. Exit the driver settings submenu by pressing the SET button or by selecting drive mode by means of the rocker switch/stop button on the panel in the cab.

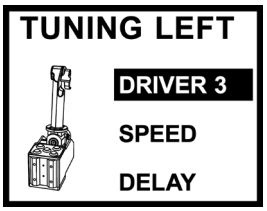


Figure 1

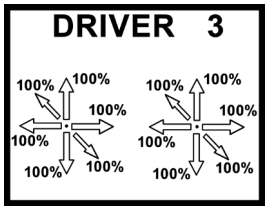


Figure 2

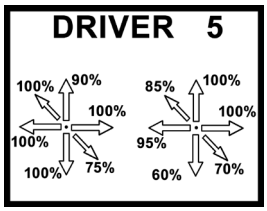


Figure 3

SPEED – limiting top speed

1. Put the system in STANDBY
2. Press the FUNCTION button on the joystick whose function must be limited.
3. Using the FUNCTION button, scroll until SPEED is highlighted in the display. **(Figure 1)**
4. Press CHANGE to select the highlighted menu. **(Figure 2)**
5. Highlight the function that must be limited by actuating (pulling) the joystick for the function concerned. **(Figure 3)**
6. Using the CHANGE button, scroll until the correct value appears. 100% = no limitation, 50% = maximum limitation. **(Figure 4)**
7. Confirm the set value by pressing the SET button. **(Figure 5)**

Repeat items 5-7 until the functions that must be limited are completed.

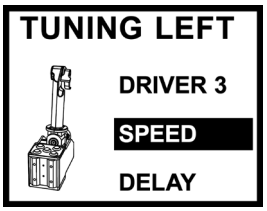


Figure 1

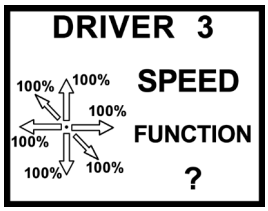


Figure 2

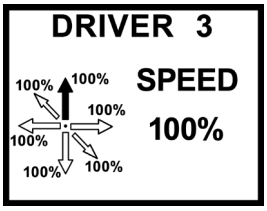


Figure 3

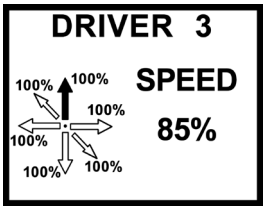


Figure 4

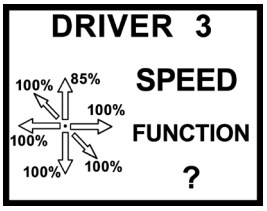


Figure 5

DELAY – delaying acceleration

1. Put the system in STANDBY
2. Press the FUNCTION button on the joystick whose function must be limited.
3. Using the FUNCTION button, scroll until DELAY is highlighted in the display. **(Figure 1)**
4. Press CHANGE to select the highlighted menu. **(Figure 2)**
5. Highlight the function that must be limited by actuating (pulling) the joystick for the function concerned. **(Figure 3)**
6. Using the CHANGE button, scroll until the correct value appears.
   0 = no delay, 4 = maximum delay. **(Figure 4)**

7. Confirm the set value by pressing the SET button. **(Figure 5)**

Repeat items 5-7 until the functions that must have delays are completed.

Figure 1

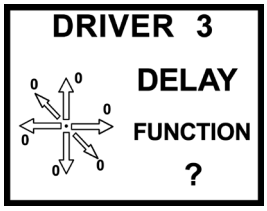


Figure 2

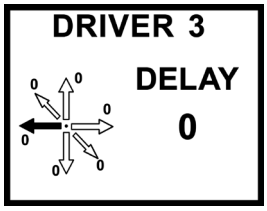


Figure 3

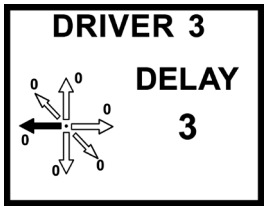


Figure 4

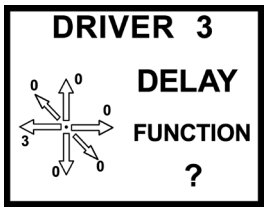
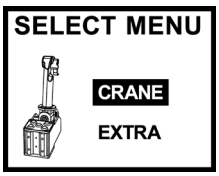


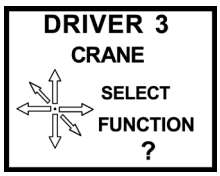
Figure 5

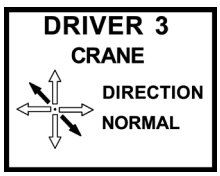
SERVICE – Service mode

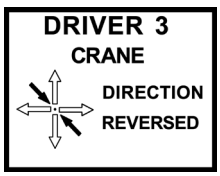
Service mode allows service workshops to make the following settings:

1. The ability to change directions on one or more functions. For one or more drivers.

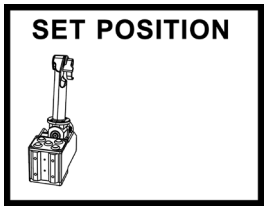


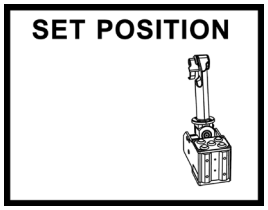




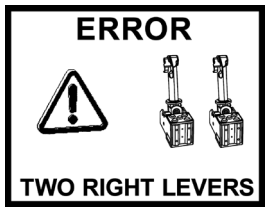


2. The ability to allocate left or right side to a chassis/joystick as when replacing parts.



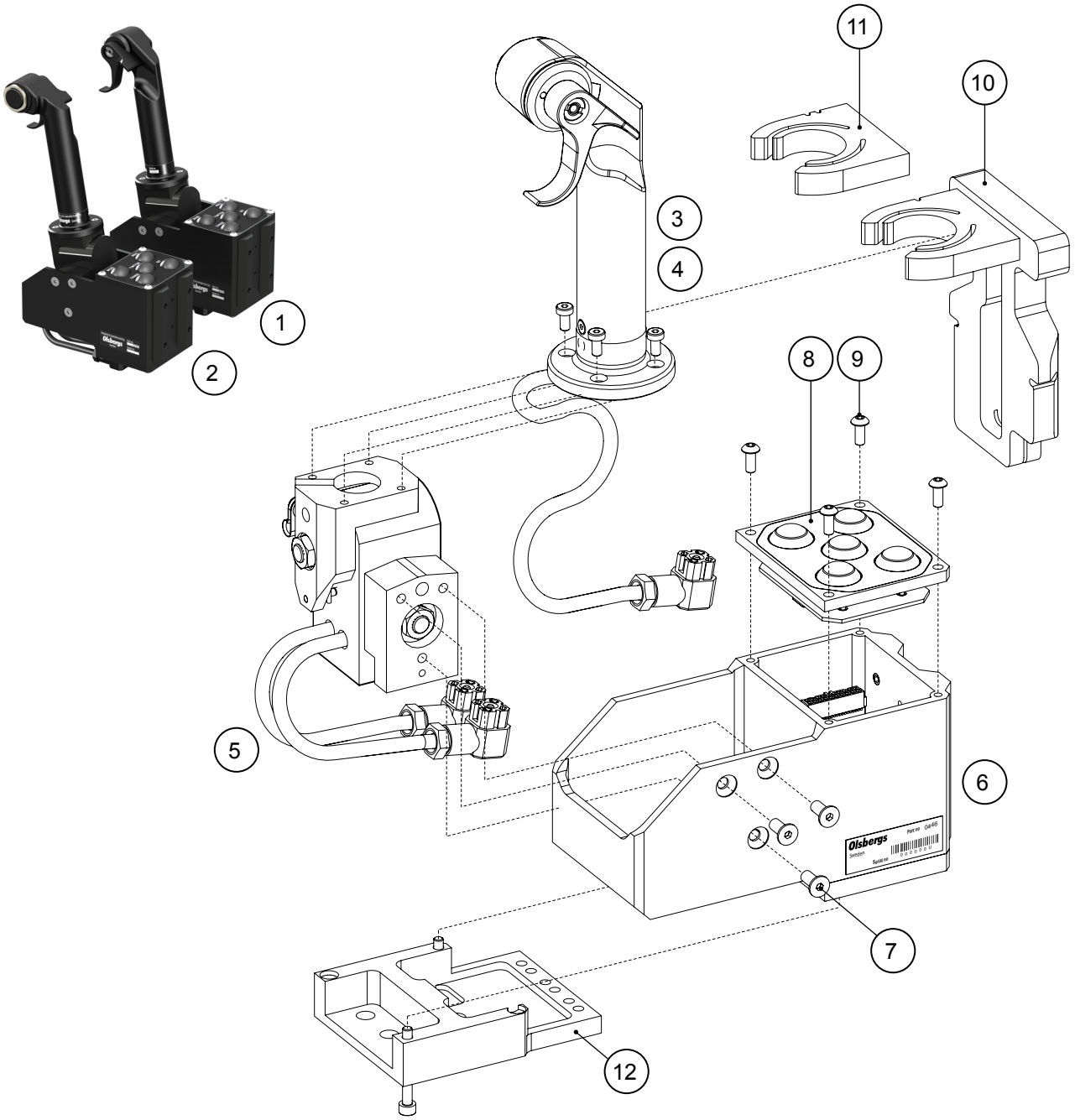


3. Safety check – if e.g. the chassis from a right side joystick is installed on the left, the symbol below will be shown in the display. The chassis can then be reconfigured as described in item 2 (above) to assume the left position.



D3 Joysticks

Spare parts



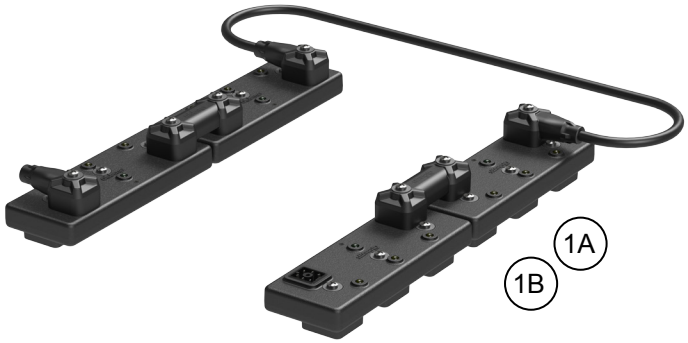
Pos	Art no.	Description	Note
1	**1280**	**Right joystick D3, complete**	
2	**1281**	**Left joystick D3, complete**	
3	0441	Right stick D3	Incl. screws
4	0442	Left stick D3	Incl. screws
5	0440	Joint D3	Fits both right and left stick
6	0446	Chassie D3, complete with button covers	Fits both right and left stick
7	S1222	Screw M5 x 12 MF6S	
8	E1327	Button Cover D3, complete	Fits both right and left stick
9	S0191	Screw M4 x 10, K6S	
10	E1724	Transport fixture, joystick	Fits both right and left stick with serial number 5000 and higher.
11	E1723	Clip 2G, joystick (requires an E1724)	Fits both right and left stick with serial number from 2991 up to 4999.
12	1499	Cover cables joystick D3, kit	Fits both right and left stick

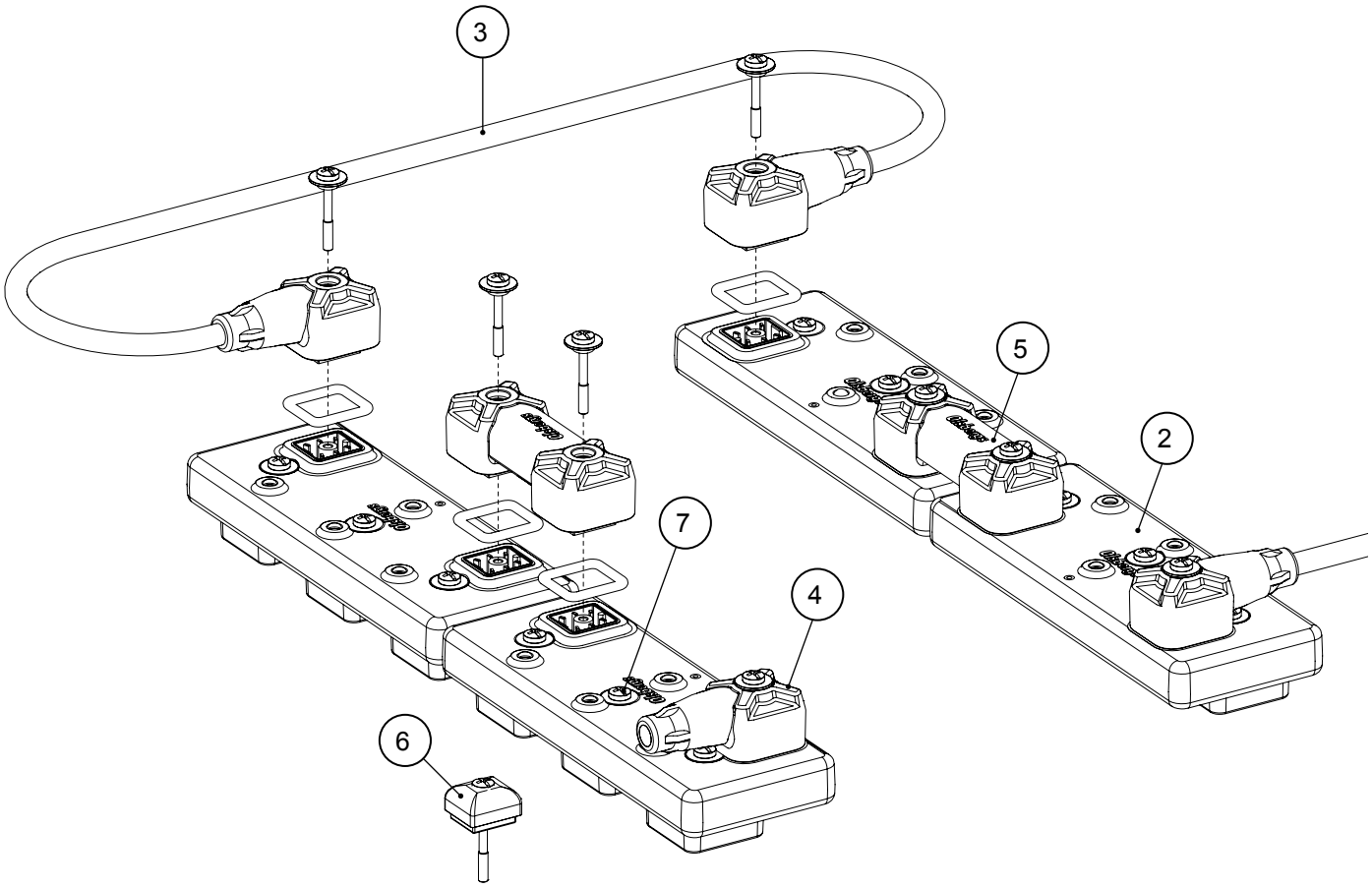
Digital Amplifier DA13

Spare parts

The DA modules are configured and numbered from factory and should be mounted as follows on the crane valve and stabilizer valve:

DA13 Kit	Modul no.	Valve side	Valve section
1479C	1	**A**	1-3
1479C	2	**A**	4-6
1479C	3	**B**	1-3
1479C	4	**B**	4-6
1479E	5	**A**	1-3
1479E	6	**A**	4-6
1479E	7	**B**	1-3
1479E	8	**B**	4-6



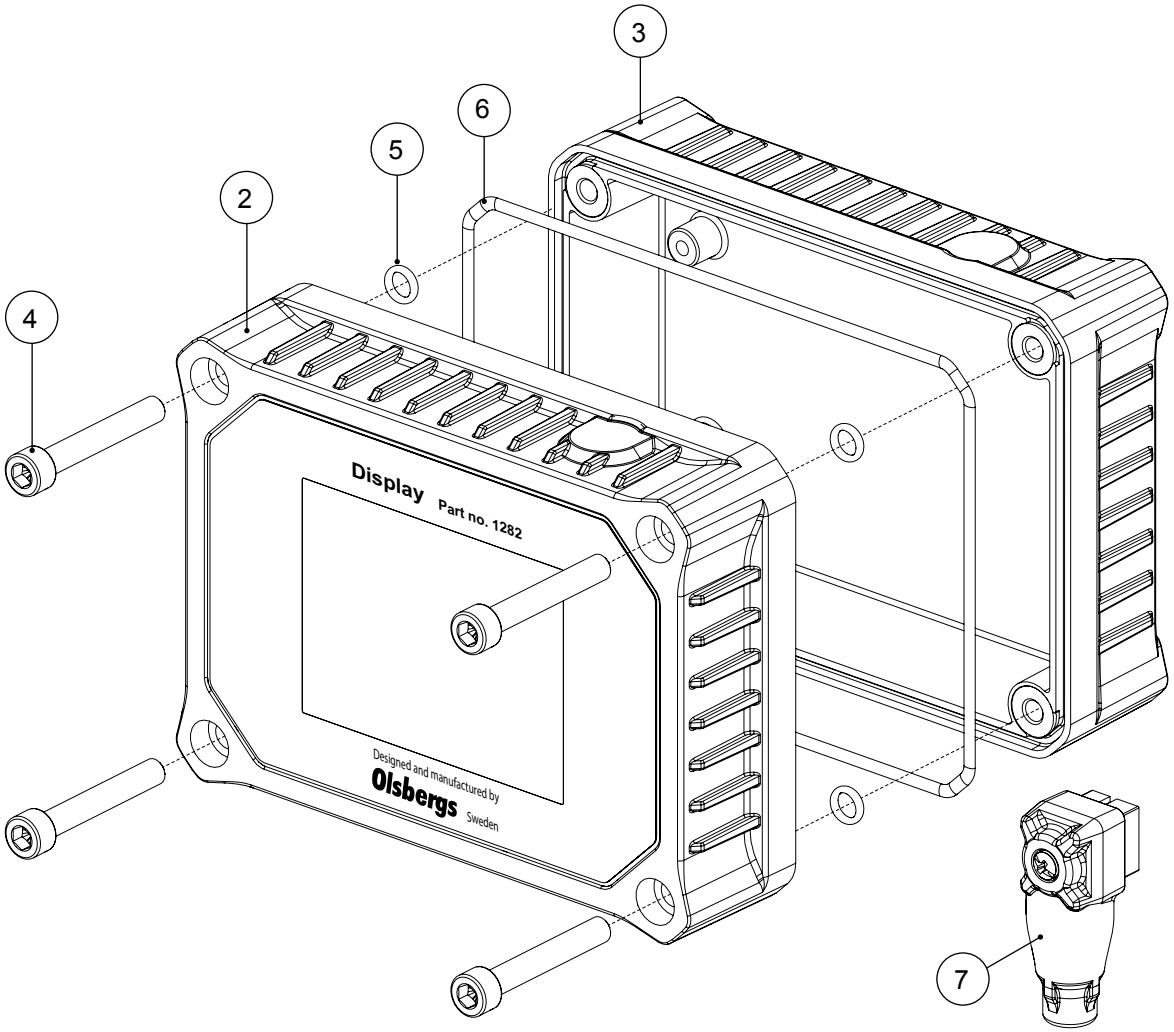


NOTE!
When the system has DA13 sets on both the crane valve and outrigger valve, the 120Ω termination E0792B (Pos.4) on one DA13 set must be replaced with S2539 (Pos.6).

Pos	Art no.	Description	Note
1A	**1479C**	**Kit DA13 for crane valve, 6 functions, 4 pcs**	Incl. screws
1B	**1479E**	**Kit DA13 for stabilizer valve, 6 functions, 4 pcs**	Incl. screws
2	1283	Digital Amplifier DA13	Incl. screws
3	E1278BB	Cable CAN GO6-GO6 0,75 m	
4	E0792B	Termination CAN 120 ohm	
5	E1163	Connector Bridge DA	
6	S2539	Protective Cap	
7	E1378	Screw DA	

Display Box D3

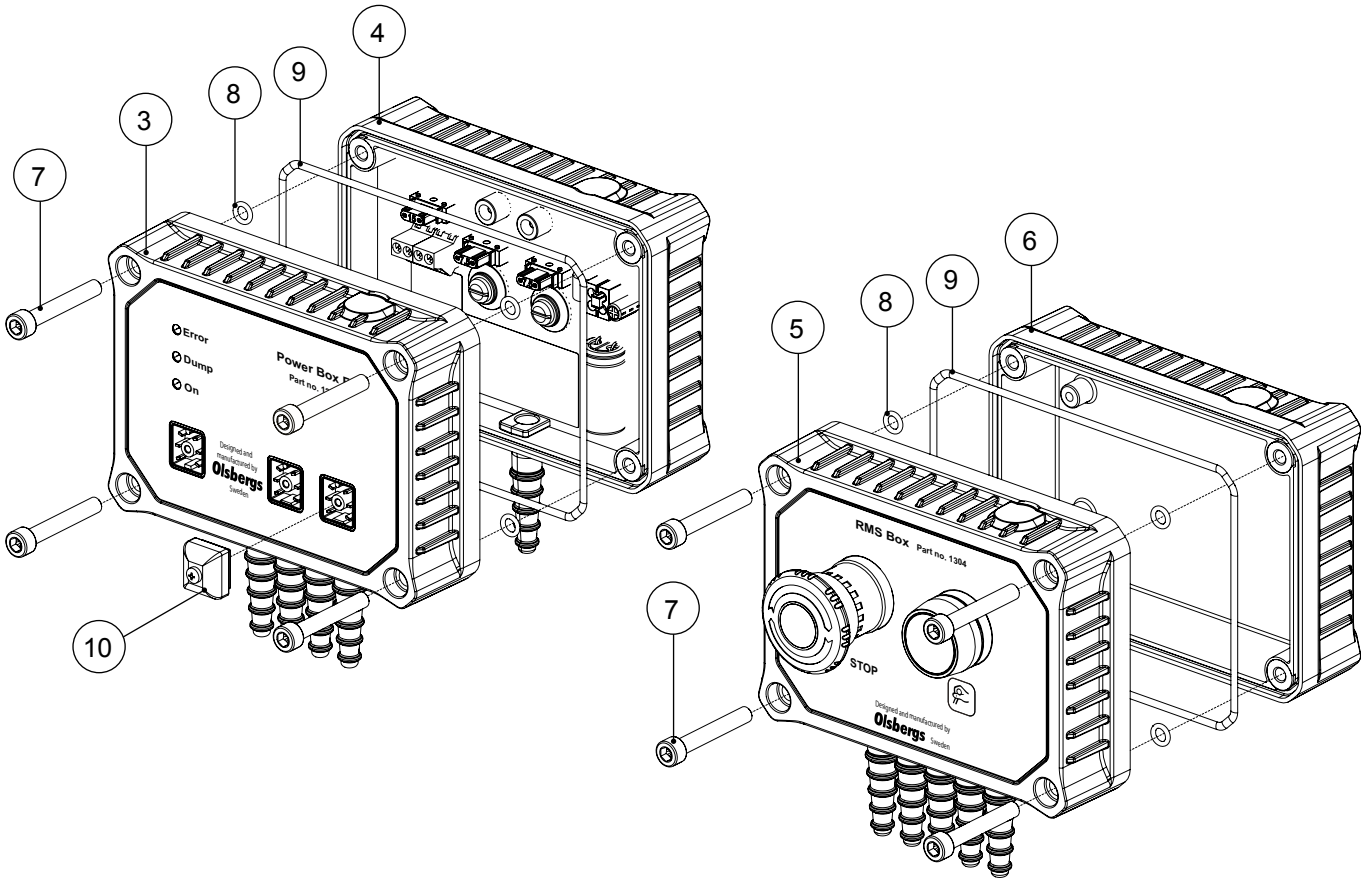
Spare parts



Pos	Art no.	Description	Note
1	**1282H**	**Display Box D3, complete**	
2	**1282**	**Cover Display Box D3, complete**	Incl. screws and O-rings
3	**E1431**	**Bottom box high, complete**	Incl. O-rings
	E1432	**Bottom box low, complete**	Option
4	S3152	Screw M6x40 MC6S	A4
5	S2556	O-ring Ø5,28 x 1,78	NBR 70 Shore
6	S3151	O-ring Ø150,0 x 2,0	NBR 70 Shore
7	E0792	Termination 120 ohm	

Power box PB.F2 & RMS Box

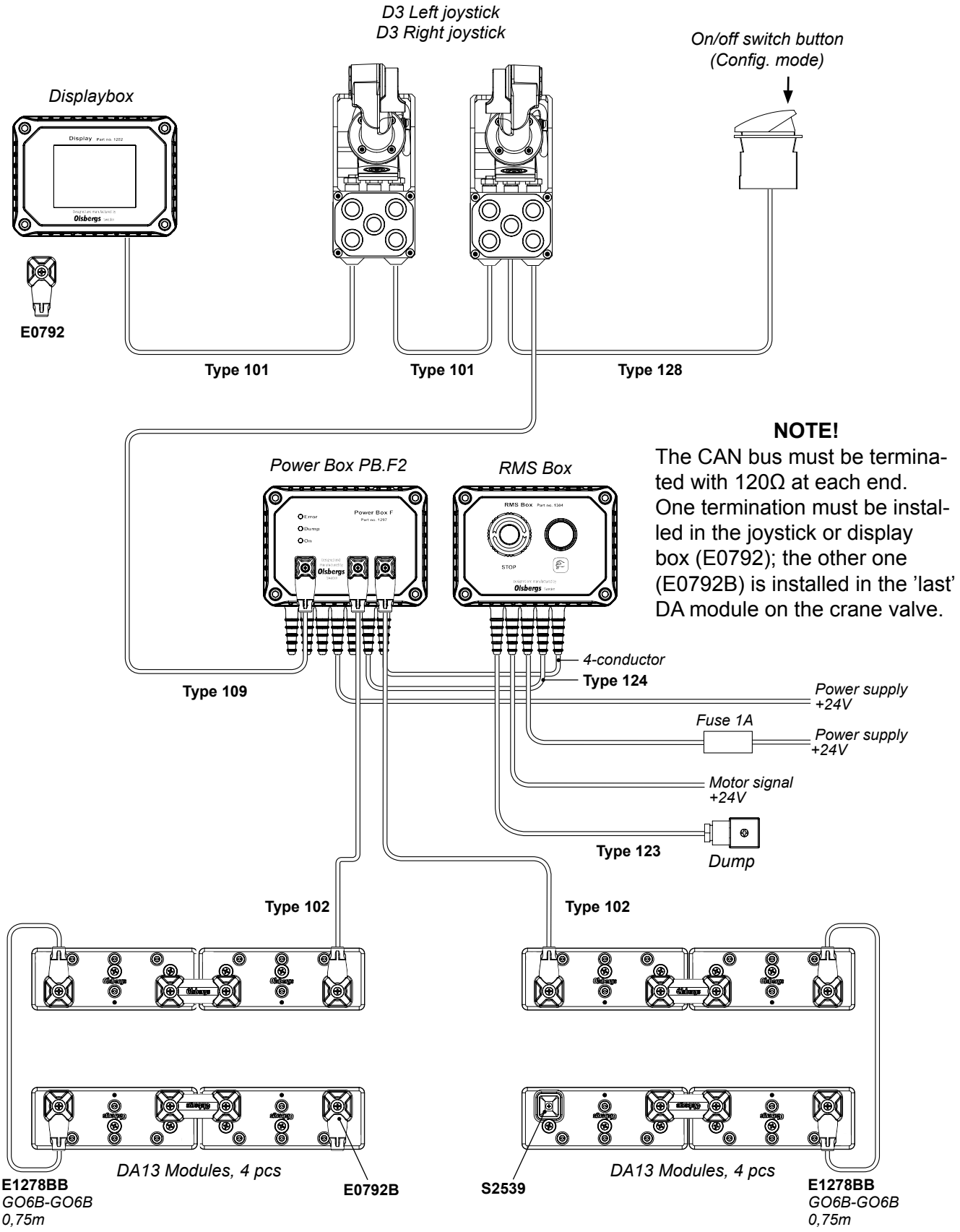
Spare parts



Pos	Art no.	Description	Note
1	**1297**	**Power Box PB.F2, complete**	
2	**1304**	**RMS Box**	
3	**E1539**	**Cover PB.F2, complete**	Incl. screws and O-rings
4	**E1541**	**Bottom box PB.F2, complete**	Incl. O-rings
5	**E1542**	**Cover RMS Box, complete**	Incl. screws and O-rings
6	**E1431**	**Bottom box high, complete**	Incl. O-rings
7	S3152	Screw M6x40 MC6S	A4
8	S2556	O-ring Ø5,28 x 1,78	NBR 70 Shore
9	S3151	O-ring Ø150,0 x 2,0	NBR 70 Shore
10	S2539	Protective Cap	

MultiDrive 2 with D3 joysticks and Display

Cable types



NOTE!

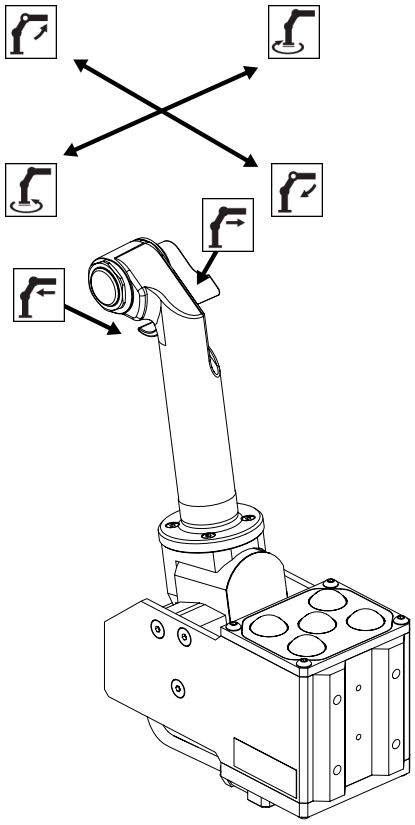
The CAN bus must be terminated with 120Ω at each end. One termination must be installed in the joystick or display box (E0792); the other one (E0792B) is installed in the 'last' DA module on the crane valve.

NOTE!

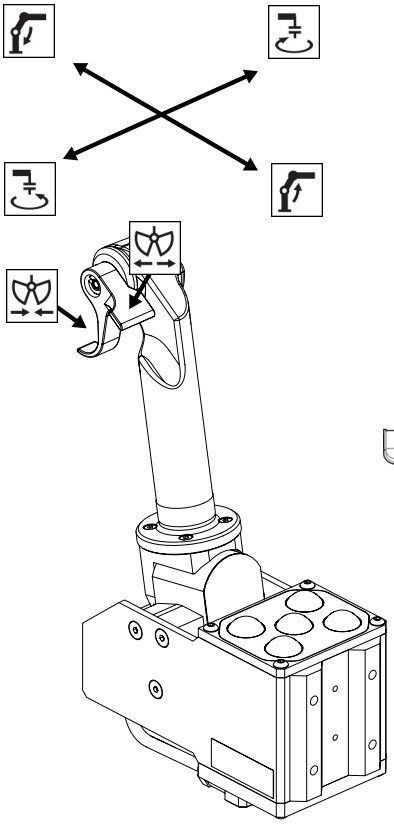
When the system has DA13 sets on both the crane valve and outrigger valve, the 120Ω termination E0792B (Pos.4) on one DA13 set must be replaced with S2539 (Pos.6). See page 11 - Spare parts DA13

Joystick functions connected to the Crane valve Q300

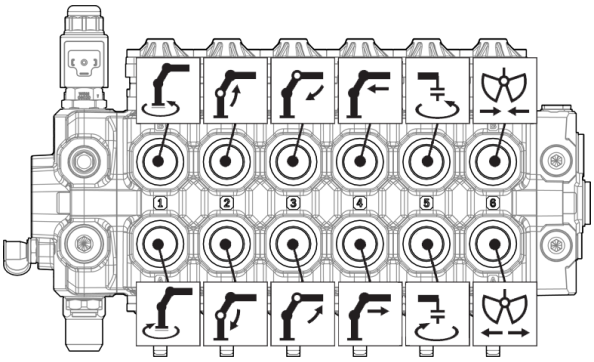
- Menu CRANE -



Left joystick

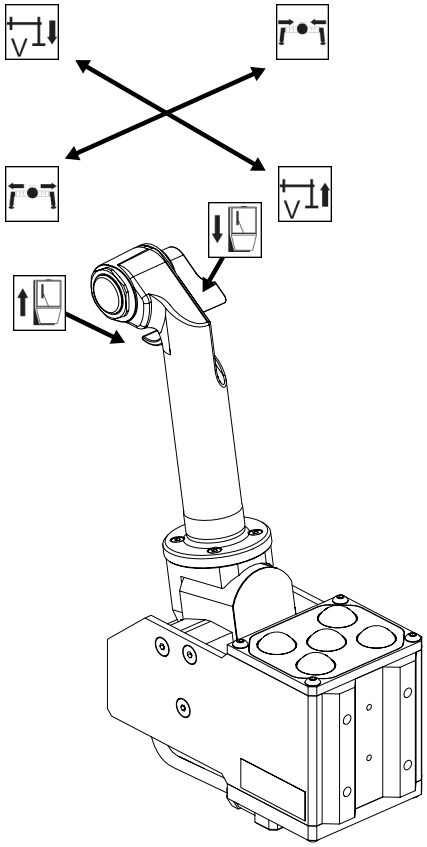


Right joystick

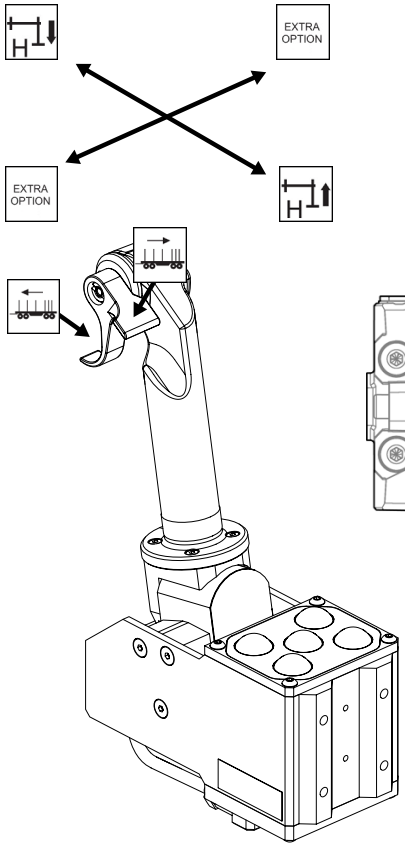


Joystick functions connected to the Outrigger valve Q200

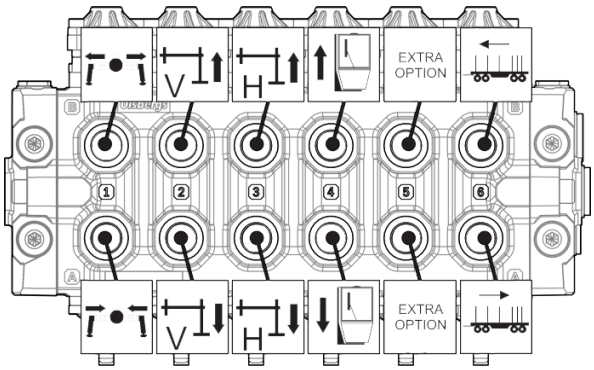
- Menu EXTRA -



Left joystick



Right joystick



Control system MultiDrive 2

- For easy use and great profitability

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