

# MATRIX™

## INSTALLATION MANUAL



**AUTO BOOM SECTION CONTROL**  
Berthoud TELEVOLUX

**TeeJet®**  
TECHNOLOGIES

A Subsidiary of  Spraying Systems Co.®

This installation manual covers installation of MATRIX™ or CenterLine 230BP with Berthoud TELEVOLUX Switchbox. We have endeavoured to deliver a fault free product. To ensure optimal use of the equipment, we ask you to pay great attention when reading this manual. Regarding responsibility for use of the product, we refer to our sales and delivery terms - especially paragraph 7, which follows:

#### Product usage.

7.1 Any use of the product is at the sole risk of the buyer. The buyer is therefore not entitled to any form for compensation caused by, for example, any of the following:

- Disturbance to/from any electronic services or products that do not conform to the standards for CE marking,
- Missing or poor signal coverage or a succession hereof from external transmitters/receivers, used by the buyer,
- Functional faults, which apply to or from a PC-program or PC-equipment, not delivered by the seller.
- Faults that may arise from the buyers negligence to react to warnings and fault messages from the product, or which can be traced to negligence and/or absent constant control of the work carried out in comparison to the planned job.

7.2 When implementing any new equipment the buyer must take great care and pay attention. Any doubts as to correct operation/use should result in contacting TeeJet Technologies.



## INTRODUCTION TO MATRIX™ AND CL230

The MATRIX™ and Centerline 230BP are combined Guidance and Automatic Boom Section Control (ABSC) devices that features control of up to 15 boom sections. The MATRIX™ or the Centerline 230BP connects in parallel to the existing wiring loom to the section valves.

### Principle of Operation

The MATRIX™ or Centerline 230BP control the sections valves according to the GPS position and the GPS guidance makes it possible to avoid overlaps or skips.

The MATRIX™ or Centerline 230BP controls the section valves in automatic mode, and the section switches should be set to off unless the operator wants to override the auto mode and thus force spraying.

The MATRIX™ or Centerline 230BP monitors the section switches that controls the valves in manual mode. The Master switch can be used both in automatic mode as well as in manual mode.

## REQUIRED PARTS AND KIT SELECTION

To add Automatically Boom Section Control to a Berthoud TELEVOLUX Switch Box, the following part numbers are required:

### MATRIX™:

Part no.	Description
* xxx-xxx	MATRIX™ Guidance controller kit
** 990-898	Berthoud TELEVOLUX ABSC kit, for 'New Safi' or 'Pneumatic' valve type (Pos. 4, 5, 6, 8 /System Overview)
** 990-899	Berthoud TELEVOLUX ABSC kit, for 'Old Safi' or 'ARAG' valve type (Pos. 4, 5, 6, 8, 9 /System Overview)
45-05626	Power/CAN/Data cable for MATRIX™ (Pos. 2 /System Overview)
45-05648	Power Cable, w/COBO connector (Pos. 7 /System Overview)

\* Refer to the MATRIX™ pricelist, \*\* 990-898 or 990-899

### CL230:

Part no.	Description
* xxx-xxx	CL230 Guidance controller kit
** 990-898	Berthoud TELEVOLUX ABSC kit, for 'New Safi' or 'Pneumatic' valve type (Pos. 3-6 /System Overview)
** 990-899	Berthoud TELEVOLUX ABSC kit, for 'Old Safi' or 'ARAG' valve type (Pos. 3-5 /System Overview)

\* Refer to the CL230BP pricelist, \*\* 990-898 or 990-899

**NEW SAFI**



- 3 wire connection
- Permanent 12V and Gnd
- Switching input 12V = ON

**Kit no. 990-898**

**PNEUMATIC**



- 2 wire connection
- Permanent Gnd

**OLD SAFI**



- 3 wire connection
- Permanent Gnd
- 2 Switching input
- 1. 12V = ON

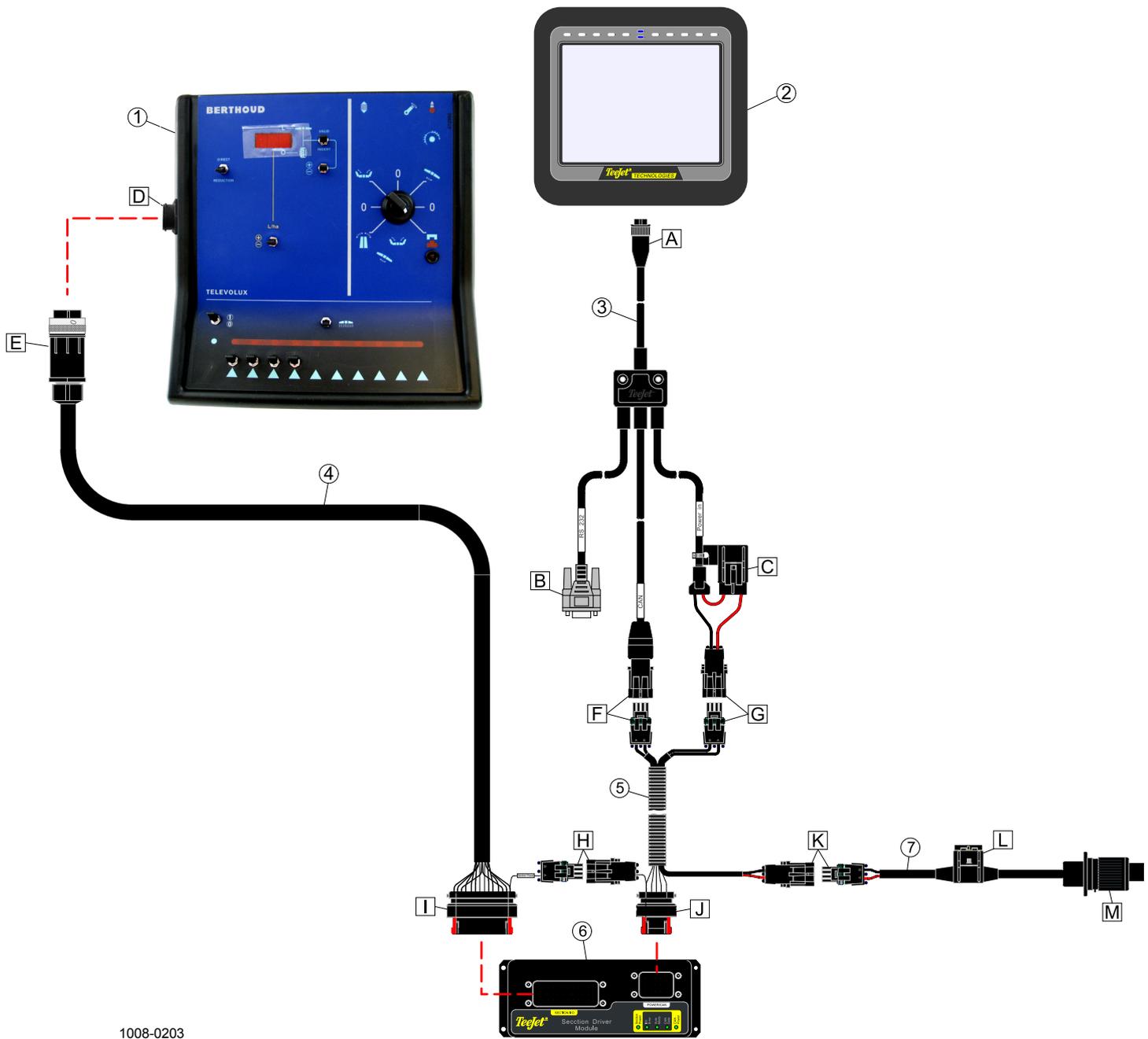
**Kit no. 990-899**

**ARAG**

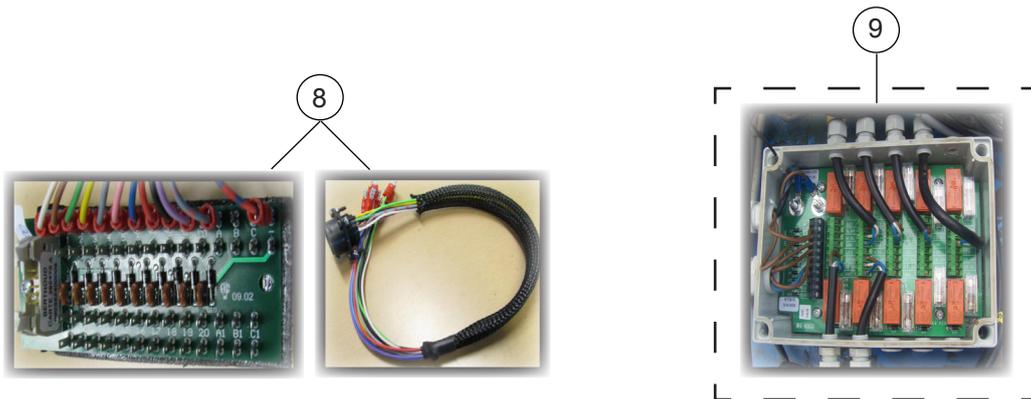


- 2 wire connection
- Changeover polarity to open and close

SYSTEM OVERVIEW, MATRIX™



1008-0203



## SYSTEM DESCRIPTION, MATRIX™

Pos.	Description	Part Number
1	Berthoud TELEVOLUX Switch Box	-
2	MATRIX™ Guidance Controller	* xxx-xxx
3	Power/CAN/Data Cable, MATRIX™	45-05626
4	BoomPilot cable (Sections)	198-417
5	BoomPilot cable (CANBUS & Power)	198-413
6	Section Driver Module	78-05072
7	Power Cable, w/COBO connector	45-05648
8	Berthoud ABSC Interface	902-422
9	Relay box	** 902-356

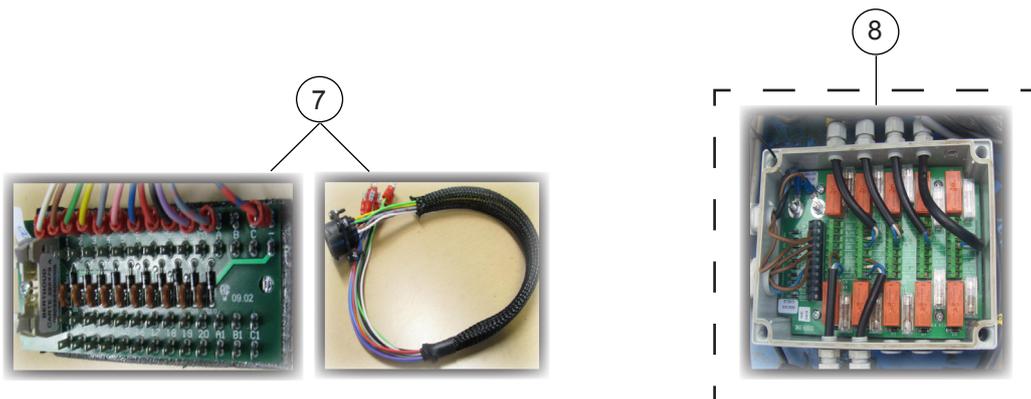
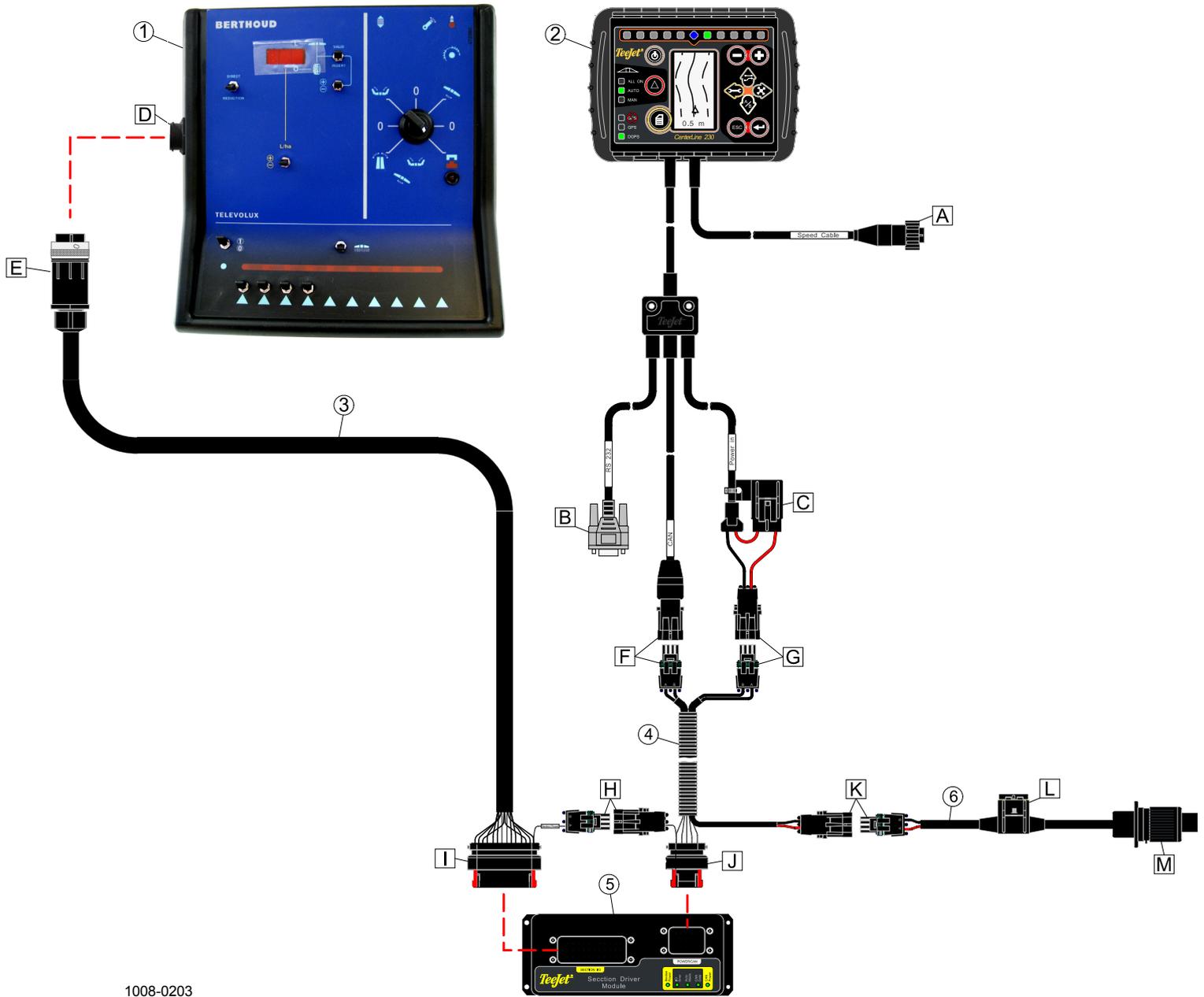
\* Depending on MATRIX™ Kit,

\*\* Only kit no. 990-899 for 'OLD SAFI' & 'ARAG' valves

### Connectors and fuses:

Pos.	Description	Part Number
A	8P Connector (Power/CAN/Data to Matrix)	
B	9P Connector (Data in/out, Sub.D. Female)	
C	Fuse (3A)	166-603
D	19P connector, from the Berthoud ABSC interface	
E	19P connector, BoomPilot cable	
F	4P Connector (CAN, Matrix and Section Driver Module)	
G	2P Connector (Power to Matrix Controller)	
H	2P connector, section power	
I	35P Connector (Boom Section I/O to Section Driver Module)	
J	14P connector, SDM module	
K	2P Connector (System Power)	
L	Fuse (3A)	39-00000
M	3P COBO connector	

**SYSTEM OVERVIEW, CL230**



## SYSTEM DESCRIPTION, CL230

Pos.	Description	Part Number
1	Berthoud TELEVOLUX Switch Box	-
2	CL230 Guidance Controller	* xxx-xxx
3	BoomPilot cable (Sections)	198-417
4	BoomPilot cable (CANBUS & Power)	198-413
5	Section Driver Module	78-05072
6	Power Cable, w/COBO connector	45-05648
7	Berthoud ABSC Interface	902-422
8	Relay box	** 902-356

\* Depending on CL230 Kit,

\*\* Only kit no. 990-899 for 'OLD SAFI' & 'ARAG' valves

### Connectors and fuses:

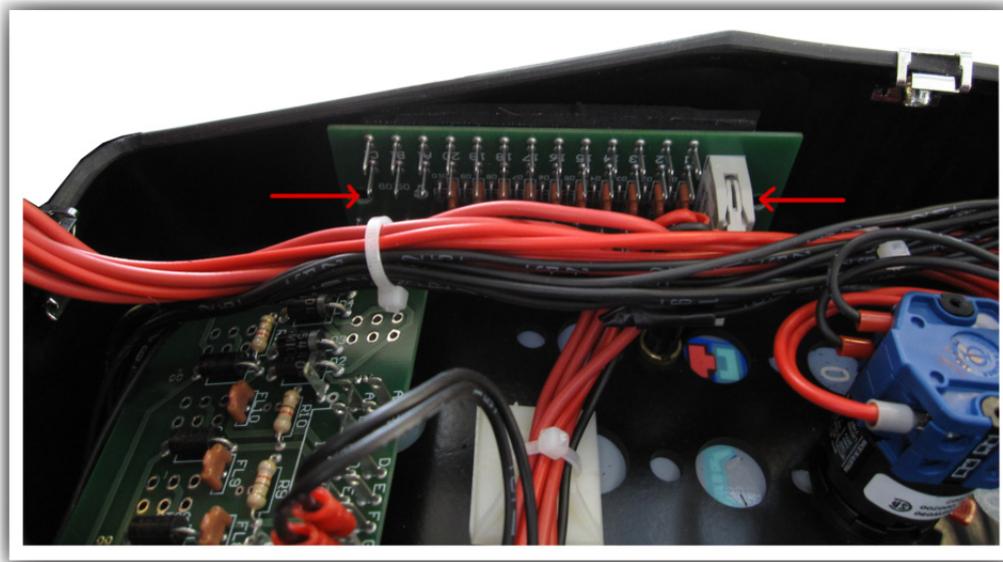
Pos.	Description	Part Number
A	4P connector, speed output	
B	9P Connector (Data in/out, Sub.D. Female)	
C	Fuse (3A)	166-603
D	19P connector, from the Berthoud ABSC interface	
E	19P connector, BoomPilot cable	
F	4P Connector (CAN, Matrix and Section Driver Module)	
G	2P Connector (Power to Matrix Controller)	
H	2P connector, section power	
I	35P Connector (Boom Section I/O to Section Driver Module)	
J	14P connector, SDM module	
K	2P Connector (System Power)	
L	Fuse (3A)	39-00000
M	3P COBO connector	

## INSTALLING THE BERTHOUD TELEVOLUX KIT

To get electrical contact with the Sections and the Master switch in the Berthoud TELEVOLUX Switch Box, it's necessary to install a Berthoud ABSC Interface (See pos. 7 and 8 on the two System Overview drawings). Before starting the installation, make sure that the power is disconnected.

**This is a critical operation and must only be conducted of persons with the necessary skills. In case the Berthoud TELELUX Switch Box is damaged during the installation, it's on the buyers sole risk and therefore the buyer is not entitled to any form for compensation.**

### Installing the Interface Circuit board:



Place the interface in the right part of the box as shown on the picture.

Drill two  $\varnothing 3.5$  mm holes in the plastic housing with a distance of 95 mm.

It's practical to install the wires on the interface before installing it (See diagram next page).

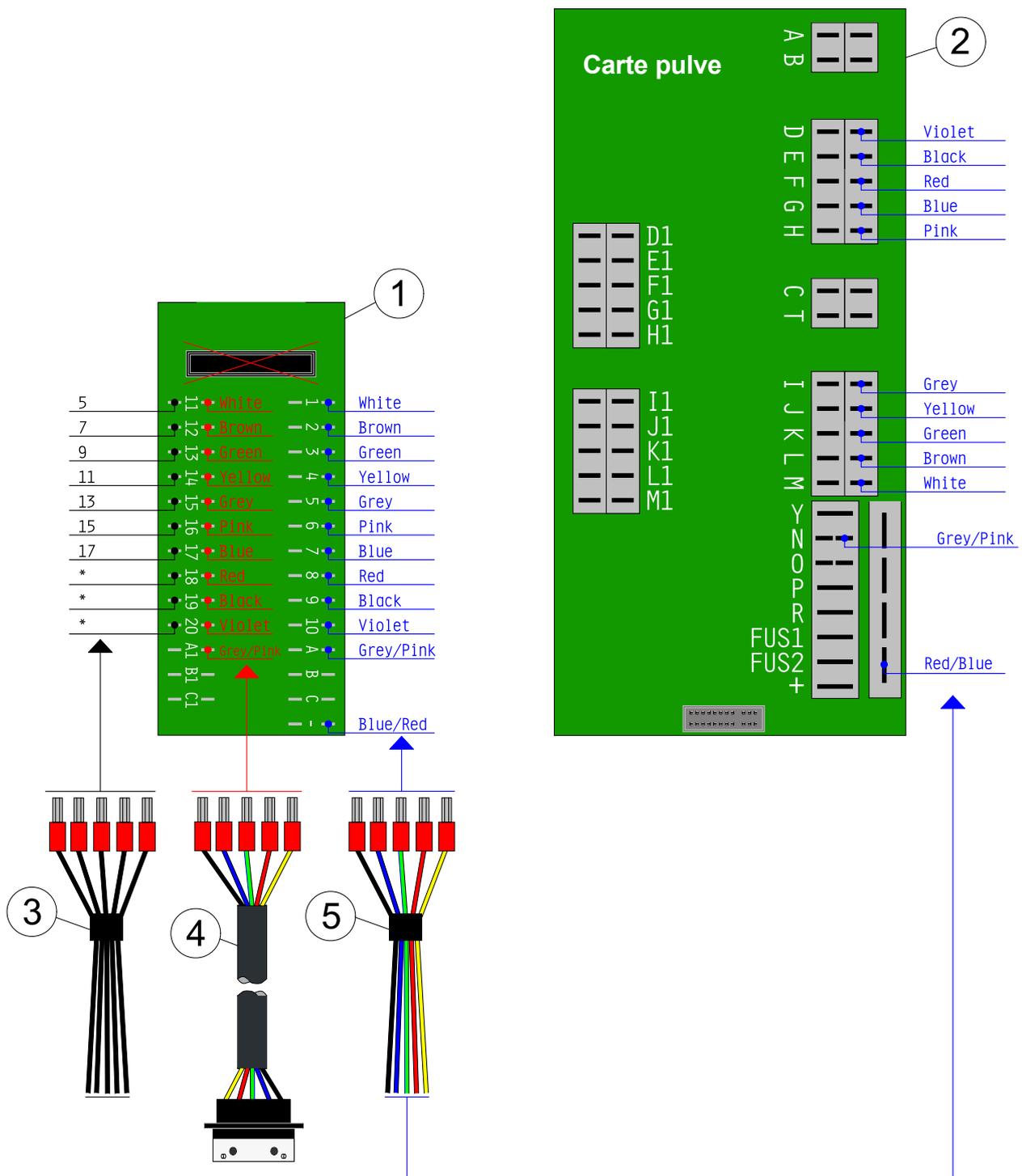
### Installing the Connector:



Make a hole in the left part of the plastic housing and install the round connector. The Hole should be  $\varnothing 25$  mm and fixing holes  $\varnothing 3.2$  mm.

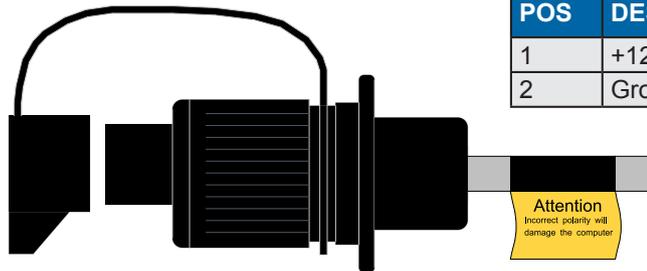
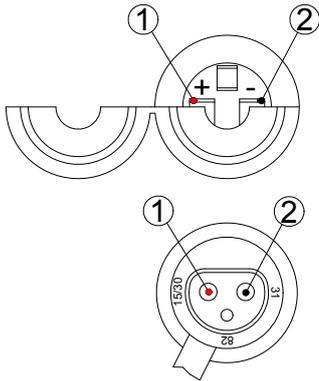
Connect the Automatic Boom section kit as show on the system overview drawings. The kit includes all necessary connectors to get electrical contact with the Berthoud TELEVOLUX Switch Box.

# WIRING DIAGRAM



1. Connect the external connector cable (4) to the interface (1), in the middle row.
2. Disconnect the wires (3) from the "Carte Pulvé" board (2) and connect them to the interface (1).
3. Connect the wires (5) to the interface (1) and to the "Carte Pulve" board (2).

**CONNECTING POS. M TO POWER**



POS	DESCRIPTION
1	+12V (15/30)
2	Ground (31)

**Attention**  
Incorrect polarity will damage the computer

***! When connecting the system to 12V power it's very important that the polarity is correct, if not the system will be damaged.***

**BATTERY CABLE (OPTION):**

The power supply must be strong enough to operate the Section and Master valves. The total current will depend on the used valve type.

If a power connector (Socket) isn't available in the tractor cabin, a optional battery cable can be used (PN 96ET14).



## VALVES CONNECTION

### Berthoud sprayers with New Safi or pneumatic valves:

- No particular connection has to be done. Original cabling is ok.

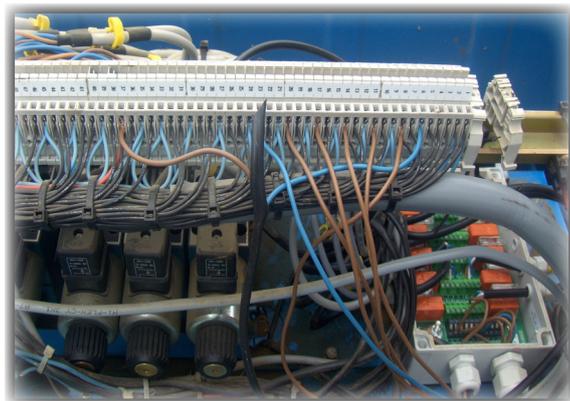
### Berthoud sprayers with Old Safi or Arag valves:

- Relay box installation

Take out the blue cover above the boom



Fix the relay box to the frame

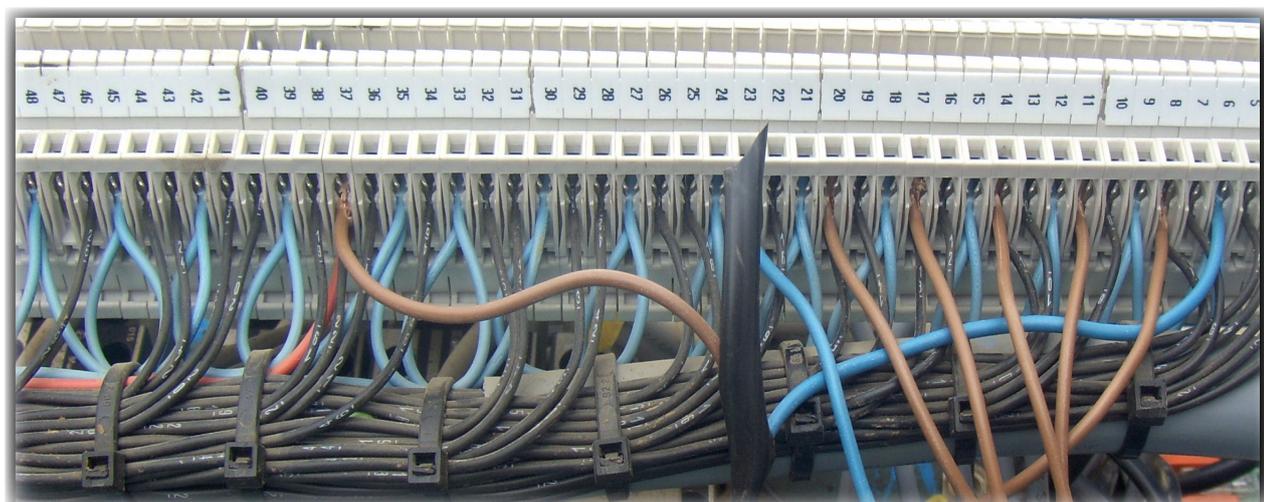


### Driving wires connection to relay box

Connect loose wires to the connection bloc. Below a informative table but verify that the respective connections are giving out 12 V when section is ON.

<b>Name</b>	S1	S2	S3	S4	S5
<b>Pin</b>	8	11	14	17	20

<b>Name</b>	S6	S7	S8	GND	12V
<b>Pin</b>	23	27	30	6	37



**Valves connections to relay box**

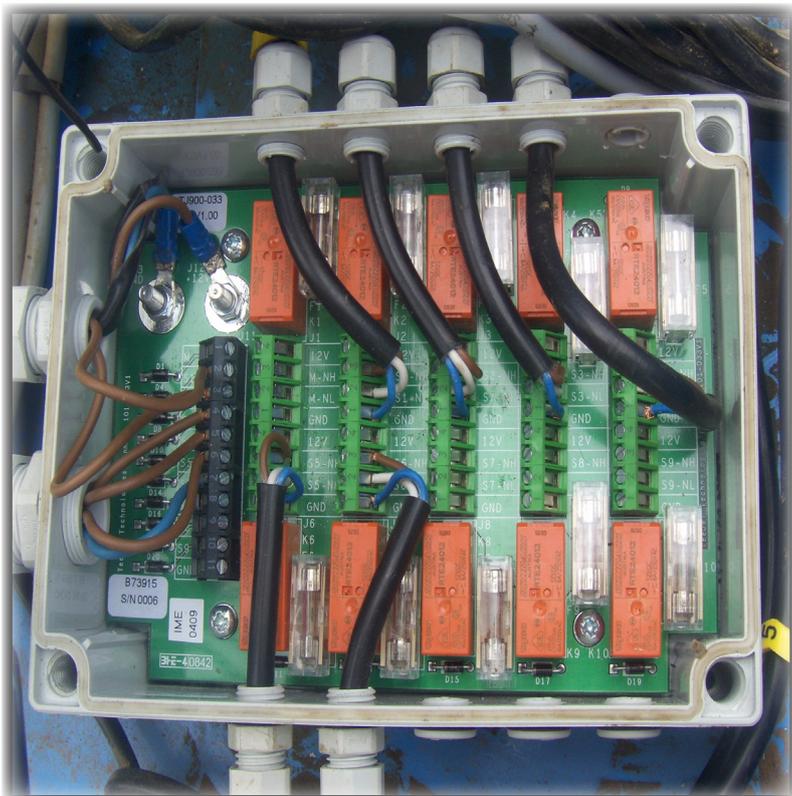
Disconnect the valves from the connection bloc and connect them into the relay box.

For old SAFI valves:

Wire Color	Connection	Function
Brown	NH	12 V for closing
White	NL	12 V for opening
Blue	GND	Permanent Ground

For ARAG valves:

Wire Color	Connection	Function
Brown	NH	12 V for closing
Blue	NL	12 V for opening



## SYSTEM CHECK

After connecting the power connector, it's time to make a system check. To check the system it's necessary to have full GPS signal so the vehicle must be placed outside.

### Check AUTO mode:

#### **Berthoud TELEVOLUX:**

- Section switches should be in OFF position when working in Automatic mode.
- The Master switch will control the sprayer and should be ON to enable automatic switching of the sections.

#### **MATRIX™ or CL230:**

- Turn the Guidance controller on
- Encode the number of sections and the width of each (Refer to the MATRIX™ or CL230 user manual)
- Wait for GPS signal
- Set the mode to AUTO
- Drive forward (> 2 km/h)
- Observe that all sections and the master valve open.
- Check that the Master valve closes when the Master switch is set off.

### Check MANUAL mode:

#### **MATRIX™ or CL230:**

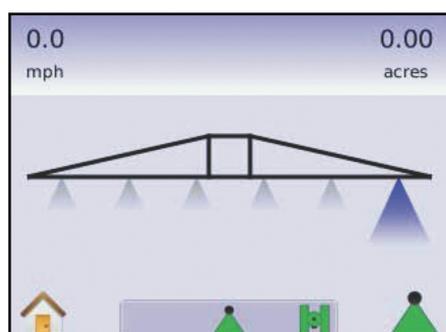
- Set the ABSC mode to MANUAL

Check in the 'Boom Section Control Screen' (Matrix or CL230) that the section icons turn off and on according to the valve/switch status.

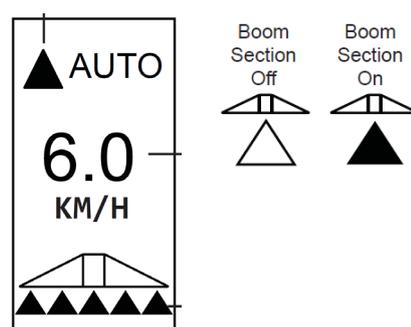
#### **Berthoud TELEVOLUX:**

- Set the section switch's on
- Set the Master switch on
- Observe that all sections and the master valve open.

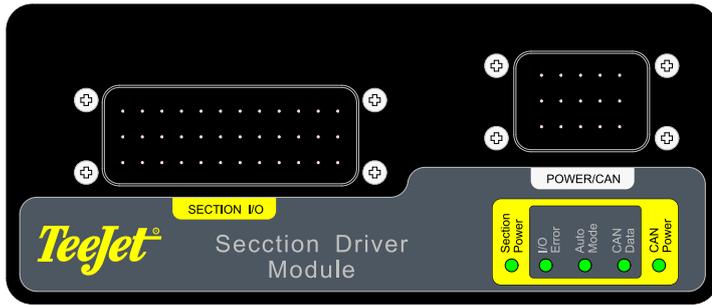
#### **MATRIX™:**



#### **CL230:**



**LED'S ON THE SECTION DRIVER MODULE**



- Section Power:** ON when power is available for the section drivers.
- I/O error:** Should normally be OFF  
(Auto Mode: ON when automatic boom switching is active).
- CAN Data:** ON is flashing when it communicates with the CenterLine 230.
- CAN Power:** ON when power is applied to the CenterLine 230 and the SDM.



# MATRIX™

## I N S T A L L A T I O N M A N U A L

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### Matrix Guidance: Exclusive Features

- RealView™ Guidance Over Video
  - ◀ Guidance Superimposed Over Video
  - ◀ Guidance Only
  - ◀ Video Only
- Bright Daylight Readable Screen
- Easy-to-Use 3D Graphical Guidance
- Coverage Mapping/Data Export



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020-047-UK R1  
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