

**Installation of Sprayer
Components with
Junction Box
for OEM and Sprayer
Specialist**

98-70010-R0

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Introduction

Congratulations! And thank you for choosing TeeJet's advanced Junction Box Connection system. With its proper installation and maintenance, you can enjoy many seasons of accurate and uniform spray application with fingertip convenience and ease of operation.

In this manual the installation of the electrical components on a sprayer with a junction box will be covered in easy to follow, step by step instructions. An overview of all the basic connections involved are shown in Fig. 1.

WE RECOMMEND THAT YOU READ THESE INSTRUCTIONS COMPLETELY before attempting installation and programming of your sprayer control. The unit's performance will depend on its proper installation and programming, along with planned preventive maintenance of your entire sprayer.

The basic Sprayer Control kit for **flow** based systems should consist of the following components:

- Computerized Control Console
- Pressure Regulating Valve
- Main Cable, Battery Cable, Battery Cable Lead (with connectors)
- Flow meter with Sensor Cable
- Speed Sensor - Proximity type
- Junction Box
- Console Programming and Operating Manual

The basic Sprayer Control kit for **pressure** based systems should consist of the following components:

- Computerized Control Console
- Pressure Regulating Valve
- Main Cable, Battery Cable, Battery Cable Lead (with connectors)
- Pressure Sensor with Cable
- Speed Sensor - Proximity type
- Junction Box
- Console Programming and Operating Manual

Warning

 **This Sprayer Control kit has been designed as a complete kit. Deviations from the kit might result in malfunctioning, destruction or might produce safety hazards.**

 **This kit should be used to maintain the CE compatibility.**

Note: There are several options both for the Control Console and for the kit. The kit options are discussed in this manual.

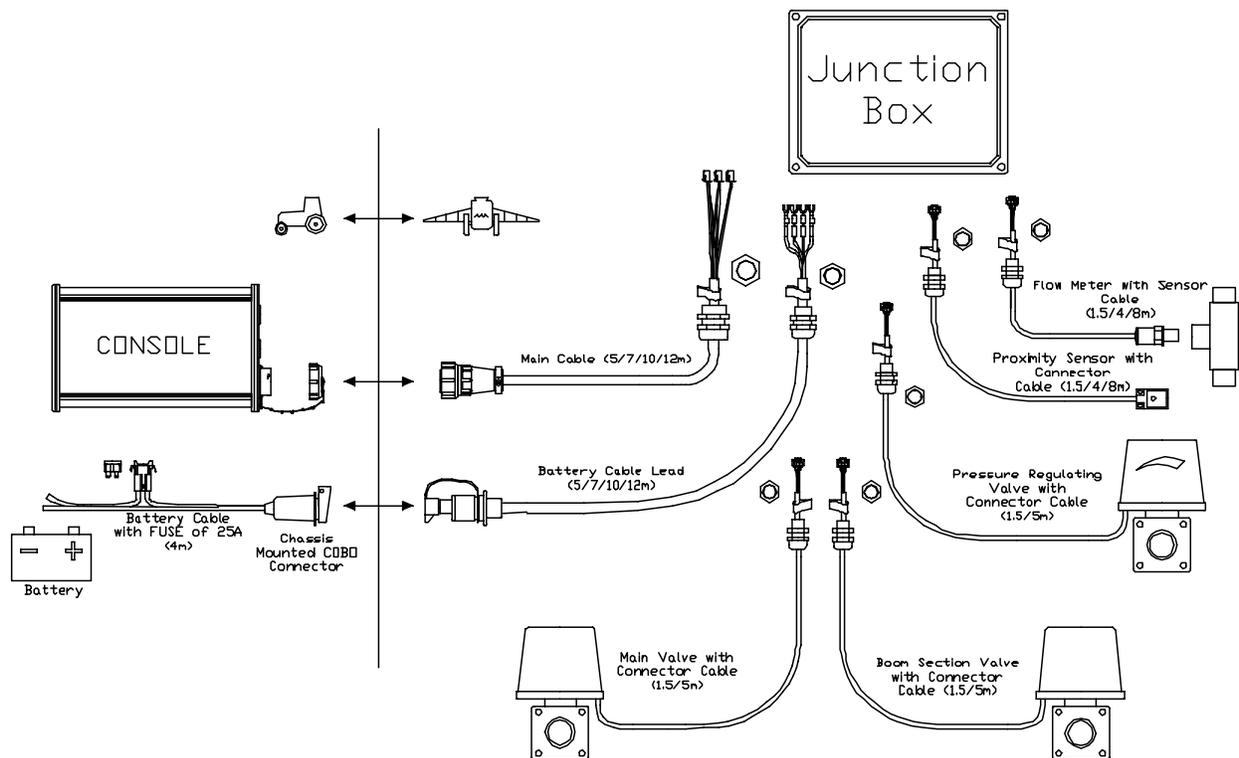


Fig. 1 Basic Cable Connection kit with Junction Box

Mounting Sprayer Components

FLOW REGULATION IN BYPASS MODE

The regulating valve will be wired for use in a by-pass system. In most situations this is the preferred installation position.

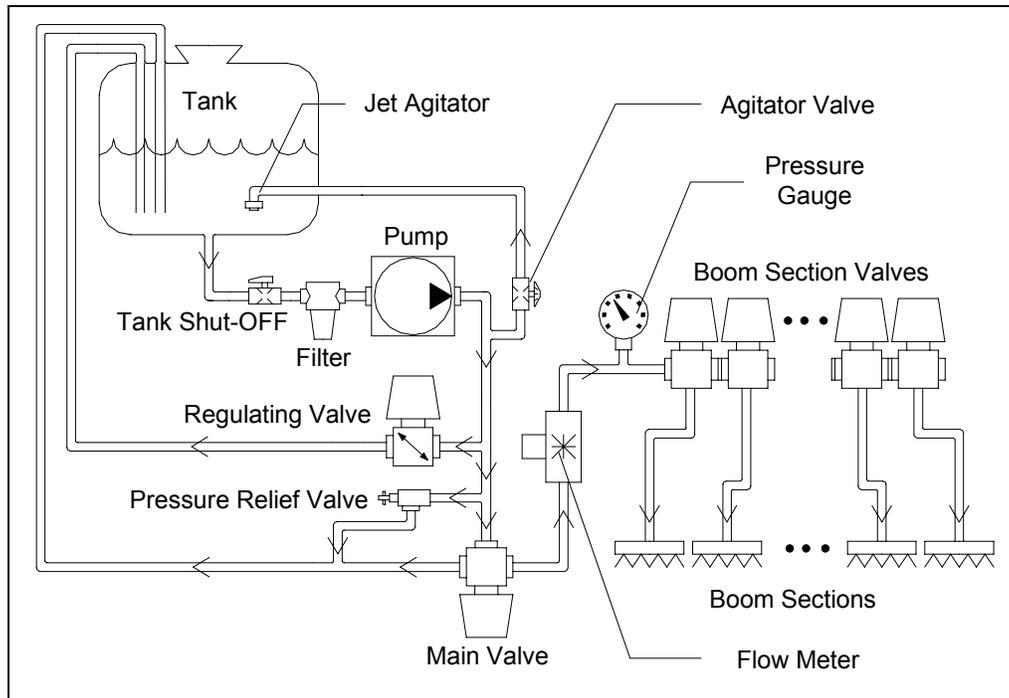


Fig. 2 Bypass Plumbing Diagram with Flow Regulation and Main Valve

Note: Take a look at Fig. 12 and lay out the cables before installing the sprayer components to be sure the cables are long enough. Several cable lengths are available.

REGULATING VALVE

The regulating valve may be plumbed in by-pass mode. This means that the flow through the regulating valve is going back to the tank. It is advisable to use a separate pipe for returning the flow to the bottom of tank (see Fig. 3).

When the regulating valve is plumbed in a by-pass mode, with the sprayer console in the manual mode, the valve should close when the "+" key is depressed and open when the "-" key is depressed.

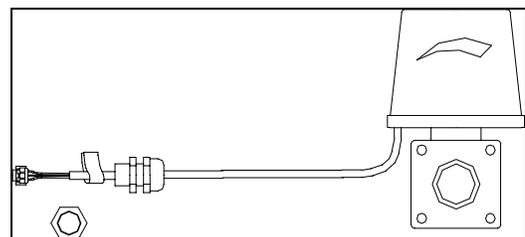


Fig. 3 Regulating Valve with 1.5/5m Cable

FLOW REGULATION IN THROTTLE MODE

The regulating valve may be plumbed for use in a throttling system. The console must be programmed to match the actual plumbed location of the regulating valve.

This means that all the flow going through the regulating valve is directed to the spray booms. When the regulating valve is plumbed in a throttle mode, with the sprayer console in the manual mode, the valve should close when the “-” key is depressed and open when the “+” key is depressed.

MAIN VALVE (OPTIONAL)

The Main Valve (if used) must be placed after the regulating valve and before the flow meter. See the Valve Instruction Manual for mounting instructions.

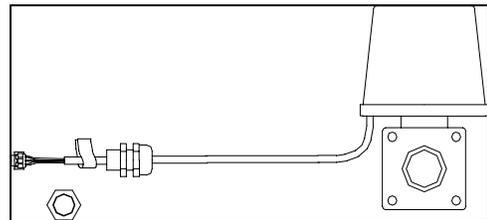


Fig. 4 Main Valve with 1.5m or 5m Cable

FLOW METER



Fig. 5 Flow meter assembly

To ensure accurate readings, the flow meter (if used) must be mounted 10 to 12 inches (25 cm to 35 cm) from other pipe fittings, preferably in a vertical position with the flow going up. It should also be

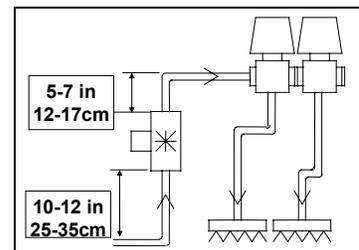


Fig. 6 Flow meter position

mounted with direction of flow arrow pointing toward the boom control valves (Fig. 5 and Fig. 6).

Be sure the flow meter is plumbed so that all liquid passing through it is routed to the booms and not back to the tank.

BOOM CONTROL VALVES

The Boom Control Valves are centered in front of the boom sections. See the Control Valve Instruction Manual for mounting instructions.

If using three-way valves, refer to the instruction manual of the valves you are using for valve calibration instructions.

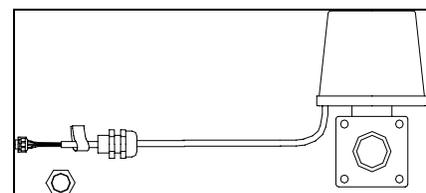


Fig. 7 Boom Control Valve with 1.5 or 5m cable

Installing the Speed Sensor Assembly

COMPONENTS

A proximity sensor with attached connector cable.
If you are installing a radar ground speed sensor, follow the instructions supplied with that unit.

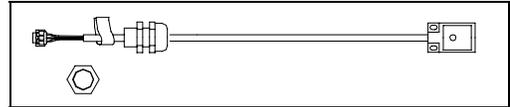


Fig. 8 Proximity Sensor with 1.5m, 4m, or 8m cable

SPEED STEP 1: LOCATION

The speed sensor assembly should be installed on a non-driven wheel to avoid potential errors that are likely to occur from a slipping drive wheel. In case of a tractor mounted sprayer the speed sensor is mostly mounted on one of the front wheels. In case of a trailed sprayer the sensor is mostly mounted on one of the sprayer wheels.

Note: The speed sensors have different connector cables attached, depending on whether they have to be connected to the console (tractor mounted sprayer) or to the junction box (all other sprayers).

The assembly can also utilize a drive shaft as a rotating member to generate the pulses needed to accurately measure vehicle speed. Only one bolt needs to be secured to the drive shaft. The proximity sensor bracket must be installed to hold the head of the sensor 1/8 to 3/8 inch (3 mm to 10 mm) from the metal piece.

SPEED STEP 2: INSTALLING THE PROXIMITY SENSOR

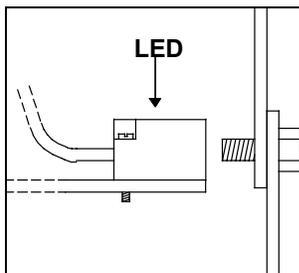


Fig. 9 Proximity Sensor Installation

Secure the wheel speed sensor to a bracket that is mounted on a vertical member near the non-driven wheel.

The proximity sensor should be secured with stainless steel self tapping screws and positioned to within 1/8 to 3/8 inch (3 mm to 10 mm) of the wheel bolts. The sensor bracket must be installed in such a way that excessive vibration is prevented. Otherwise false pulses can be detected by the sensor due to vibrations of the sensor itself.

Your installation will likely vary from the example. It may be necessary to customize the installation to accommodate your specific machine. Keep in mind that the bolts must be spaced an equal distance around the wheel (which is normally the case). The proximity sensor must be mounted in-line with the bolts and positioned within 1/8 to 3/8 inch (3 mm to 10 mm) from each bolt as they pass the Sensor assembly.

Mounting the Console

CONSOLE STEP 1: LOCATION

Determine the best location for the control console in the cab or operator's compartment. Allow sufficient clearance, approximately 6 to 8 inches (15-20 cm) to accommodate for the Main Cable that will be connected to the connector on the right hand side of the console.

CONSOLE STEP 2: MOUNTING

Mount the console to a firm support within the cab area, and secure using the slots provided on the top, back, or bottom of the Console. Brackets can provide angle adjustment.

The slots in the Console will accept 6 mm bolts.

Mounting the Junction Box

JUNCTION BOX STEP 1: LOCATION

Determine the best location for the junction box. The junction box should be mounted as close as possible to the location where most of the valves are situated. This is usually close to the spray boom. Allow sufficient clearance around the junction box to accommodate for all the cables that will be connected into the junction box.

Note: Mount the junction box **as high as possible** to avoid too much chemical deposit.

JUNCTION BOX STEP 2: MOUNTING

Mount the junction box to a flat and firm support and secure using the four notches on the back of the junction box. The notches will accept 6 mm bolts (Fig. 10).

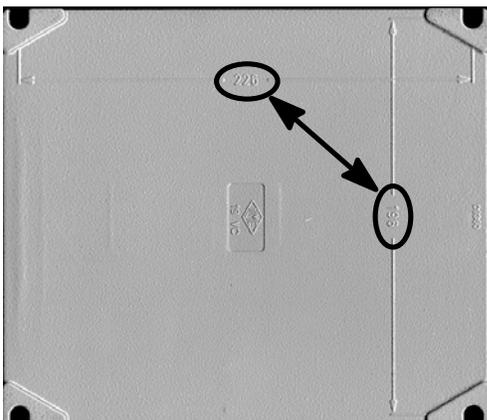


Fig. 10 Bottom View of Junction Box Model 15

The center to center distances of the mounting holes are marked [226 mm (H) x 196 mm (W)] on the back of the junction box (Model 15). (Fig. 10)

Note: Mount the junction box in such a way that the side with **the holes** is at the **bottom!**

Note: As long as you don't connect any cables into the junction box, **leave the lid on** the junction box. When you take the lid off: **do not loose the O-ring!**

Note: If you mount the junction box in a vertical position, it is a good idea to mount a protective cap above it.

Power Connection

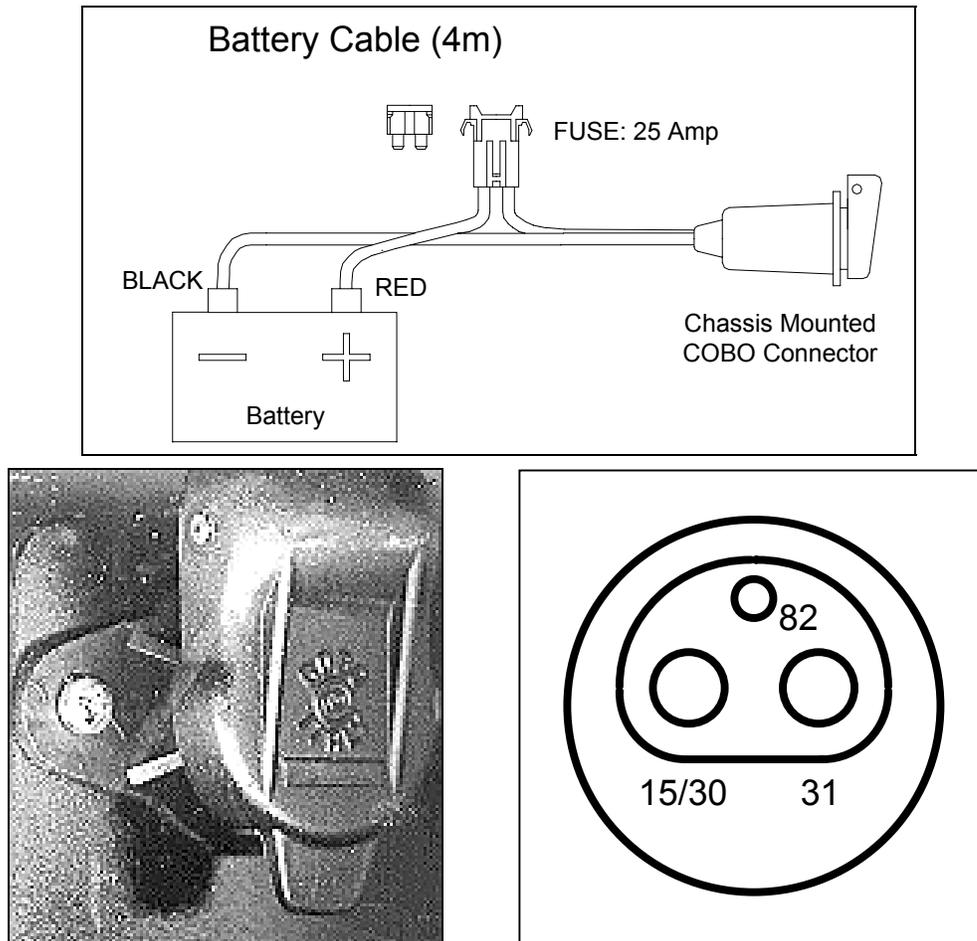


Fig. 11 Battery Connection and Chassis Mounted Part of COBO Connector

Mount the female part of the COBO connector onto the chassis of the tractor and secure it with stainless steel self-tapping screws.

Connect the battery terminal rings to the battery posts, making sure that the positive (**Red**) and negative (**Black**) wires correspond with the polarity of the battery terminals (see Fig. 11). The three pins of the COBO connector are used as follows:

- **15/30** : +12V, Red wire
- **31**: Ground -, Black wire
- **82** : NOT USED

If you have already a COBO connector on your tractor, then you should check if the correct signals are available on the pins (as described before).

Warning

This Sprayer Control kit has been designed as a complete kit. Deviations from the kit might result in malfunctioning, destruction or might produce safety hazards.

This kit should also be used to maintain the CE compatibility.

Warning

The COBO connector and the battery cable have a maximum continuous rating of 25 Amp! See following Guidelines for Power Consumption.

Guidelines for Power Consumption						
Component	Quantity Needed		Current Draw (Amps)		Total Current Draw (Amps)	
TeeJet Controller	1		0.5		0.5	
TeeJet Regulating Ball Valve (e.g. 344E-2RL)	1		1.0		1.0	
TeeJet Main Ball Valve (e.g. 344E-2PR)	1		0.3		0.3	
TeeJet Boom Section Ball Valve (e.g. 344E-EC)	5 ~ 9		0.3		1.5 ~ 2.7	
TeeJet Boom Section Solenoid Valve (e.g. 145)		5 ~ 9		2.9		14.5 ~ 26.1
Boom Balance Spindle Motor	1		12		12	
TeeJet Foam Marker	1		6		6	
Total					21.3 ~ 22.5	34.3 ~ 45.9
<p>Warning: these guidelines are indicative only and may vary strongly depending on model and manufacturer. As one can see, the current easily exceeds the maximum ratings of the COBO connector when installing solenoid boom control valves!</p>						

Table 1 Guidelines for power consumption

Note: Reliable operation of the Sprayer Control depends on a clean power supply. Ensure this by connecting the power cables directly to the battery and not to another power source.

When the Spray Console is switched off, all power is automatically removed from all valves and sensors except for the console. This prevents battery drainage. The Spray Console is used to switch the main relay on and off in the junction box. To power off the Console See your Console Manual for instructions.

Connecting System Components to the Junction Box

Now that you have the junction box and all other components installed you can begin connecting the junction box to the other components of the sprayer system. The following

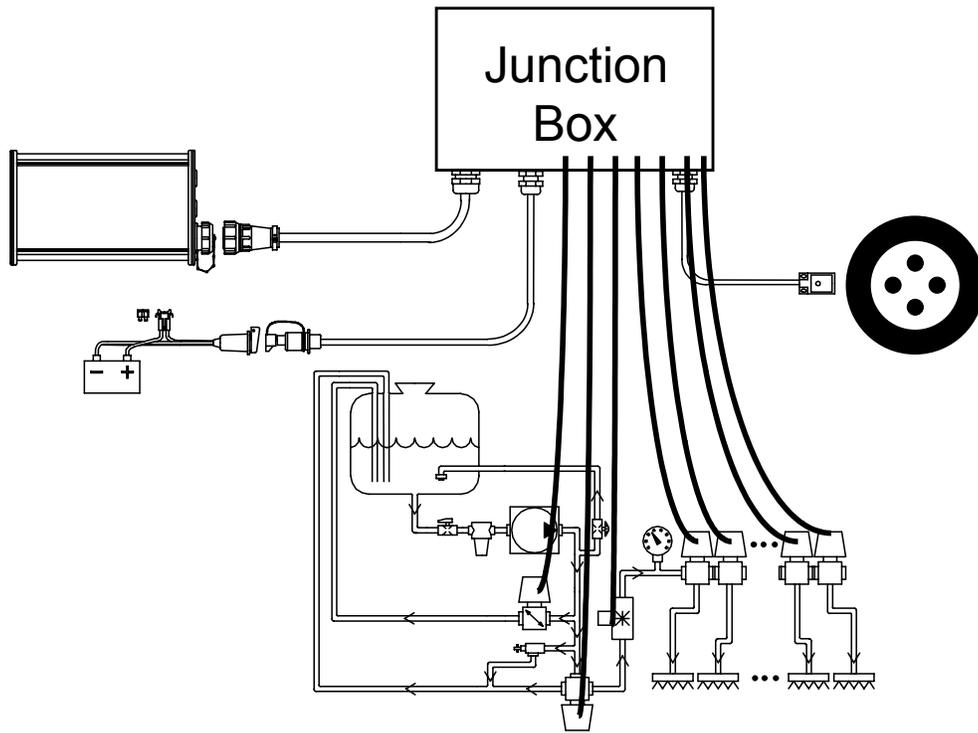


Fig. 12 Wiring Overview

connection steps will only show the connections to a Model 15 junction box. If you have a Model 8 junction box then all the same applies to that model of junction box except that there are only 5 section valve connections in stead of 9.

CONNECT STEP 1: WIRING LAYOUT

Determine the best cable routing to the sprayer control components on the sprayer. This could be along the flow line, main frame of the sprayer, or wherever the cables can be conveniently secured. Avoid any situation where the cables may lay in puddles, or come in contact with extreme heat sources.

Note: Avoid routing cables or mounting system components next to areas of vibration or sources of high frequency interference (i.e. engines and switching devices).

(15): Connectors for Main Cable: 9-pole (labeled on the PCB with **SENSORS**), 10-pole (labeled on the PCB with **SECTIONS**) and 5-pole (labeled on the PCB with **RELAYS**). Connect the 9-pole connector to the 9-pole receptacle, the 10-pole connector to the 10-pole receptacle and the 5-pole connector to the 5-pole receptacle.

(16): Power Connector. Labeled on the PCB with **POWER**. The detailed lay out of this connector is shown in Fig. 14. There are two **+12V** and two **Ground** connections and a **Contact** connection (NOT USED). The power is protected with a fuse of 25A MAX.

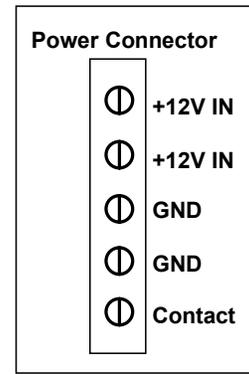


Fig. 14 Power Connector

(17), (18), (19): Sockets for optional relays with spring loaded contact connectors (WAGO) e.g. for Foam Markers, Boom Balance or other extra functions.

(20): Auxiliary Power Out Connector. This connector can be used to drive extension PCB's and also for testing if power is available on the junction box PCB.

Note: The junction box and its connected parts are protected against reverse polarity of the battery. The maximum current that can be handled by the PCB is 25A.

CONNECT STEP 3: CONNECTING SENSORS AND VALVES

Connect the valves and the sensors with the "Wire to Board" connectors (JST) into the junction box as in Fig. 15.

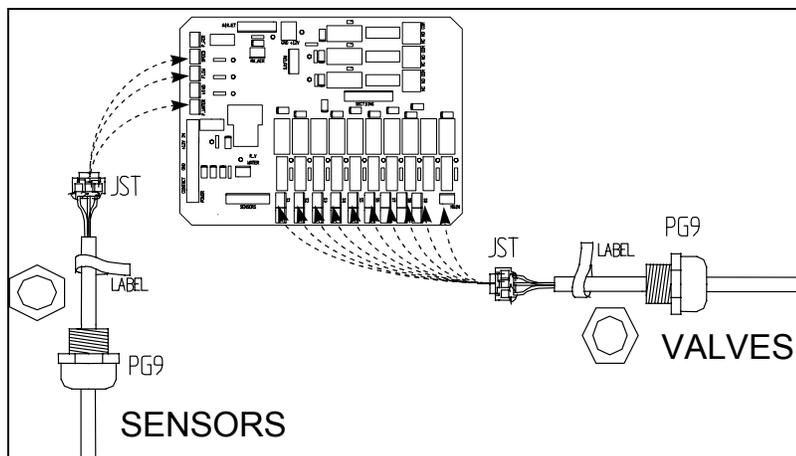


Fig. 15 "Wire to Board" Connections into Junction Box

Several cable lengths are available see Table 2.

Component	Cable lengths
Regulating Valve	1.5m or 5m
Boom section Valve	1.5m or 5m
Main Valve	1.5m or 5m
Speed Sensor	1.5m, 4m or 8m
Flow meter	1.5m, 4m or 8m

Table 2 Available cable lengths for sprayer components

CONNECT STEP 4: CONNECT MAIN CABLE INTO JUNCTION BOX

Connect the Main Cable into the junction box.

- ✎ Connect the 9-pole connector to the 9-pole receptacle (SENSORS).
- ✎ Connect the 10-pole connector to the 10-pole receptacle (SECTIONS).
- ✎ Connect the 5-pole connector to the 5-pole receptacle (RELAYS).

Note: Several cable lengths are optionally available (Fig. 16).

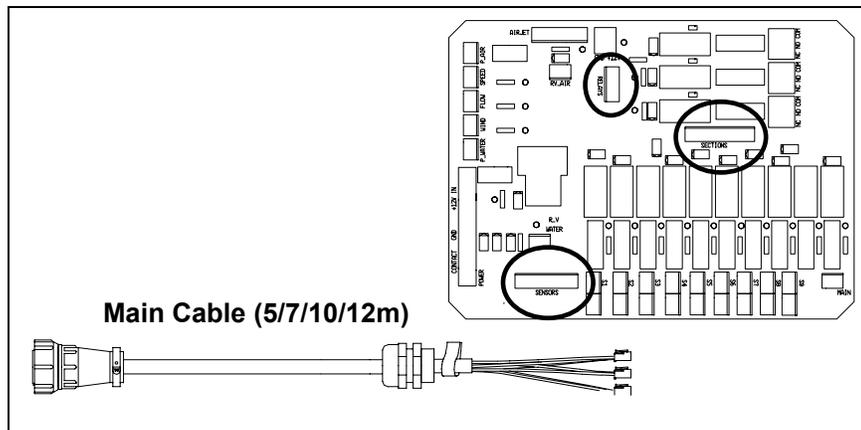


Fig. 16 Main Cable Connection into Junction Box

CONNECT STEP 5: CONNECT MAIN CABLE TO CONSOLE

The standard kit contains a main cable that attaches to the console on one end (Fig. 17), and directly into the junction box on the other end. Several cable lengths are optionally available (Fig. 18).

Note: If an exit hole had to be cut in the cab, be sure the edges are deburred and protected to prevent damage to the cables.

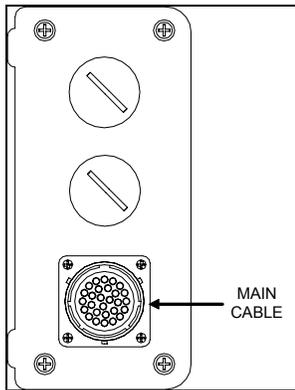


Fig. 17 Main Cable Connector on Console

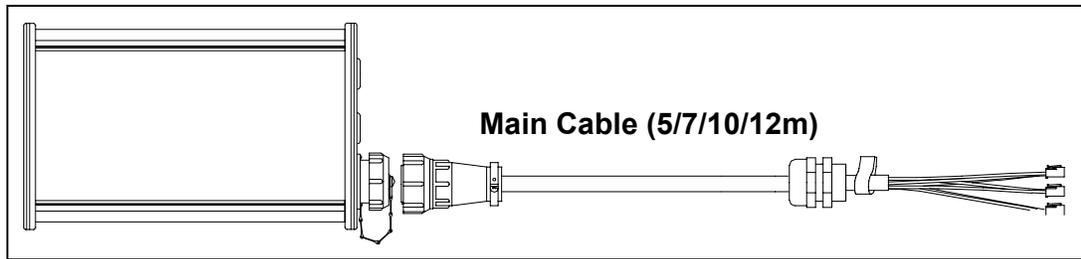


Fig. 18 Main Cable Connection to Console

CONNECT STEP 6: CONNECT BATTERY CABLE LEAD TO JUNCTION BOX

Connect the battery cable lead into the junction box as shown in Fig. 19.

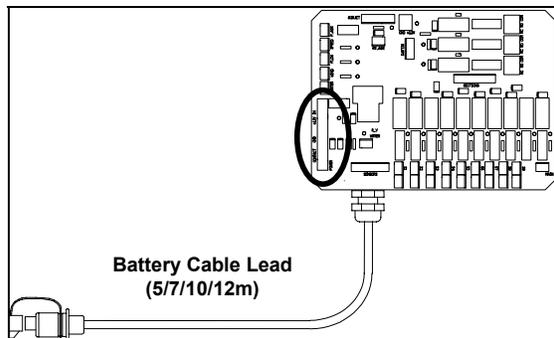


Fig. 19 Connecting the Battery Cable Lead to the Junction Box.

The battery cable lead has 4 wires. Two wires with a red sleeve (to be connected with the +12V IN terminals), two wires with a black sleeve (to be connected with the GND terminals). The Contact terminal is not used (not connected).

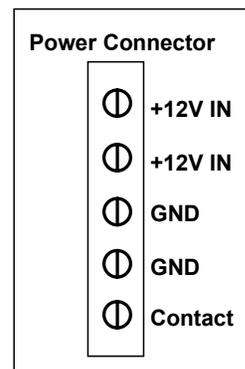


Fig. 20 Power Connector Lay Out

Installation Test

Before you continue:

1. Check whether components and cabling are installed correctly and according to this Installation Manual.
2. Also check that connections are made properly (check especially for loose or intermittent contacts).

Note: If anything fails to function as described in the following test procedure, consult the Troubleshooting Guide in the Programming and Operating Manual.

TEST STEP 1: TEST POWER INSTALLATION

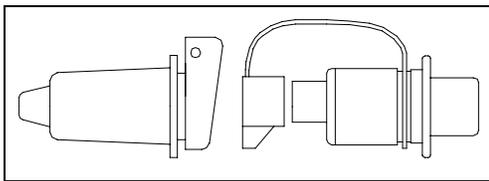


Fig. 21 COBO plug

Before testing the POWER you should temporarily disconnect the Main Cable from the Console (see Fig. 18).

Plug the other side of the battery cable lead into the chassis mounted COBO plug (Fig. 21).

Check if the Power LED (just below the 25A fuse) is lit GREEN (see Fig. 13). If it is not lit, this means that there is no power coming to the junction box (check the 25A fuse).

If the power LED is lit RED, then the power is reverse connected. In this case, somewhere in the connection path, the + and - leads are exchanged. Exchange the + and - leads until the power LED is green.

Continue only when the LED is green!

TEST STEP 2: TEST CONSOLE POWER UP

Make sure that the Main Cable is again connected with the Console (Fig. 18). Check if the Console starts up by pressing the **Pro** Key of the Console. If the display shows information then the power to the Console is correctly connected. If the Console does not power up, check the Main Cable connection and check the 12V in the Junction Box.

When the Console powers up, the Junction Box will also power up (via the Main Relay on the PCB).

WARNING: No power is connected directly to the Console - ONLY through the junction box! The Console is powered through the Junction Box only.

Note: The TeeJet Sprayer Controls have an automatic power down feature. The Console will automatically shut down after about 10 minutes of no inputs. This prevents possible battery drainage.

Warning: DO NOT SWITCH OFF THE CONSOLE BY REMOVING THE MAIN CABLE.

TEST STEP 3: TEST SPEED SENSOR INSTALLATION

Proximity Wheel Sensor

Rotate the wheel on which the proximity switch is installed.

Each time a bolt passes the sensor, a LED on the sensor will light up - **and** also in the junction box if the speed sensor is connected to the junction box.

The display on the console will also indicate a speed as the bolts pass the sensor or you can count the pulses when the Console has an auto speed calibration mode (see Programming and Operation Manual of the Console).

Another way to check the wheel speed sensor is with the Speed Self Test function (if available, see Programming and Operation Manual of the Console).

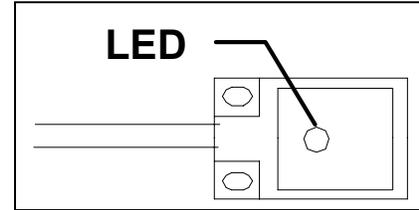


Fig. 22 LED indication on Proximity Sensor

TEST STEP 4: TEST FLOW METER INSTALLATION

Make sure that the flow meter pick-up sensor is mounted in the correct position: the pickup sensor should be mounted in the hole closest to the arrow on the flow meter body. This hole is also deeper than the other one.

When a liquid flow passes the flow meter a red LED in the junction box will light up. It is also possible to activate the flow meter by blowing through the flow meter until you see the little propeller turning in the flow meter body. You can test the flow signal also when the flow meter pickup sensor is not yet screwed into flow meter body. The sensor can be activated by bringing a piece of metal (e.g. screw driver) against the pickup. The red LED in the junction box should light up when the metal is against the sensor pickup, and the Led should be OFF when the metal is removed.

Warning: Perform those initial tests only with water (no chemicals) !

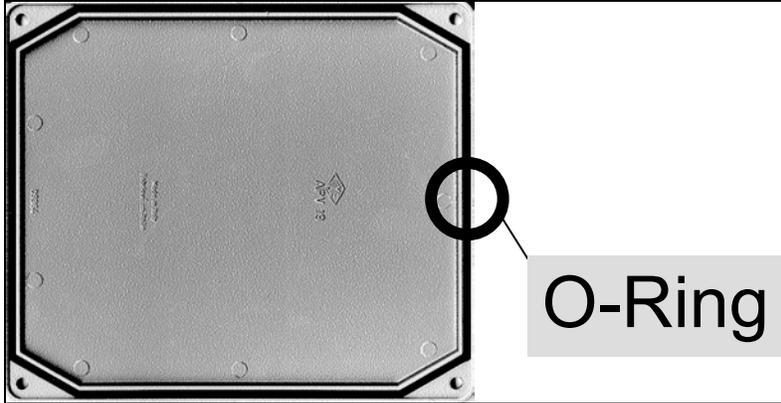
TEST STEP 5: TEST VALVES INSTALLATION

From the Console turn the Main Valve switch and the Boom Section switches ON and OFF - one by one - and verify whether the valves open and close properly.

The regulating valve can be tested by putting the Console in the Manual regulation mode. When the Main valve switch is ON, you can drive the regulating valve by pressing the + or the - key. Pressing the + key should close the valve and pressing the - key should open the valve (in bypass regulation).

Closing the Junction Box

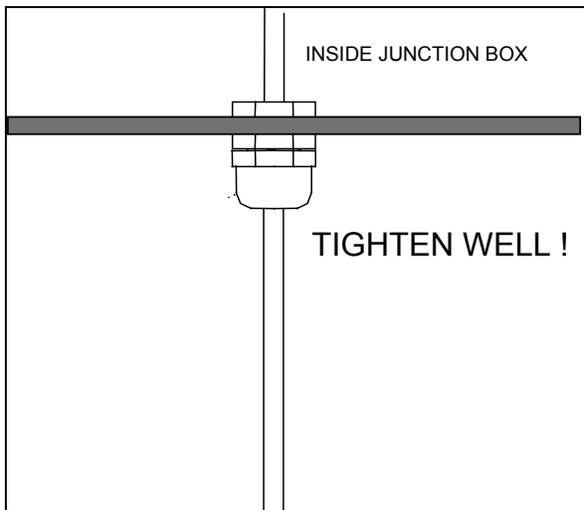
After all connections have been made into the junction box, and after all components have been verified and confirmed for proper operation, screw the lid back onto the junction box.



Note: Make sure that the pre-formed o-ring is correctly in place in the lid of the junction box. (Fig. 23)

This is very important to avoid corrosion of the internal connections and printed circuit board.

Fig. 23 Junction Box Lid with O-Ring



Also make sure that the cable clamps of the feed-through cables are well tightened. (Fig. 24)

This is very important to avoid corrosion of the internal connections and printed circuit board.

Fig. 24 Cable Feed-Through

Kit Options

The cable connections to the junction box with the possible options is shown in Fig. 25.

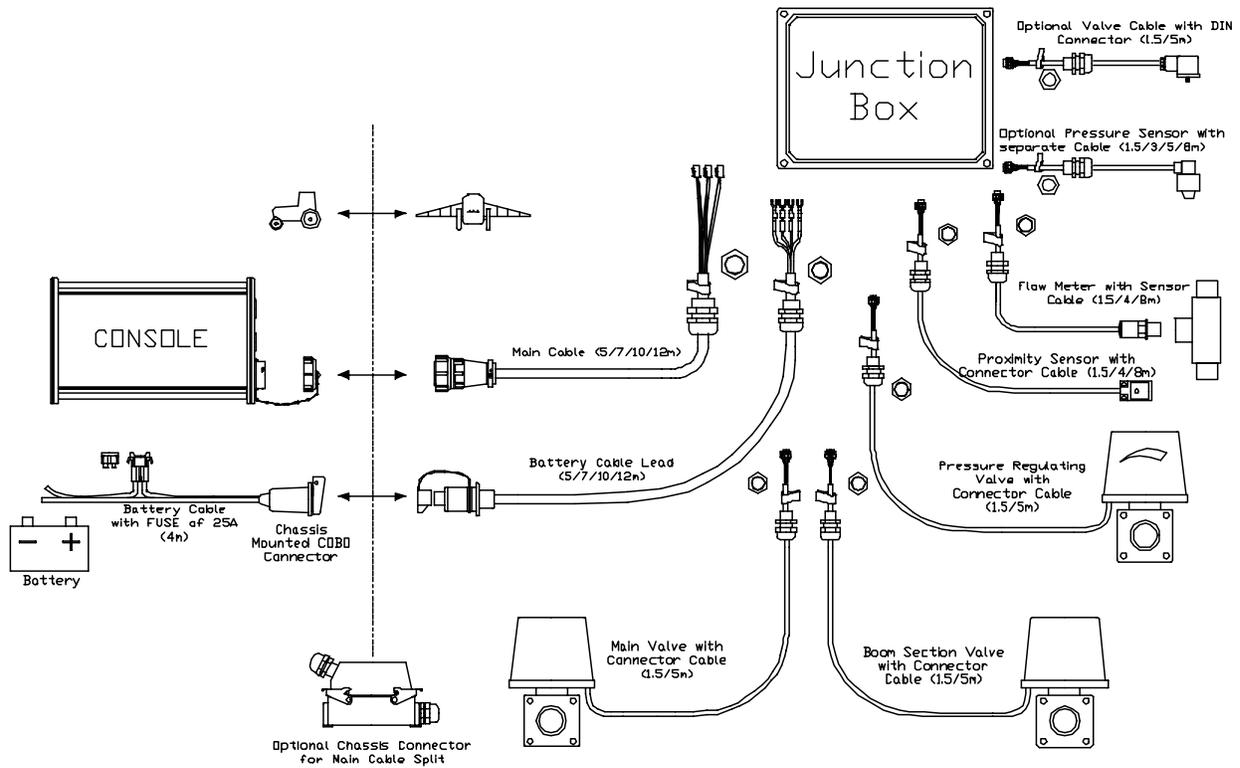


Fig. 25 Options to the Cable Connection kit with Junction Box

The different options are now discussed in more detail.

PRESSURE SENSOR

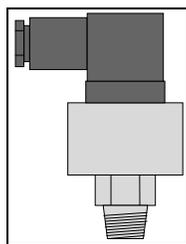


Fig. 26 Pressure sensor

The pressure transducer (if used) has to be installed as close as possible to the boom control valve assembly (Refer to Fig. 27). The pressure transducer has to be placed after the Main Valve.

Mount the unit vertically on a short stand pipe to help protect the sensor.

Check all components to make sure they are mounted securely to avoid excessive vibration.

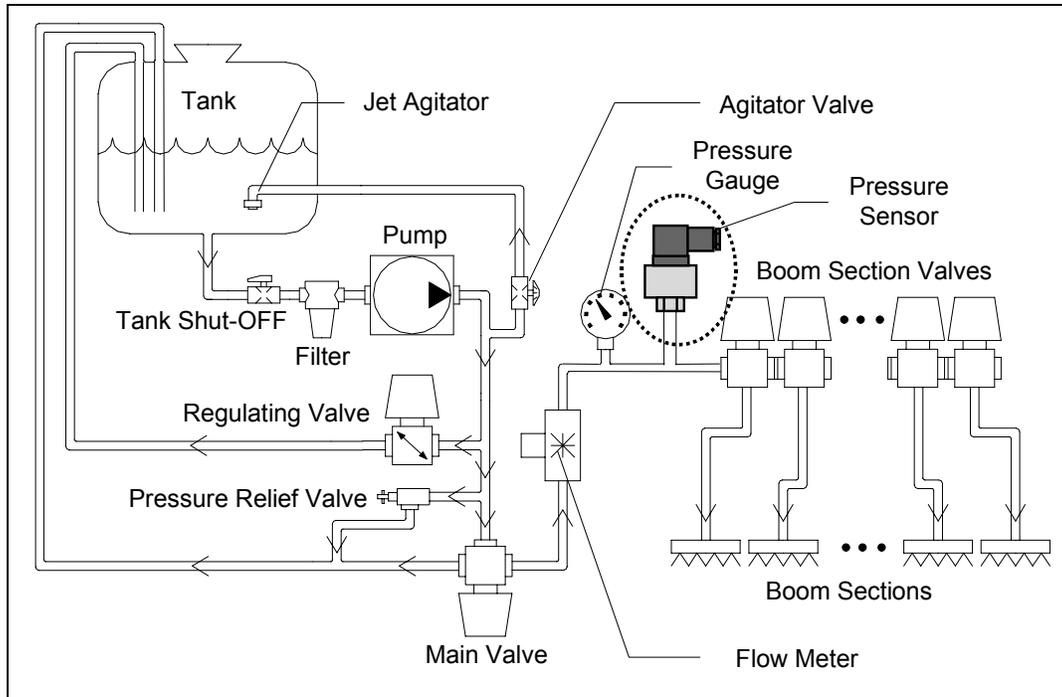


Fig. 27 By-pass plumbing diagram with Pressure Sensor Option

Note: Your pressure sensor could be different from the model depicted in Fig. 26. The pressure transducer should be a 4 to 20 mA type since this type allows sensor alarm checking.

Connect the pressure sensor to the connector labeled P_WATER in junction box Model 15 (see Fig. 29) or to the connector labeled PRESSURE in junction box Model 8 (see Fig. 30).

Test the pressure sensor installation. When the pressure sensor is installed and the system is brought up to a certain pressure, this pressure will be indicated on the display of the Console.

SPLIT MAIN CABLE

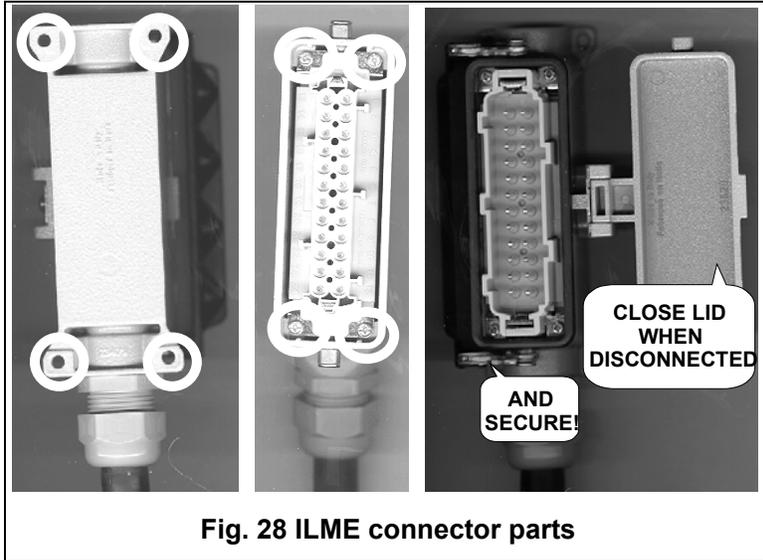


Fig. 28 ILME connector parts

A chassis connector with screw terminals is available as an option in case one wants to split this main cable into two parts - a tractor part and a trailed sprayer part.

Mount the base part of the ILME connector onto the chassis of the tractor (at the back) and secure it (Fig. 28).

Cut the main cable in two at the correct lengths.

Both connector parts can be disassembled: unscrew the terminal part (Fig. 28).

Strip all the internal wires of

both open cable ends.

Screw the wires into the lead terminals: connect the same color to the terminal with the same number on both connector parts.

Re-assemble the connectors and plug them together.

When the connector is unplugged, close the lid to avoid corrosion! (Fig. 28)

JUNCTION BOX TYPES

There are two main junction box types:

- **Model 15** : up to 9 section valves, Master valve and maximum 5 extension relays (see Fig. 29)
- **Model 8**: up to 5 sections, Master valve and maximum 2 extension relays (see Fig. 30)

For both models there are a number of different options possible. The configuration you need depends on the type and number of electrical valves you are using and also on the options on the Console (e.g. boom balance switch, foam marker switches, ...). Notice that all junction box PCB's are limited to a maximum current of 25A.

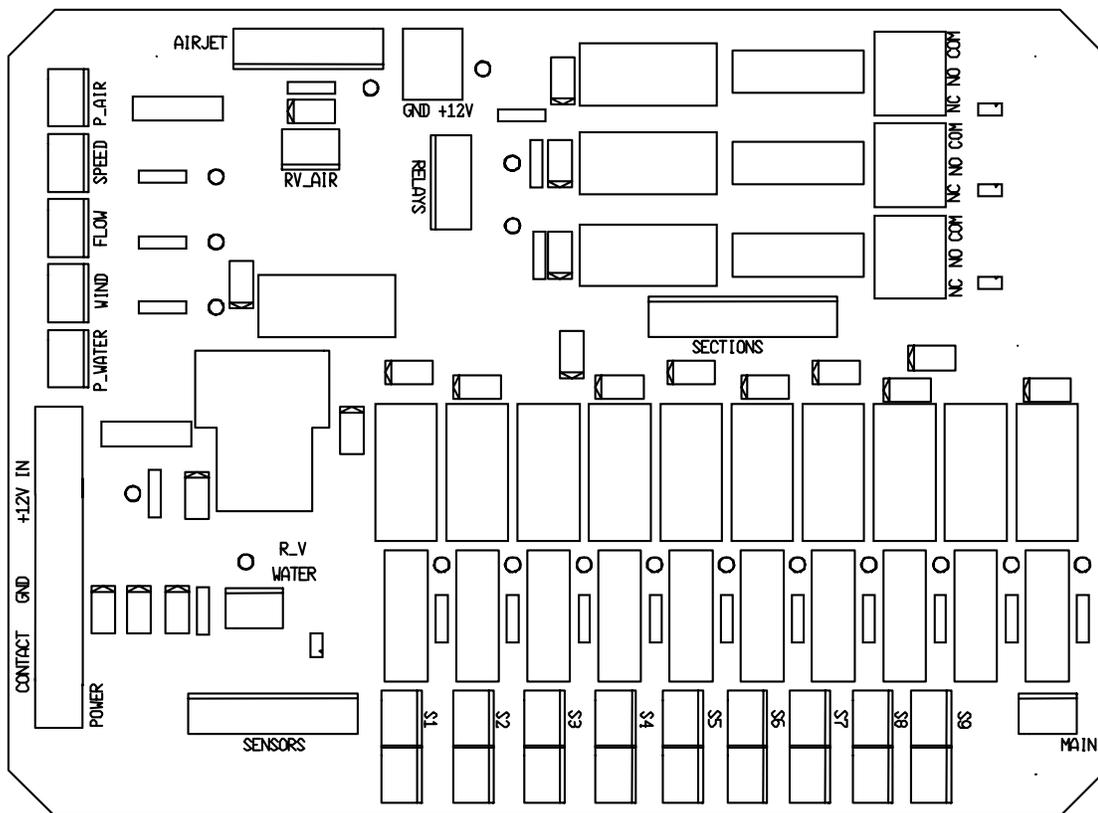


Fig. 29 PCB of Junction Box Model 15

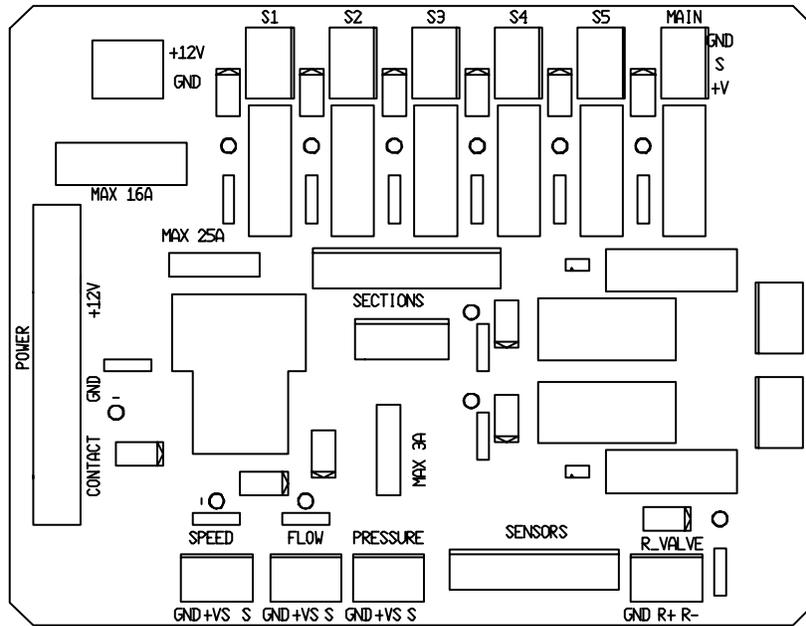


Fig. 30 PCB of Junction Box Model 8

An overview of the features of both junction boxes is given in Table 3. For each model, the basic features and the optional features are shown. Each model will be described in more detail in the following text.

	Model 15		Model 8	
	Basic	Optional	Basic	Optional
Compatible with 844-E, 844-AB, 834, 814, 814-AB, AirMatic	✓	-	✓	-
Max. nr. of boom sections	9	-	5	-
Main valve connection	✓	-	✓	-
Valve relays on socket	Not needed for TeeJet 344-EC valves	10	Not needed for TeeJet 144 or 344-EC valves	-
Extra 16A relays (on board)	sockets	3	sockets	2
Extra 16A relays (extension PCB)	-	2	-	-
Bicolor LED indicator for water reg. valve	✓	-	✓	-
LED indicator for water main valve and for each water boom section valve	✓	-	✓	-
Bicolor LED indicator for water main valve and section valves (when relays on board)	-	✓	-	-
LED's for 3 optional relays	✓	-	-	-
LED indicator for speed sensor	✓	-	✓	-
LED indicator for flow sensor	✓	-	✓	-
Water pressure sensor connector	✓	-	✓	-
Bicolor LED indicator for air regulating valve	✓	-	-	-
Air pressure sensor connector	-	✓	-	-
LED indicator wind speed sensor	-	✓	-	-
Air regulating valve connector	-	✓	-	-
Air section valve connectors	-	9	-	-
Reverse voltage protection	✓	-	✓	-
Bicolor LED indicator for power status	✓	-	✓	-
JST Wire to Board connectors	✓	-	✓	-
Screw connectors (Hartman)	-	✓	-	-
Faston connectors	-	-	-	✓
Main fuse (25A)	✓	-	✓	-
Fuse for sensors (3A)	✓	-	✓	-
Fuse for each valve (3A)	✓	-	✓	-
Fuses for optional relays (16A)	✓	-	✓	-
Remote power ON/OFF	✓	-	✓	-
Auxiliary power OUT connector	✓	-	✓	-
Fly back diodes on valve circuits	✓	-	✓	-
Size (mounting holes)	226x196mm	-	168x149mm	-

Table 3 Overview of Junction Box Types

Junction Box Model 15

The Basic version of Junction Box Model 15 can be used for machines with up to 9 TeeJet 344EC section valves and a Main valve. The PCB (printed circuit board) can be equipped with Wire to Board connections (=JST) or with screw connections (Hartman).

Options:

- ☞ For other valve types, the model 15 junction box PCB can be equipped with 10 valve relays.
- ☞ Model 15 can also be equipped with 3 extension relays on board. This option is needed when you want to toggle extra functions from your Console such as a boom balance or foam markers.
- ☞ If you want to use this Junction Box for a sprayer with AirJet nozzles and an AirMatic installation then this model can be equipped with all necessary AirMatic connections such as water and air pressure sensor, air regulating valve, air section valves (in parallel with the water section valves), connector for AirMatic Main cable, ...
- ☞ Model 15 can also be equipped with 2 extension relays on an extension PCB. This option is needed when you need more than the 3 extension relays on board. This PCB has two 16A relays for driving high current outputs (see Fig. 31).

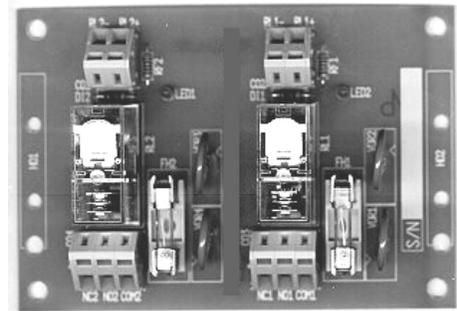


Fig. 31 Relay Extension Print

Remark: The total current cannot be higher than 25A since the fuse in the battery cable limits the current to 25A, and also the PCB is limited to 25A Max. If you want to go above 25A, then you have to provide an extra power cable and extra power connector coming directly from the battery.

WARNING: the three extra relay functions for driving foam markers, boom balance, ... do not have fly back diodes or other circuitry to avoid spikes. You must provide the necessary circuitry (fly back diodes or transzorb) yourself on the extra functions you want to add. Some examples are given in Fig. 32 and Fig. 33. You should also provide fly back diodes on solenoid operated valves such as a TeeJet 144 valve.

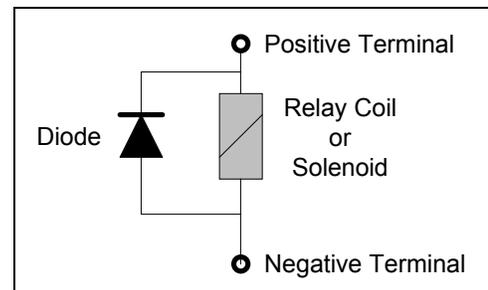


Fig. 32 Fly back diode for coils and solenoids

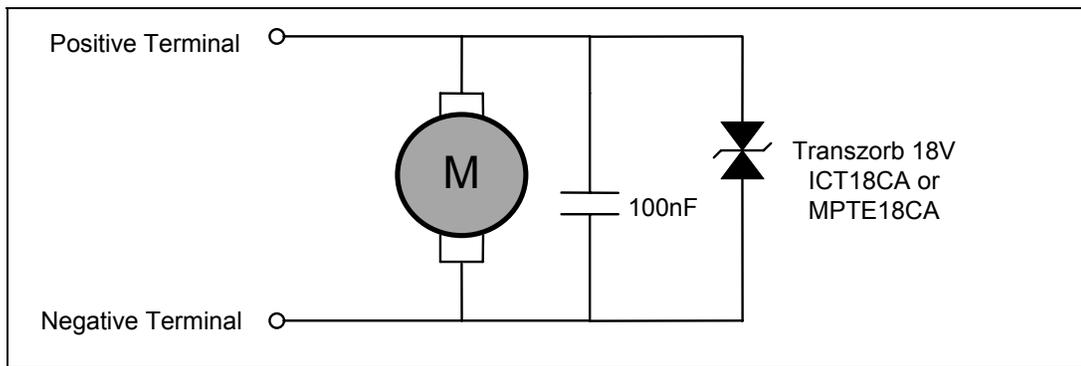


Fig. 33 Transzorb and C circuit for motors

Junction Box Model 8

The Basic version of Junction Box Model 8 can be used for machines with up to 5 TeeJet 344EC or 144 section valves and a Main valve. The PCB (printed circuit board) can be equipped with Wire to Board connections (=JST) or with Faston connections.

Options:

- ☞ Model 8 can be equipped with 2 extension relays on board. This option is needed when you want to toggle extra functions from your Console such as a boom balance or foam markers.

Remark: The total current cannot be higher than 25A since the fuse in the battery cable limits the current to 25A, and also the PCB is limited to 25A Max. If you want to go above 25A, then you have to provide an extra power cable and extra power connector coming directly from the battery.

WARNING: the extra relay functions for driving foam markers, boom balance, ... do not have fly back diodes or other circuitry to avoid spikes. You must provide the necessary circuitry (fly back diodes or transzorb) yourself on the extra functions you want to add. Some examples are given in Fig. 32 and Fig. 33.

You should also provide fly back diodes on solenoid operated valves such as a TeeJet 144 valve.

Appendix A: Console End Plate Connectors

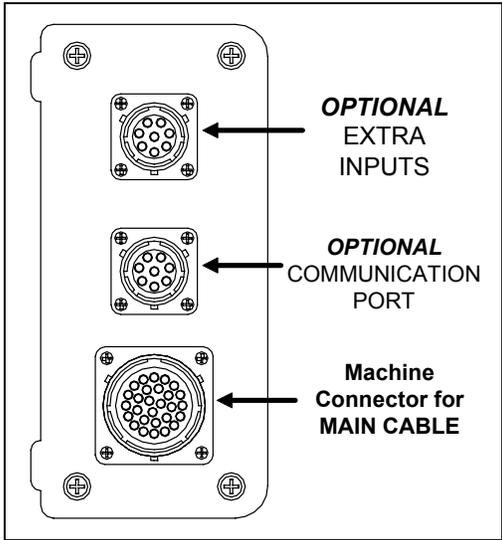


Fig. 34 Right Hand End Plate Connectors

In its maximum configuration there can be three connectors on the right hand end plate of the Console.

The upper connector (8-pole) is an optional speed sensor connector (for a separate speed sensor on the tractor and an implement input).

The connector in the middle (8-pole) is the optional communication connector for PC, GPS system or Printer connection.

The lower connector (28-pole) is the standard machine connector with all necessary connections for the machine sensors, valves, power connection, etc..

MACHINE CONNECTOR

The machine connector is a 28-pole Framatome connector with all necessary machine connections. The connector socket on the side plate has male pins, so the connector on the cable should have the matching female pins.

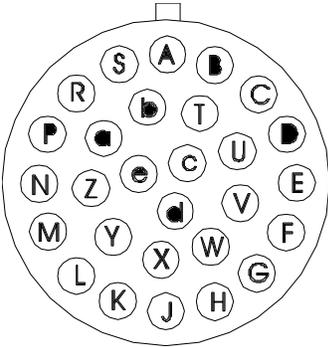


Fig. 35 Male pin layout (Socket on Console)

On a Console without section switches an external section switch box must be available and all other switches should also be provided in that external switch box (e.g. foam markers, boom balance, ...). This means that in this case the boom balance pins on the connector are not used. The lay-out of the male pins in the socket on the Console is shown in Fig. 35.

The functions of each pin are explained in the following table.

Pin	Signal	Remarks
A	Main Valve	Output to drive the Main Valve (+12V when active)
B	Section 1	<ul style="list-style-type: none"> • Output to drive the valve for section 1 in case of integrated boom section switches OR • Output to drive the left foam marker in case the foam marker option is installed OR • Input for section 1 in case of external boom section switches.
C	Section 2	<ul style="list-style-type: none"> • Output to drive the valve for section 2 in case of integrated boom section switches OR • Output to drive the valve for section 1 in case the foam marker option is installed OR • Input for section 2 in case of external boom section switches.
D	Section 3	<ul style="list-style-type: none"> • Output to drive the valve for section 3 in case of integrated boom section switches OR • Output to drive the valve for section 2 in case the foam marker option is installed OR • Input for section 3 in case of external boom section switches.
E	Section 4	<ul style="list-style-type: none"> • Output to drive the valve for section 4 in case of integrated boom section switches OR • Output to drive the valve for section 3 in case the foam marker option is installed OR • Input for section 4 in case of external boom section switches.
F	Section 5	<ul style="list-style-type: none"> • Output to drive the valve for section 5 in case of integrated boom section switches OR • Output to drive the valve for section 4 in case the foam marker option is installed OR • Input for section 5 in case of external boom section switches.
G	Section 6	<ul style="list-style-type: none"> • Output to drive the valve for section 6 in case of integrated boom section switches OR • Output to drive the valve for section 5 in case the foam marker option is installed OR • Input for section 6 in case of external boom section switches.
H	Section 7	<ul style="list-style-type: none"> • Output to drive the valve for section 7 in case of integrated boom section switches OR • Output to drive the valve for section 6 in case the foam marker option is installed OR • Input for section 7 in case of external boom section switches.
J	Section 8	<ul style="list-style-type: none"> • Output to drive the valve for section 8 in case of integrated boom section switches OR • Output to drive the valve for section 7 in case the foam marker option is installed OR • Input for section 8 in case of external boom section switches.
K	Section 9	<ul style="list-style-type: none"> • Output to drive the valve for section 9 in case of integrated boom section switches or • Output to drive the right foam marker in case the foam marker option is installed. • Input for section 9 in case of external boom section switches.
L	Section 10	Input for external boom valve switch for section 10
M	Section 11	Input for external boom valve switch for section 11
N	Section 12	<ul style="list-style-type: none"> • Input for external boom valve switch for section 12 OR • special input for automatic recognition of Hectare Counter Working Mode
P	Section 13	<ul style="list-style-type: none"> • Input for external boom valve switch for section 13 OR • special input for automatic recognition of Air Blast Working Mode
R	Flow Sensor	Input for the flow sensor (active GND)
S	Pressure Sensor	Input for the pressure sensor (0 to 20mA or 4 to 20mA)
T	Speed Sensor	Input for the speed sensor (Active GND). Proximity or Radar type.
U	Balance Up	Output of the UP function of the Boom balance switch (Active GND)
V	Remote Power ON/OFF	Output for remote ON/OFF switching of the Junction Box. Outputs +12V when Console is switched ON.
W	Balance Down	Output of the DOWN function of the Boom balance switch (Active GND)
X	Foam Marker Pump Out	Output for driving the Foam Marker Pump
Y	GND Printer	Separate GND supply for Printer
Z	+12V Printer	Separate +12V supply for Printer (switched by main relay on junction box PCB)
a	Reg. Valve +	Output with the plus signal for the regulating valve
b	Reg. Valve -	Output with the minus signal for the regulating valve
c	+12V Switched Input	+12V Input (switched by main relay on Junction Box PCB). Supply for Main valve and Boom section valve outputs
d	Ground (-)	Supply GND
e	+12V supply	+12V Supply for Console

COMMUNICATION CONNECTOR

The communication connector is an 8-pole Framatome connector. The connector socket on the side plate has female pins, so the connector on the cable should have male pins. The female pins in the socket are shown in Fig. 36.

Pin Name	Signal Function
A	Transmit Output (TX)
B	Receive Input (RX)
C	Ground
D	RTS input
E	CTS output
F	GND Printer
G	+12V Printer
H	

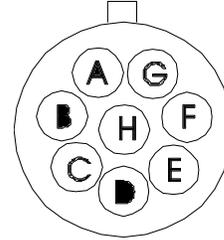


Fig. 36 Female pins layout (Socket on Console)

Table 4 Connections of middle communication connector

EXTRA INPUT CONNECTOR

The extra input connector is an 8-pole Framatome connector. The connector socket on the side plate has female pins, so the connector on the cable should have male pins. The female pins in the socket are shown in Fig. 36.

Pin Name	Signal Function
A	Speed Input
B	Implement Input (in parallel with internal Main Valve Switch)
C	
D	
E	
F	+12V Switched Output
G	Ground (-)
H	

Table 5 Connections on upper extra input connector

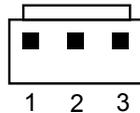
On this connector there are extra inputs for connecting an extra external Main Switch in the tractor cab or for connecting an implement switch in case the Console is used as a Hectare Counter.

Appendix B: Junction Box Connectors

In this section the connections on the junction box PCB are described in detail. Most connections are the same for Model 8 and Model 15 junction box types. When there is a difference between the two types it will be indicated.

JST CONNECTION FOR BOOM SECTION AND MAIN VALVES

The JST connections for the section valves are labeled **S1** until **S9** (until **S5** for Model 8) and the main valve connection is labeled **MAIN**. The top view of the JST connector on the junction box PCB is shown below.



The signals on the 3 pins of these connectors are given in the table below.

On Model 15, there are two identical connections provided for each section. One JST connection is provided for connecting the water sections valves. The second JST connection is provided for connecting the air section valves and is only available if you have selected the AirJet capabilities option of the junction box (in case of an AirJet installation).

On Model 8 there is only one connection provided for each section (no AirJet capabilities).

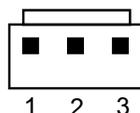
Pin	Voltage levels on the pins			
	Standard Junction Box		Universal Junction Box	
	Valve OFF	Valve ON	Valve OFF	Valve ON
1	GND	GND	GND	GND
2	Open Circuit	+12V	+12V	GND
3	+12V	+12V	GND	+12V

JST CONNECTION FOR REGULATING VALVE

On Model 15, there are two regulating valve connections, one for the water regulating valve (labeled **R_V WATER**) and one for the air regulating valve in case of an AirJet Machine (labeled **RV_AIR**).

On Model 8 there is only one regulating valve connection (for the water regulation and labeled **R_VALVE**).

The top view of the JST connector on the junction box PCB is shown below.



The signals on the 3 pins of these connectors are given in the table below. When the regulating valve has only two wires, the connection on pin 1 is not used.

Pin	Signal Function
1	GND
2	Reg. Valve +
3	Reg. Valve -

JST CONNECTIONS FOR SENSORS

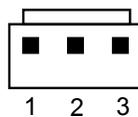
The 5 JST connections for the sensors on Model 15 are labeled as follows:

- ☞ **P_WATER**: water pressure sensor
- ☞ **WIND**: wind speed sensor (when AirJet Capabilities are selected)
- ☞ **FLOW**: flow sensor
- ☞ **SPEED**: speed sensor
- ☞ **P_AIR**: air pressure sensor (when AirJet Capabilities are selected)

The 3 JST connections for the sensors on Model 8 are labeled as follows:

- ☞ **PRESSURE**: water pressure sensor
- ☞ **FLOW**: flow sensor
- ☞ **SPEED**: speed sensor

The top view of the JST connectors on the junction box PCB is shown below.



The signals on the 3 pins of these connectors are given in the table below.

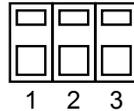
Pin	Signal Function
1	GND
2	+12V
3	Signal

WAGO CONNECTIONS FOR OPTIONAL RELAYS (E.G. BOOM BALANCE)

On Model 15 there are three optional relays on the PCB and two extra relays on an extension board possible.

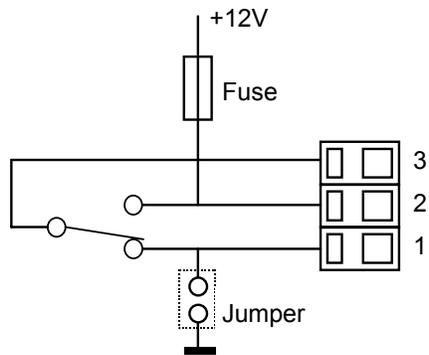
On Model 8 there are only two optional relays on the PCB.

The top view of the WAGO connectors on the junction box PCB is shown below.



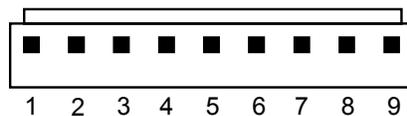
A change over contact of each relay is connected with each WAGO connector. The signals on the 3 pins of these connectors are given in the table below.

Pin	Signal Function
1	Normal Closed (and GND when jumper is closed)
2	Normal Open (and +12V when fuse is installed)
3	Common



JST CONNECTION FOR SENSOR CONNECTION TO THE CONSOLE

This connector is labeled **SENSORS** on the junction box PCB. The top view of the JST connector on the junction box PCB is shown below.

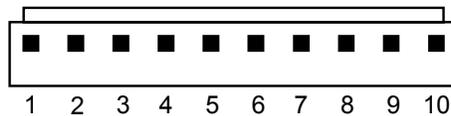


The signals on the pins of this connector is given in the table below.

Pin	Signal Function
1	+12V Supply for Console (before master relay)
2	+12V after master relay
3	Remote ON/OFF
4	GND
5	Flow signal
6	Speed signal
7	Water Pressure Signal
8	Regulating Valve +
9	Regulating Valve -

JST CONNECTION FOR VALVE CONNECTION TO THE CONSOLE

This connector is labeled **SECTIONS** on the junction box PCB. The top view of the JST connector on the junction box PCB is shown below.

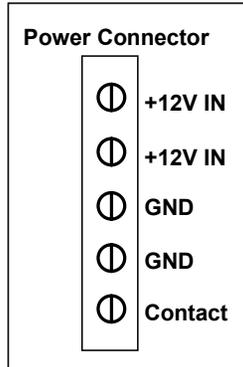


The signals on the pins of this connector is given in the table below. The pins for section 6 until section 9 are not used on Model 8.

Pin	Signal Function
1	Section 1
2	Section 2
3	Section 3
4	Section 4
5	Section 5
6	Section 6
7	Section 7
8	Section 8
9	Section 9
10	Main Valve

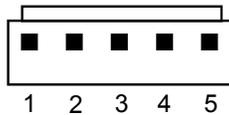
POWER CONNECTION

This connector is labeled **POWER** on the junction box PCB. The top view of the connector on the junction box PCB is shown below.



JST CONNECTION FOR OPTIONAL RELAY CONNECTION TO THE CONSOLE

This connector is labeled **RELAYS** on the junction box PCB. The top view of the JST connector on the junction box PCB is shown below.

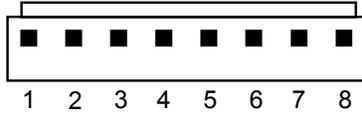


The signals on the pins of this connector is given in the table below. The pin 4 is not used on Model 8.

Pin	Signal Function
1	+12V
2	Relay 1 Signal (e.g. Balance Up)
3	Relay 2 Signal (e.g. Balance Down)
4	Relay 3 Signal
5	GND

JST CONNECTION FOR CONNECTION TO THE AIRMATIC CONSOLE

This connector is labeled **AIRJET** on the junction box PCB and is only available on Model 15 with AirJet capabilities. The top view of the JST connector on the junction box PCB is shown below.



The signals on the pins of this connector is given in the table below.

Pin	Signal Function
1	+12V Supply (after Master relay)
2	Water Pressure Signal
3	Air Pressure Signal
4	Wind Sensor Signal
5	Main Valve Signal
6	Air Regulating Valve +
7	Air Regulating Valve -
8	GND