

STACKER SECTION CONTROL CONFIGURATIONS- OPERATORS MANUAL

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Disclaimer

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ABOUT THIS MANUAL

This manual includes instructions for installation, operation, maintenance and troubleshooting of a Section Control Configuration of a Stacker Distribution System. All dimensions shown in this manual are in millimetres.

SAFETY AND DAMAGE WARNINGS

The terms WARNING, CAUTION and NOTE are used throughout this manual to stress the importance of personal safety, potential machinery damage and useful operating information.

Term description and usage is shown below.

⚠ WARNING: Indicates the strong possibility of severe personal injury or damage to machinery if instructions are not followed.

⚠ CAUTION: Highlights hazards, unsafe or unwise practices which could cause personal injury, property damage, damage to your machinery or loss of potential crop yield if instructions are not followed.

👉 NOTE: Refers to important and useful information which should not be overlooked.

IMPORTANT SAFETY INSTRUCTIONS

⚠ WARNING:

Always wear protective gloves, eyewear and clothing when dealing with liquid fertilizers and other liquid agricultural products.

Do not disconnect any hose lines while the pump is running.

Ensure power is switched off or disconnected when connecting or disconnecting any electrical components of the system.

⚠ WARNING:

Use of phosphoric acid with this equipment will void the warranty.

ABOUT THE SYSTEM

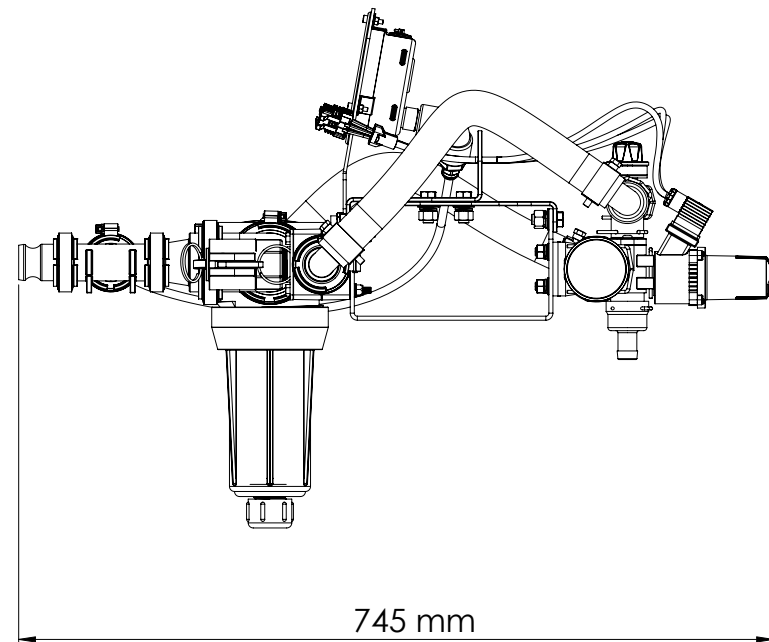
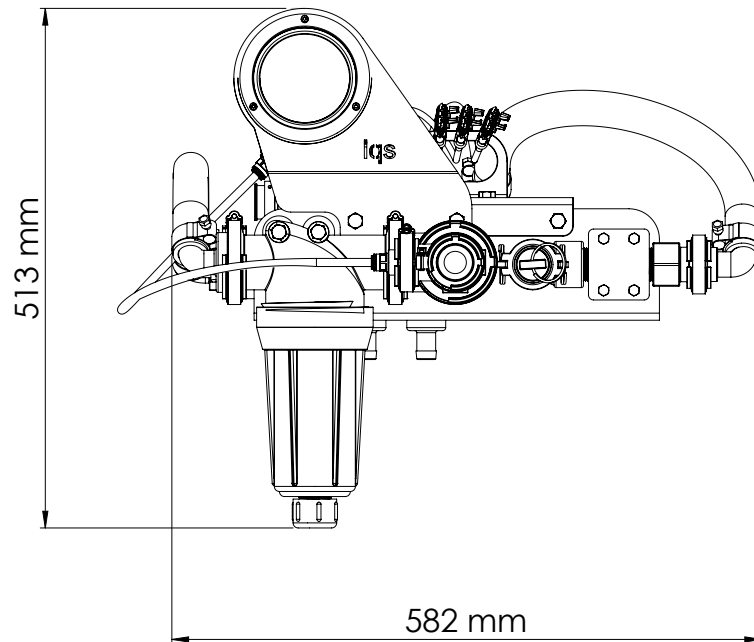
Stacker Distribution Systems have been designed to provide accurate and even rate controlled application of clear liquid fertilizers and other high analysis agricultural liquids.

Section Control Configurations have been designed to integrate with electronic control systems that incorporate section control logic in their liquid application functionality to provide the means to switch off liquid application to individual sections of the air tool or planter either manually or automatically with a mapping based control system.

SYSTEM COMPONENTS

Section Control Module Dimensions

Mounting bracket material 3 mm 304 stainless steel
 Weight 13kg (3 section)



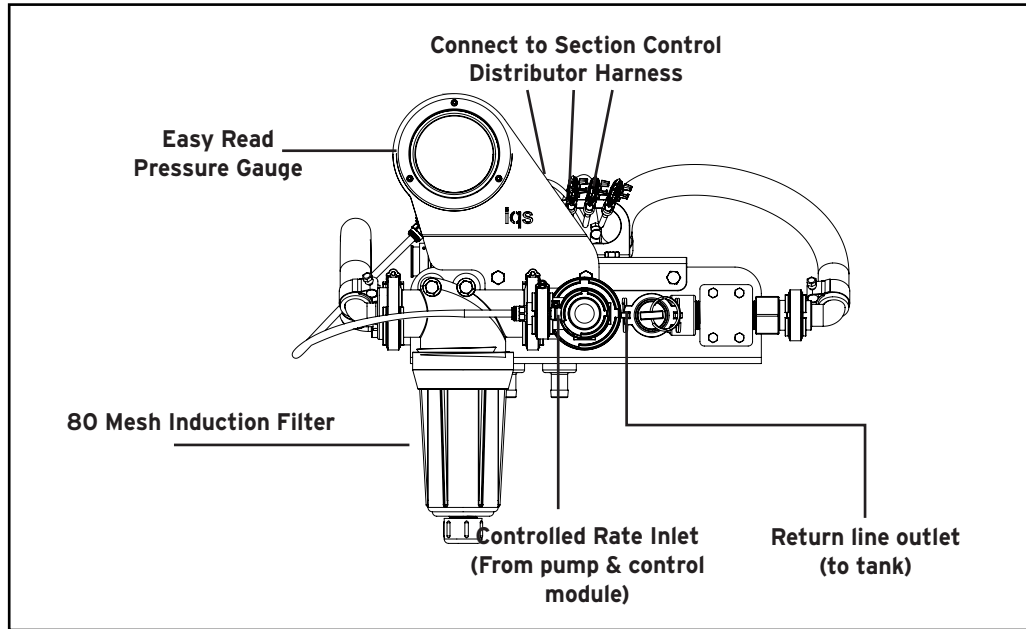
SUPPORTED ELECTRONICS

Currently supported electronic control systems include:

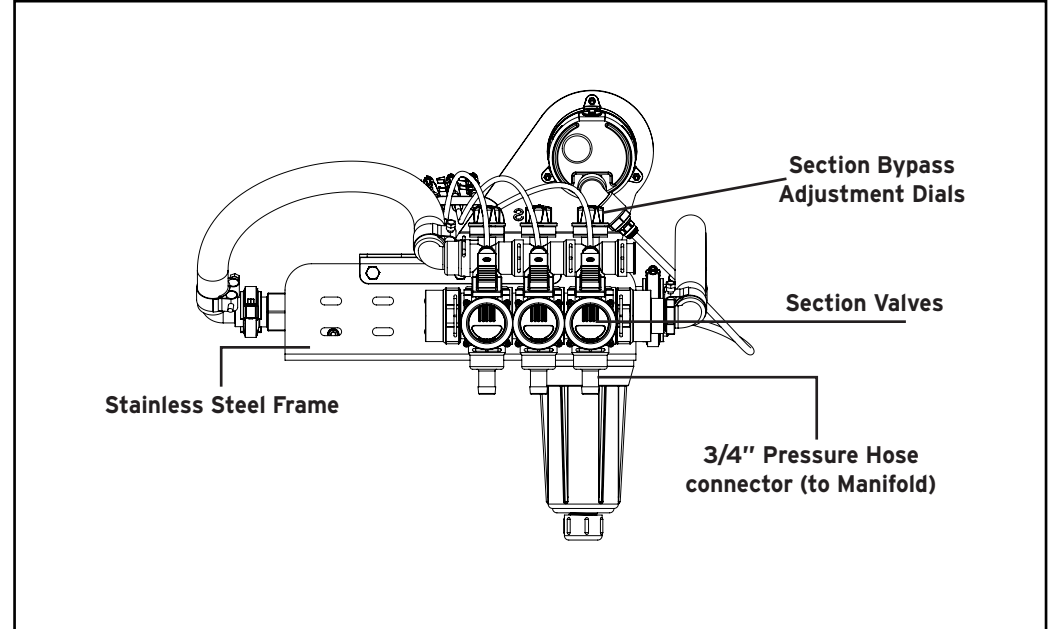
- John Deere Greenstar™ Rate Controller
- John Deere Rate Controller 2000
- Raven ISOBUS RCM
- Topcon X30, X35 via Apollo EM24 ECU
- Trimble TMX-2050, GFX-750, FmX and CFX-750 via Field IQ module
- Seed Hawk iCon with PM4X ECUs
- Ag Leader Versa, Integra, InCommand 800 and 1200

SYSTEM COMPONENTS

MODULE FRONT VIEW



MODULE BACK VIEW



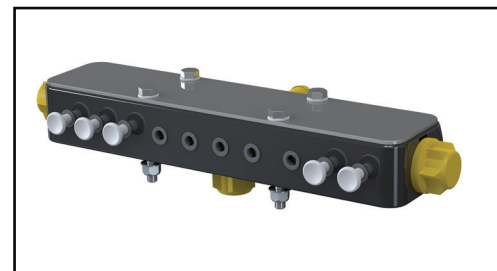
ELECTRICAL REQUIREMENTS

The Section Control Module requires 12V electrical power for the Teejet section valves.

Maximum current draw occurs when all valves open or close at the same time.

Nominal Voltage	12V
Maximum Current	0.5 AMP per section Eg. 3 AMP for 6 section

Single Stacker Manifold

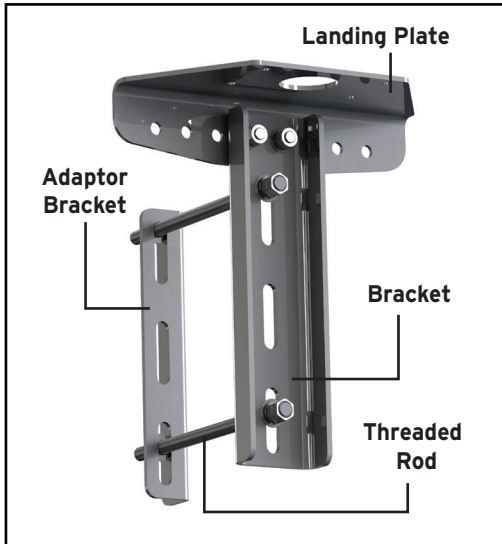


Dual Stacker Manifold



SYSTEM COMPONENTS - Manifold Assembly Kit

Universal Manifold Mounting Assembly



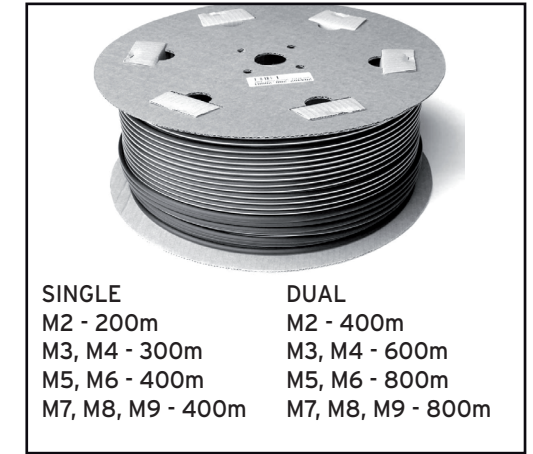
Section Control Return Line



Pressure Hose



8mm OD Delivery Tube



NOTE: INSTALLATION TIPS ON PAGE 3.2

SYSTEM COMPONENTS - Terminal Assembly Kit

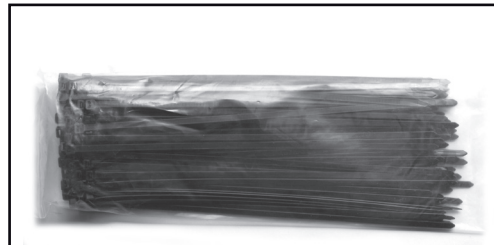
Components Pack



Support Kit - contains spare components and tools



Cable Ties



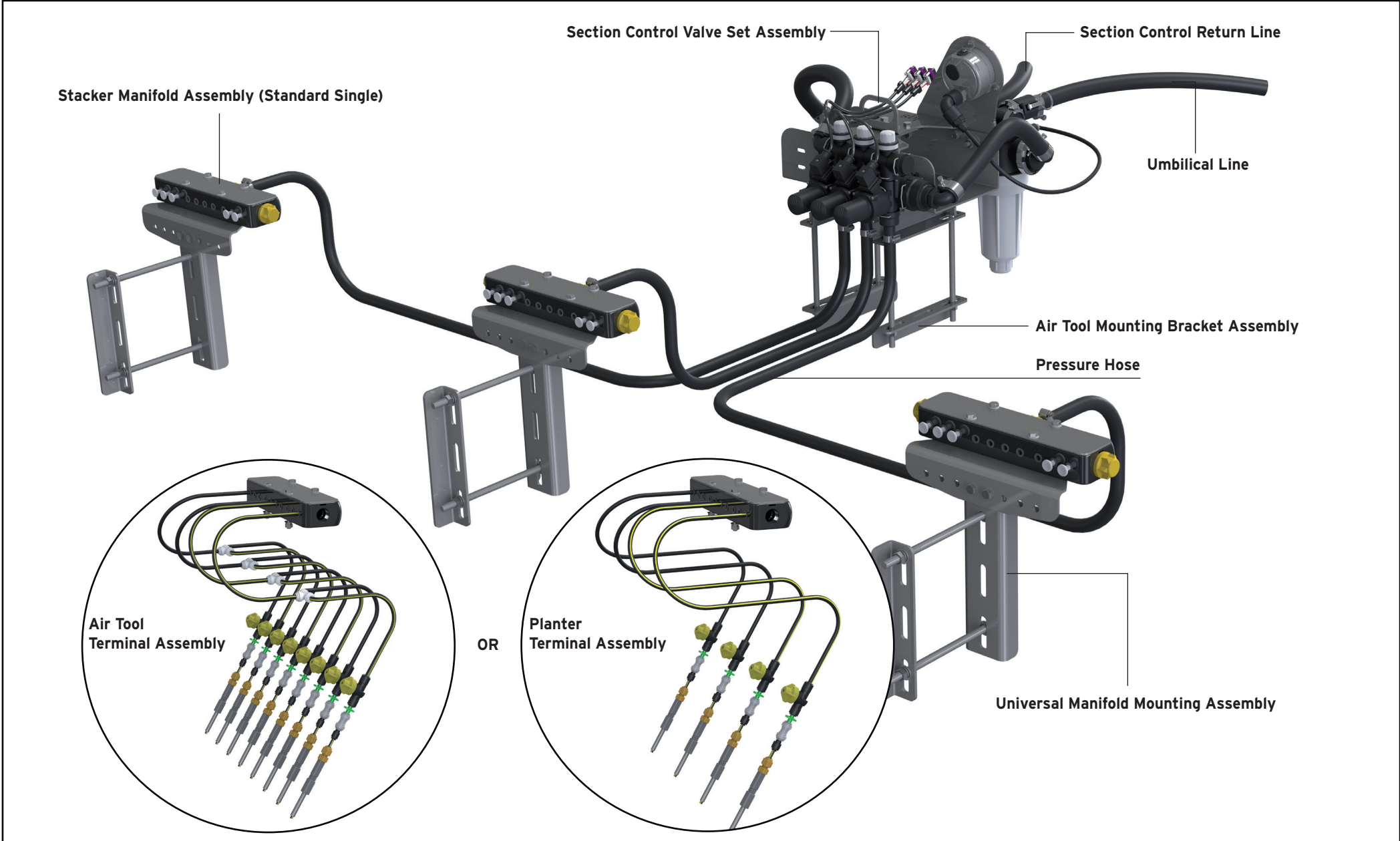
SINGLE	DUAL
M2, M3, M4 - 2PK	M2, M3, M4 - 4PK
M5, M6 - 3PK	M5, M6 - 6PK
M7, M8, M9 - 3PK	M7, M8, M9 - 6PK

6, 5 or 4mm OD Terminal Tube



NOTE: INSTALLATION TIPS ON PAGE 3.6

COMPLETE SYSTEM LAYOUT – Example: 3M Section Control Single System



MOUNT SECTION CONTROL MODULE

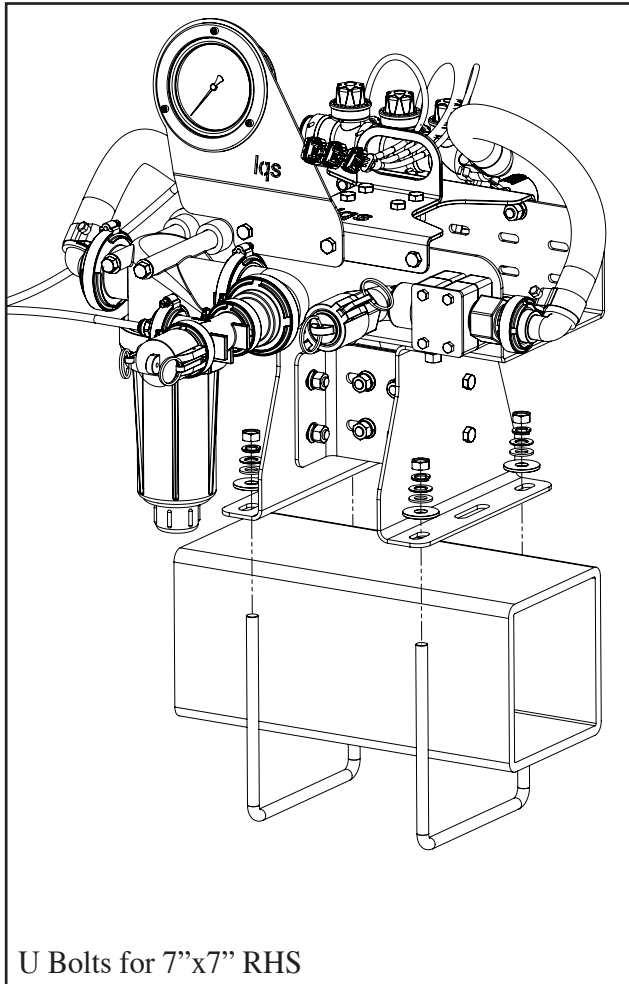
The Section Control module needs to be mounted on an existing implement such as a tillage bar, air drill or planter. The most suitable location for mounting the module will depend on the implement.

Factors to consider when selecting a mounting location:

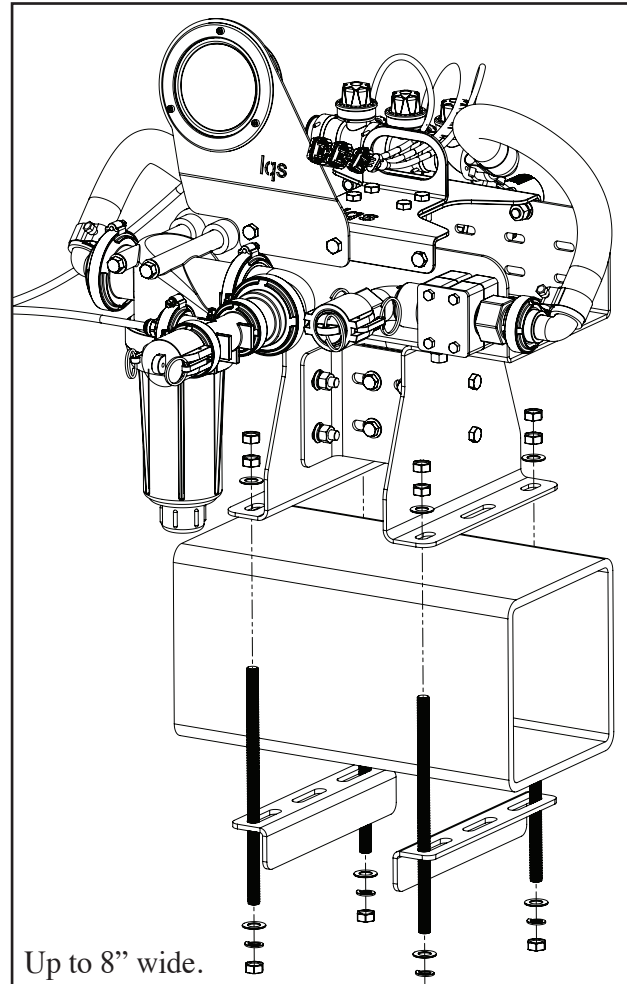
- Ensure the location of the module does not interfere with functionality of implement. E.g. folding sections, filling bins.
- Routing of umbilical and return lines.

Use mounting assembly supplied for installation.

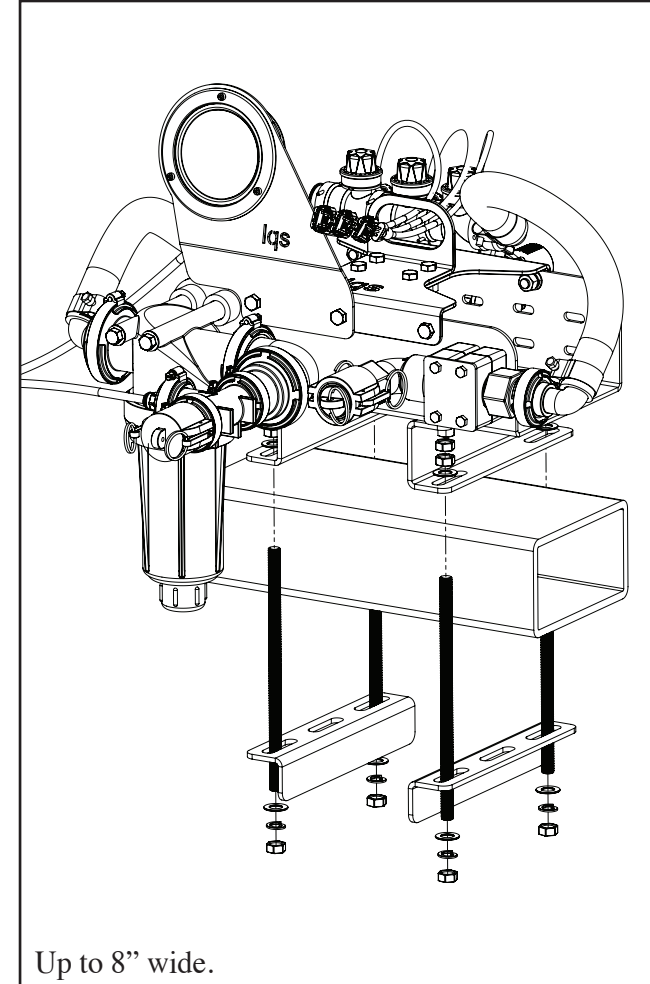
JD NT Planter - Mounting



Universal Planter Mounting



Air Tool Mounting



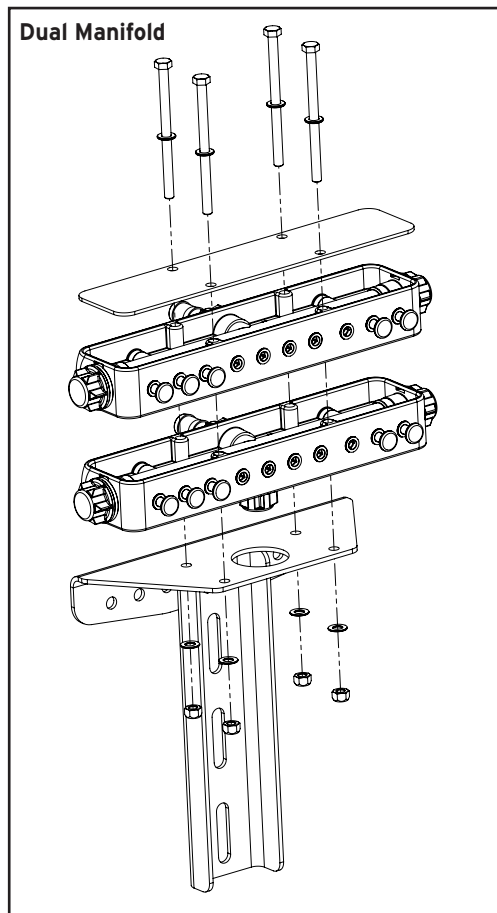
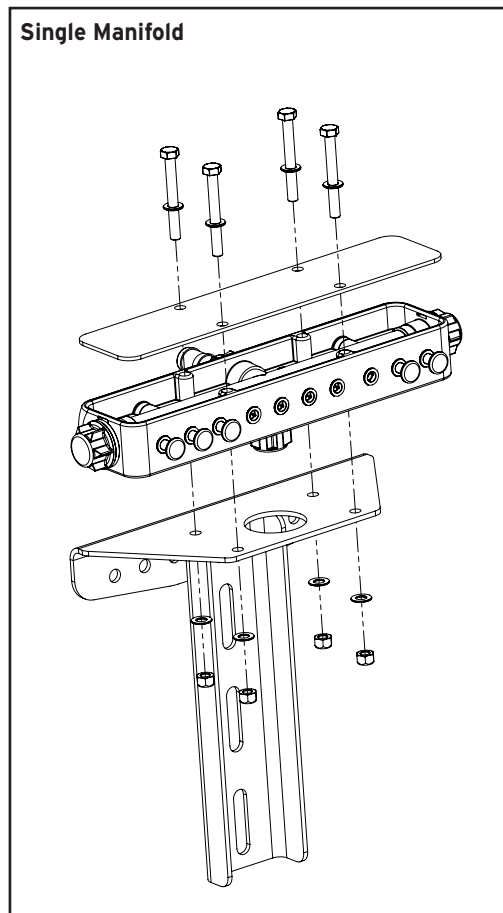
MOUNT MANIFOLDS

Mount manifolds using brackets provided as shown below.

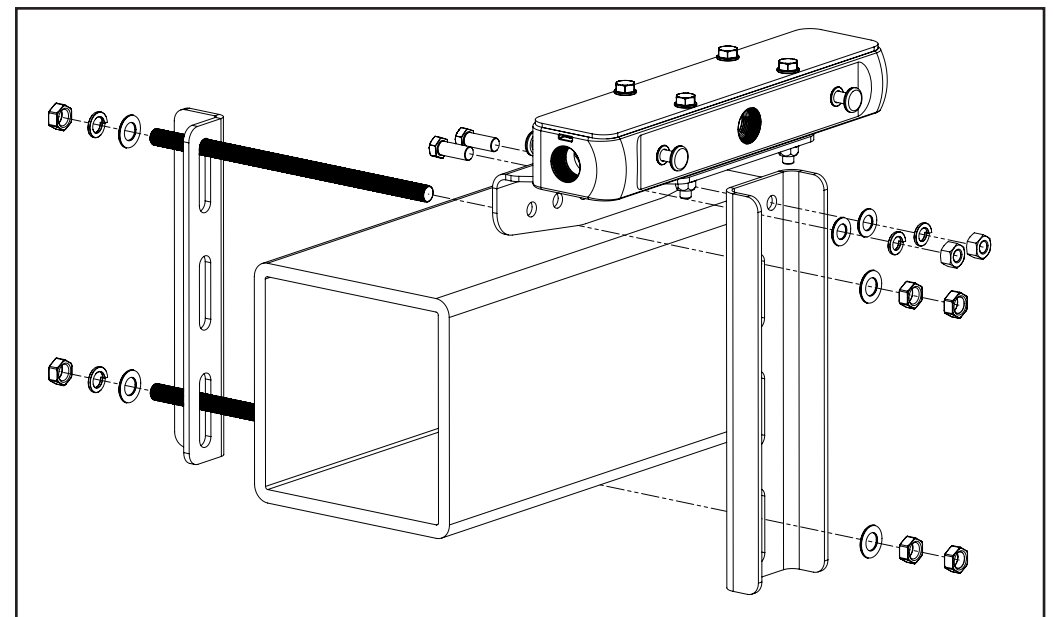
Mounting location Tips:

- Minimise routing distance to openers.
- Ensure folding of implement will not damage the manifold, pressure hose or delivery tube.
- Ensure manifolds and mounting brackets will not interfere with movement of tyne or disc openers.

1. Mount Stacker Manifold to mounting bracket.



2. Mount mounting bracket to implement bar.

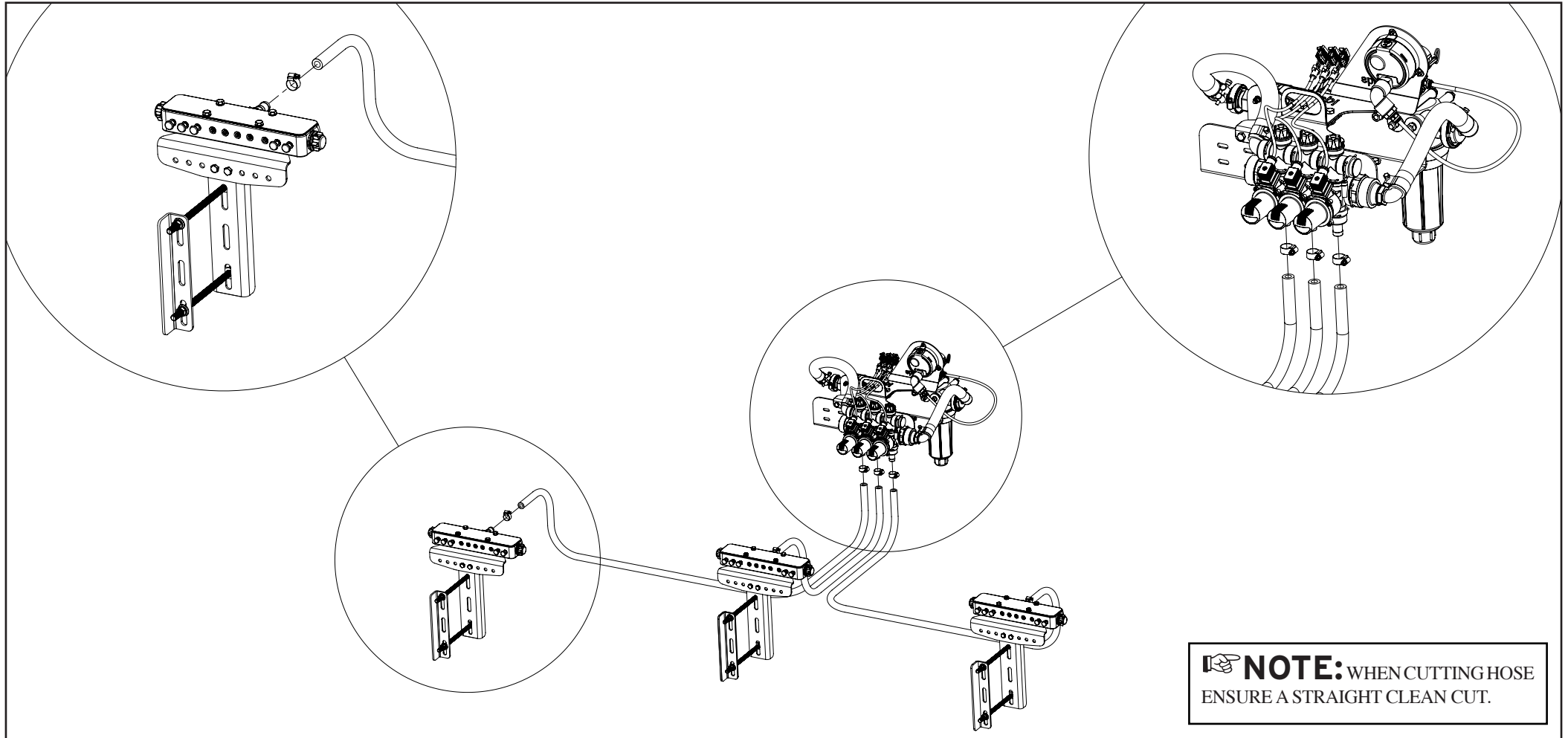


INSTALL PLUMBING

Connect Pressure Hose

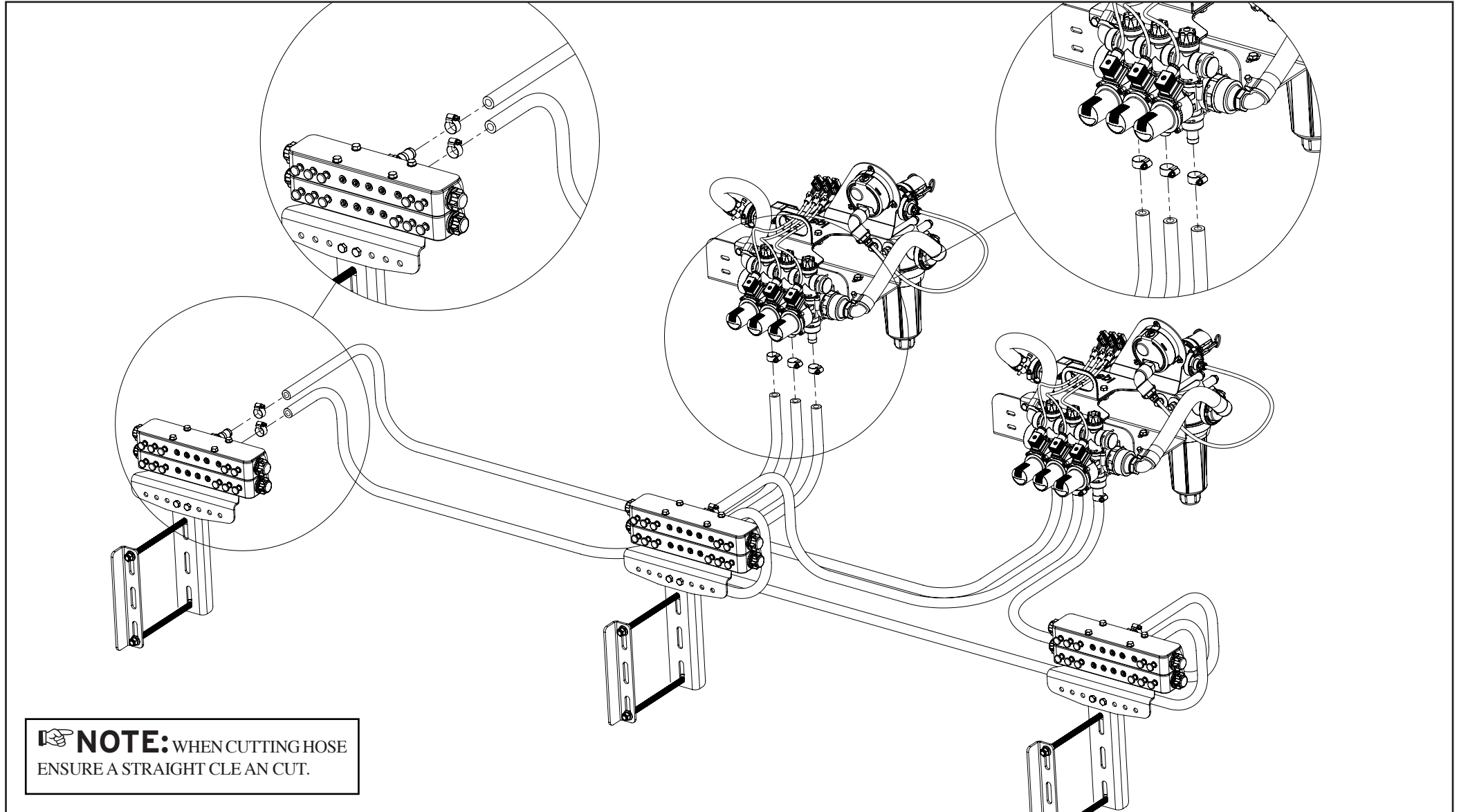
1. Route 20mm (3/4") pressure hose from Section Control module to manifolds and cut to length.
2. Ensure hose will not be kinked or crushed when implement folds. Use cable ties supplied to secure hose into place.
3. Attach hose to section valve and manifold hose barbs with hose clamps provided.

EXAMPLE: M3 Section Control SINGLE System



INSTALL PLUMBING

EXAMPLE: M3 Section Control DUAL System

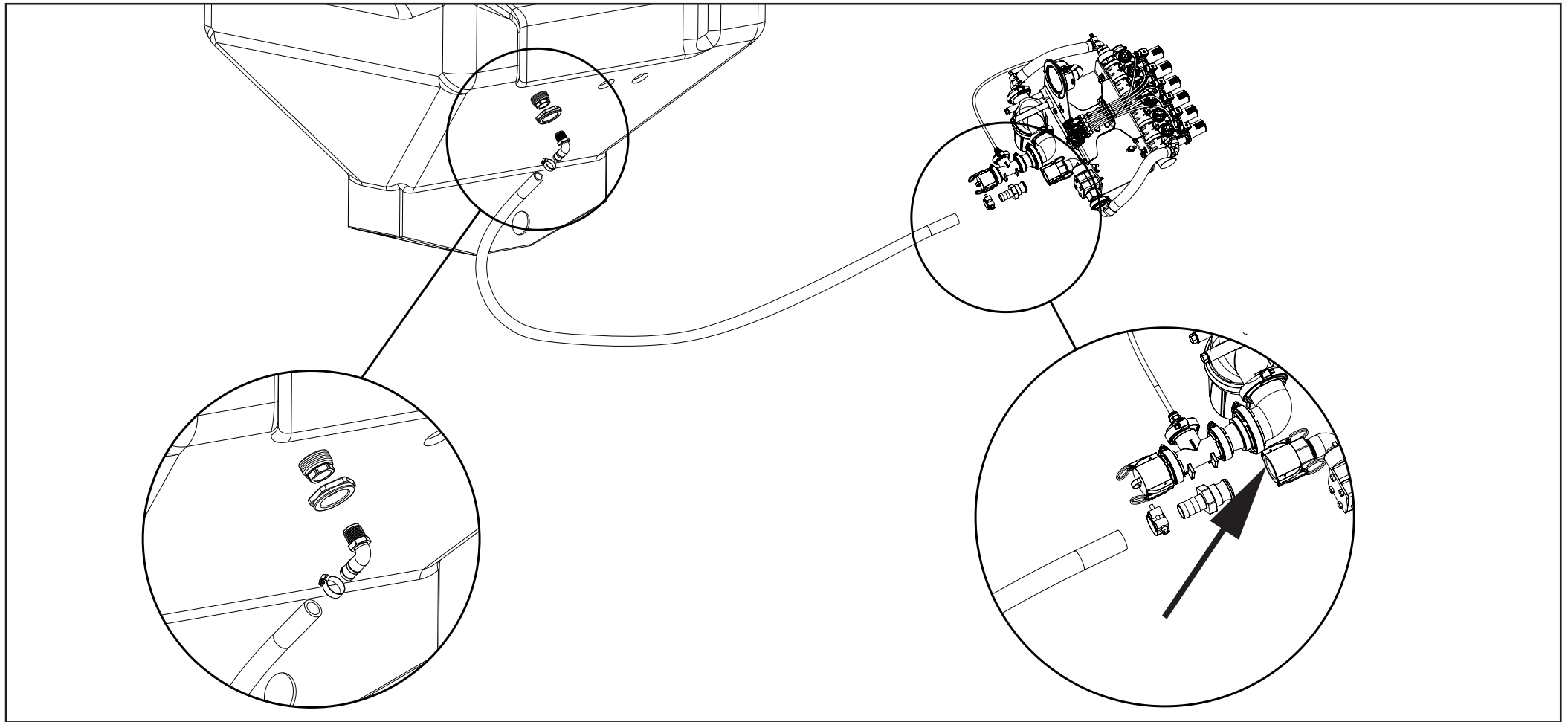


INSTALL PLUMBING

Assemble and Install Section Control Return Line

The Section Control module has a return line that connects back to the product tank. Ensure your controller has a “Constant Flow” setting for section valves before installing the Section Control Return Line.

1. Cut a 57mm diameter hole in the tank. It must be on a flat surface and requires 13mm clearance around the hole internally and 20mm externally.
2. Install tank fitting and assemble Section Control Return Line as shown. Cut 25mm (1”) hose to a suitable length for routing from the tank to the Section Control module.
3. Connect line to female camlock coupling on the Section Control module.



INSTALL TERMINAL ASSEMBLIES - RESTRICTIVE DEVICE SELECTION

All terminal assemblies require either a Line Meter or a length of Friction Tube. These restrictive devices create a system back pressure that ensures equal application of liquid product at each outlet across the tool bar.

Line Meters are a fixed size orifice that can be used with 8mm push-in fittings. They come in a range of orifice sizes from 0.55 to 2.5 mm.

Friction Tube creates back pressure according to the length of tube used. Longer tube means higher operating pressure. Friction tube is available in 4 sizes: 5mm OD x 1.2mm ID, 5mm OD x 1.8mm ID, 4mm OD x 1.8mm ID and 3mm OD x 1.2mm ID.

It is important to install restrictive devices that are suitable for the range of application rates and operating speeds for the intended cropping program to ensure the system is operating at a suitable pressure.

The system operates best at pressures between 1 and 6 bar (14 to 90 psi).

Line Meters



Friction Tube



NOTE: Liquids with high viscosity may require a larger size line meter.

INSTALL TERMINAL ASSEMBLIES - RESTRICTIVE DEVICE SELECTION CONTINUED

Different liquid products can flow at very different pressures for the same restrictive device due to differences in viscosity and density.

Calculate range of flow required out of each outlet by using the following formulae. Calculate minimum flow using **lowest** target application rate and **slowest** ground speed required. Calculate maximum flow using **highest** target application rate and **fastest** ground speed required.

<p>Metric</p> $\frac{W \times R \times S}{600 \times N} \text{ L/min}$ <p>Where:</p> <ul style="list-style-type: none"> W is width of bar in metres R is rate in L/Ha S is operating ground speed in km/h N is number of outlets
--

<p>US</p> $\frac{W \times R \times S \times 128}{495 \times N} \text{ fl-oz/min}$ <p>Where:</p> <ul style="list-style-type: none"> W is implement width in feet R is rate in US Gal/Acre S is operating ground speed in MPH N is number of openers
--

Look up resistance charts to identify Line Meter size or Friction Tube length that is most suitable for the identified flow range and the intended product. Water added to liquid products will normally reduce the operating pressure. It is better to overestimate friction tube length than cut lengths that are too short.



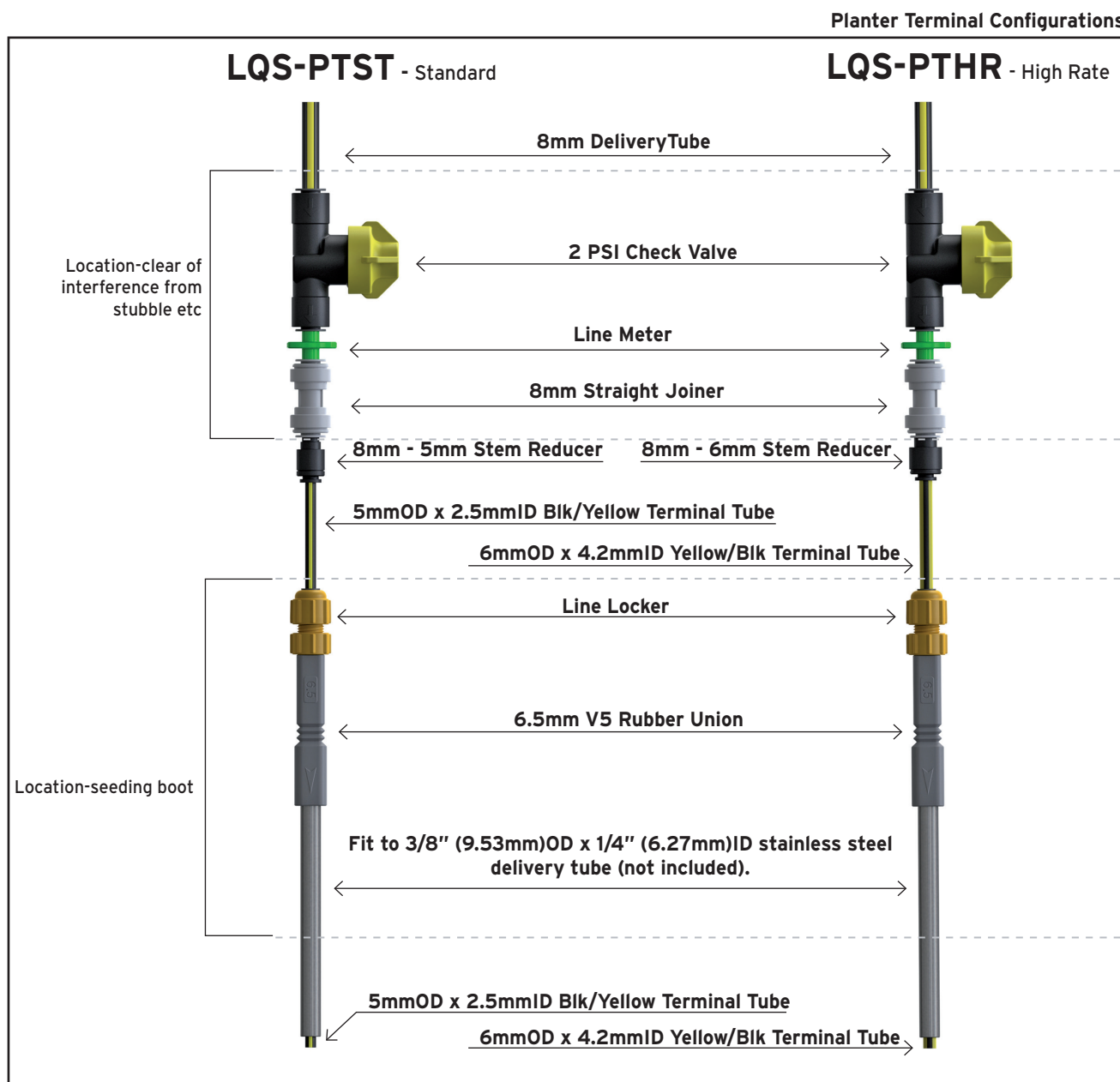
NOTE: DOWNLOAD OUR FLOW DATA FROM: www.liquidsystems.com.au/technical/flow-charts/

INSTALL TERMINAL ASSEMBLIES

Assemble & Install Terminal Assemblies

Install liquid ready points or stainless steel terminal tubes prior to installing Terminal Assemblies. Whether using liquid ready points or attaching after market or custom stainless steel terminal tubes, consult with an agronomist to determine optimal point of delivery for the liquid products being applied.

Assemble and install Terminal Assemblies on openers as shown. Use cable ties provided in support kit to secure assemblies in place.



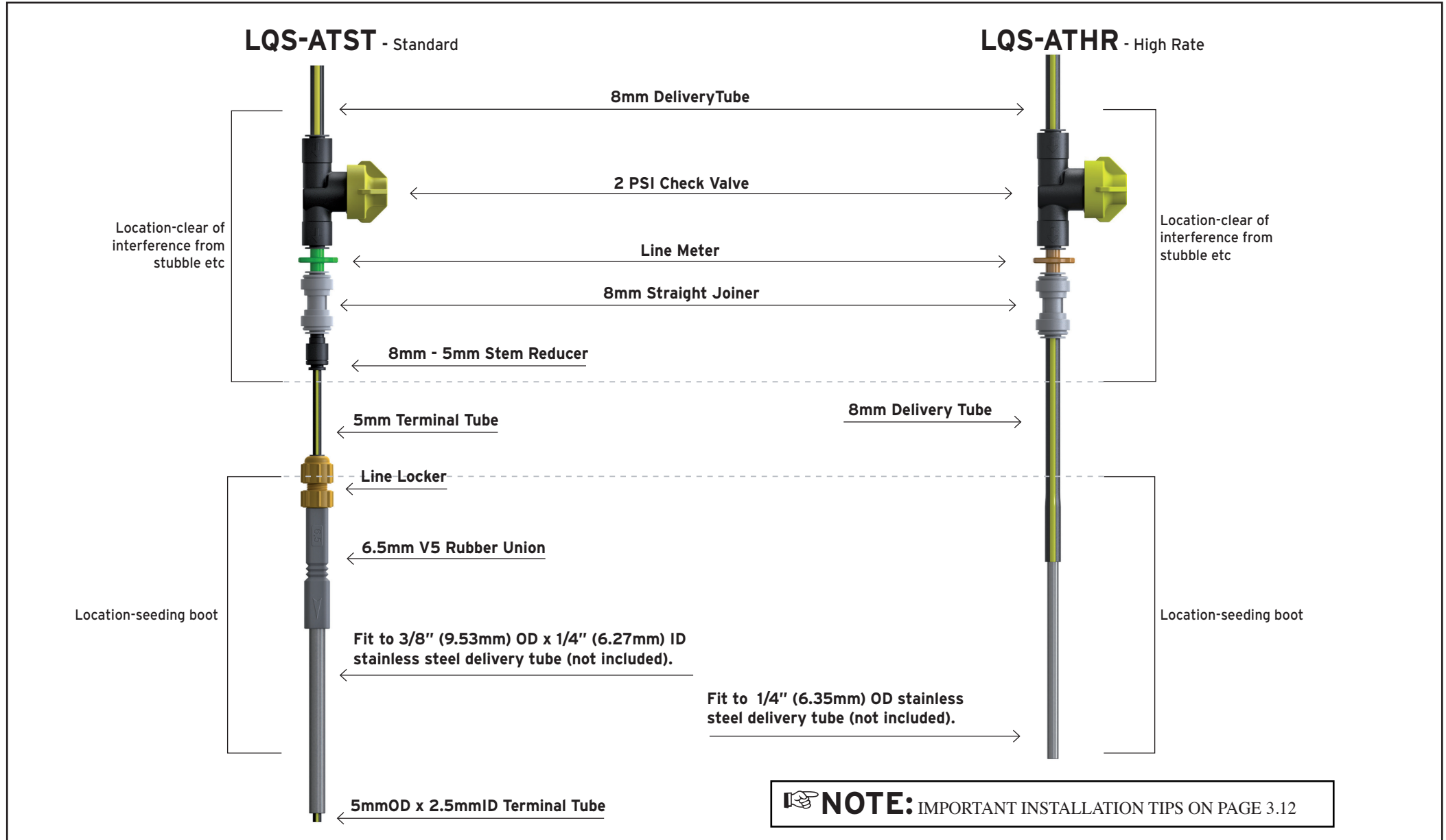
NOTE: IMPORTANT INSTALLATION TIPS ON PAGE 3.12.

NOTE: Each terminal configuration is different. It is important to follow the required assembly closely.

INSTALL TERMINAL ASSEMBLIES

Air Tool Terminal Configurations

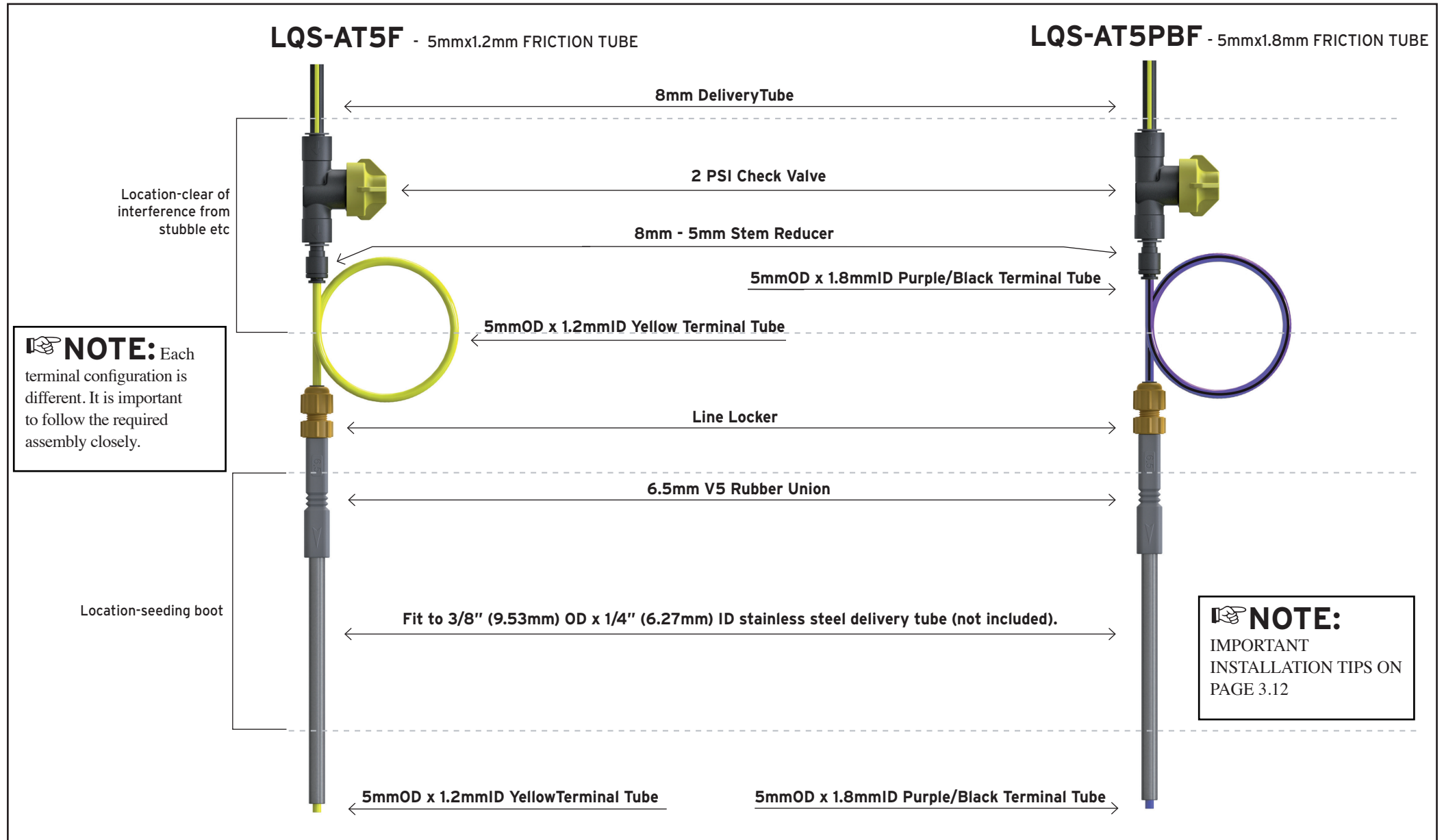
NOTE: Each terminal configuration is different. It is important to follow the required assembly closely.



INSTALL TERMINAL ASSEMBLIES

Air Tool Terminal Configurations

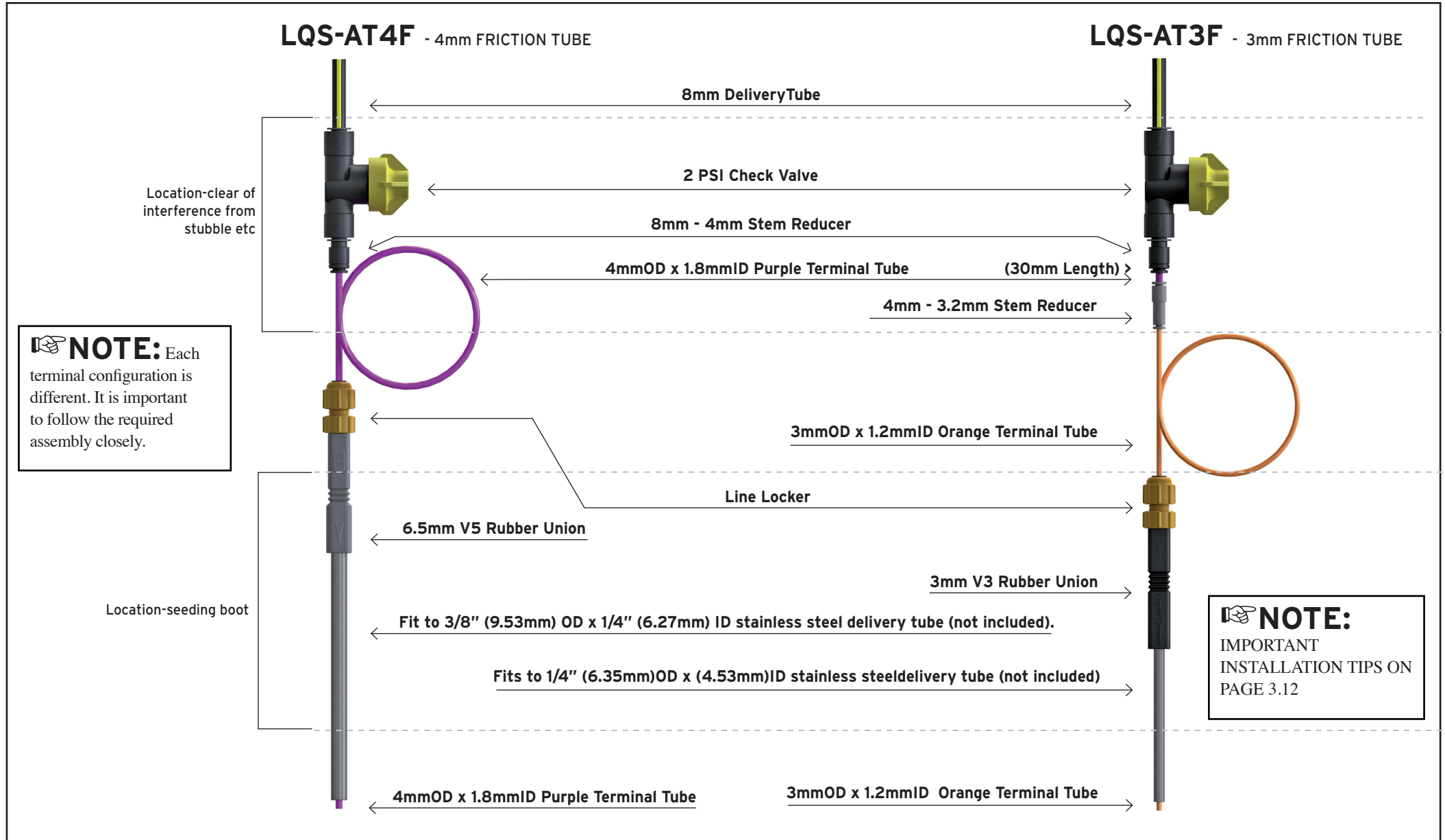
NOTE: TO FIND YOUR TUBE LENGTH DOWNLOAD OUR FLOW DATA FROM:
www.liquidsystems.com.au/technical/flow-charts/



INSTALL TERMINAL ASSEMBLIES

Air Tool Terminal Configurations

NOTE: TO FIND YOUR TUBE LENGTH DOWNLOAD OUR FLOW DATA FROM:
www.liquidsystems.com.au/technical/flow-charts/



INSTALLATION TIPS

Check Valve

- When possible place Check Valve along air hose. Install Check Valves at an appropriate height to minimise dirt and debris. **(Image 1.)**
Build up of dirt on the check valve cap will prevent it from functioning correctly.
- Arrows on check valve must point in direction of flow. **(Image 2.)**
- Use Check Valve Saddle to hold valve firmly in position on air hose. **(Image 2.)**

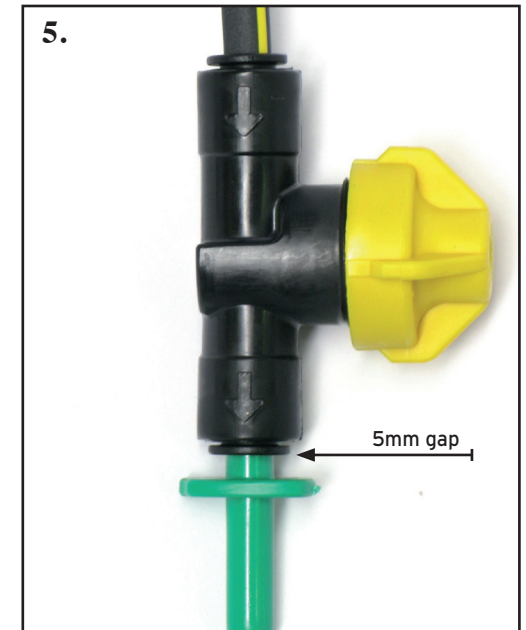
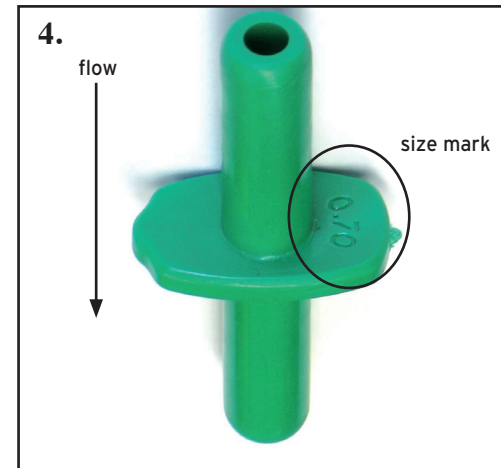
Check Valve Boot

- Install Check Valve Boot by stretching over check valve cap. **(Image 3.)** Ensure boot is fully expanded by pulling boot out sideways to ping it into shape.



Line Meter

- Fit all line meters in the same direction. Line meter size marking should be on the upstream side of the central tab. **(Image 4.)**
- Leave 5mm gap between central tab and check valve. This makes it easier to use separator tool Type 2 to change line meters. **(Image 5.)**



 **NOTE:**
MUST READ ALL TIPS

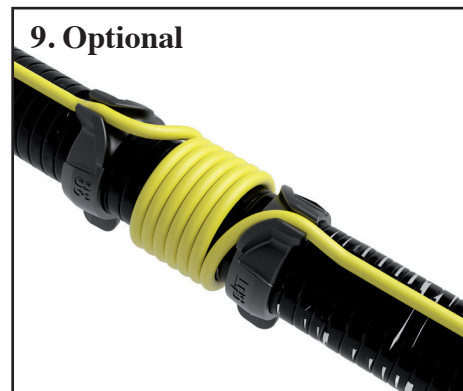
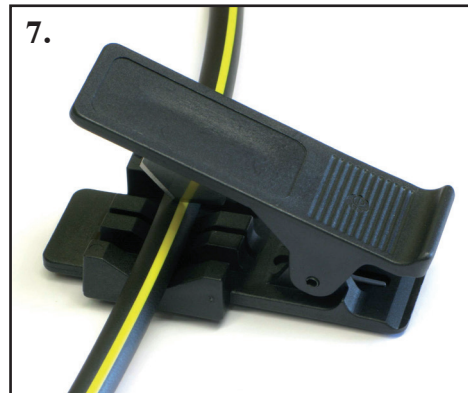
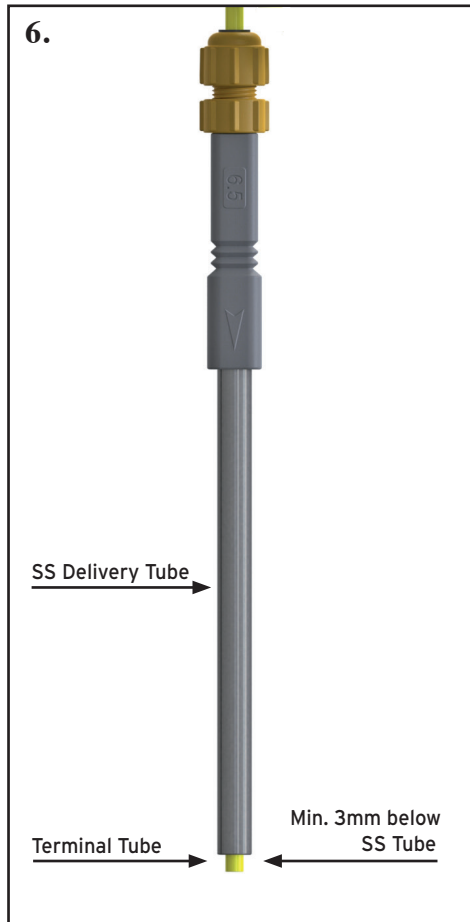
INSTALLATION TIPS

Terminal Tube

- For optimal stream control push polyethylene terminal tube all the way through steel delivery tube. **(Image 6.)**
- Always use tube cutter supplied in Support Kit to cut straight across *delivery tube & terminal tube*. It will ensure clean non distorted tube ends. **(Image 7.)**
- Chamfer the tube end after cutting using the pencil sharpener provided. (This allows easier fitment into push-in fittings.) **(Image 8.)**
- Use wrapping guide to wrap and hold 5mm OD friction tube on air hose for quick tidy placement of terminal tube. **(Image 9.)**

Rubber Unions

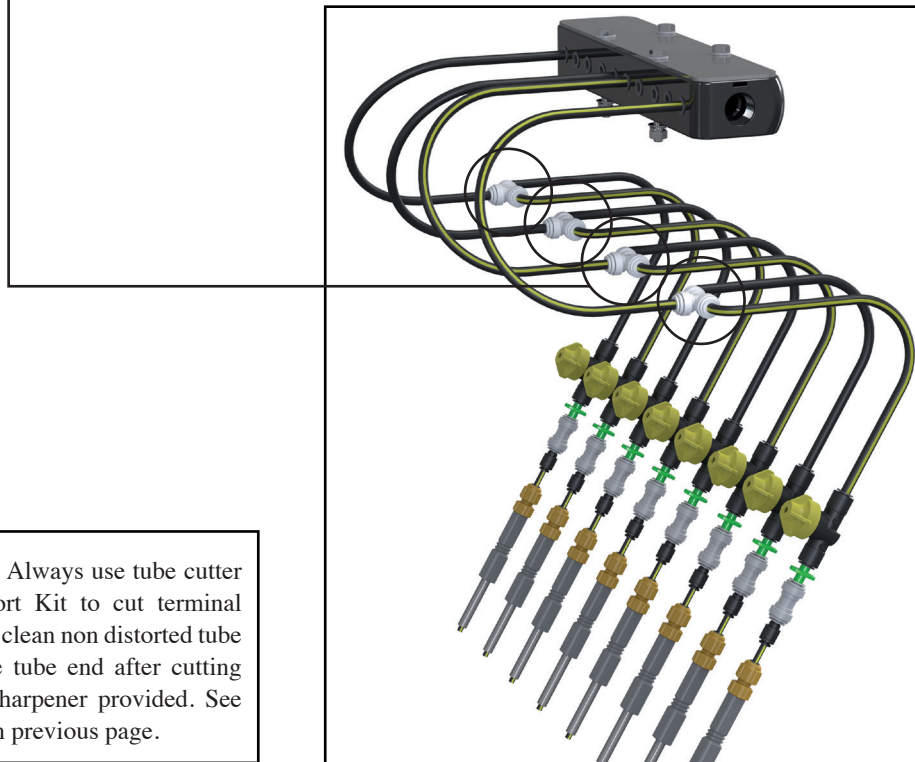
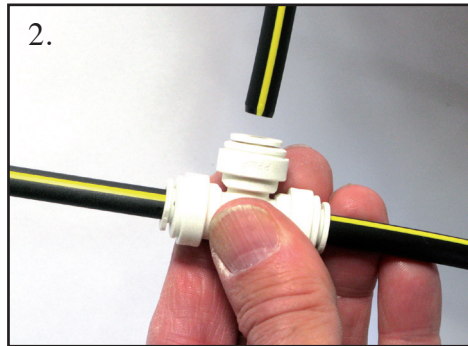
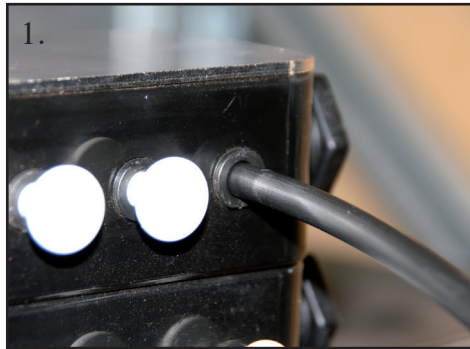
- Place a few drops of detergent in the end of the rubber union before fitting to steel delivery tubes or polyethylene terminal tube. **(Image 10.)**



NOTE: HIGH IMPORTANCE Images 7, 8 & 10.

ROUTE DELIVERY TUBE

Route 8mm delivery tube from Manifolds to Terminal Assemblies. Use 8mm push-in tees (Image 2) to split flow where required with Air Tool assemblies.



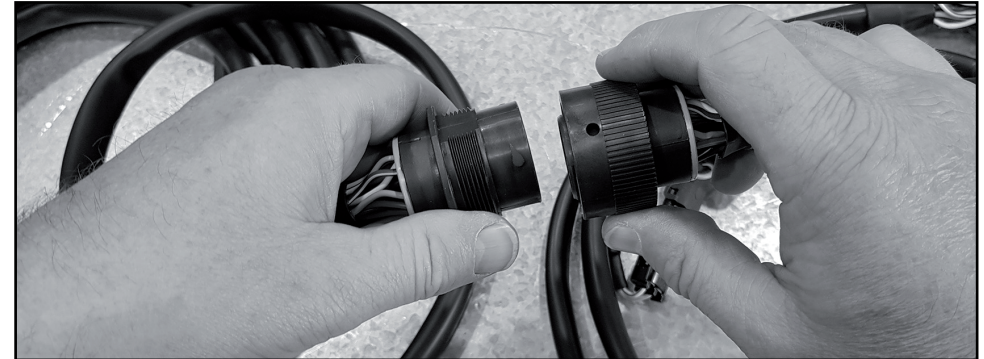
NOTE: Always use tube cutter supplied in Support Kit to cut terminal tube. It will ensure clean non distorted tube ends. Chamfer the tube end after cutting using the pencil sharpener provided. See Installation Tips on previous page.

CONNECT SECTION LOOMS

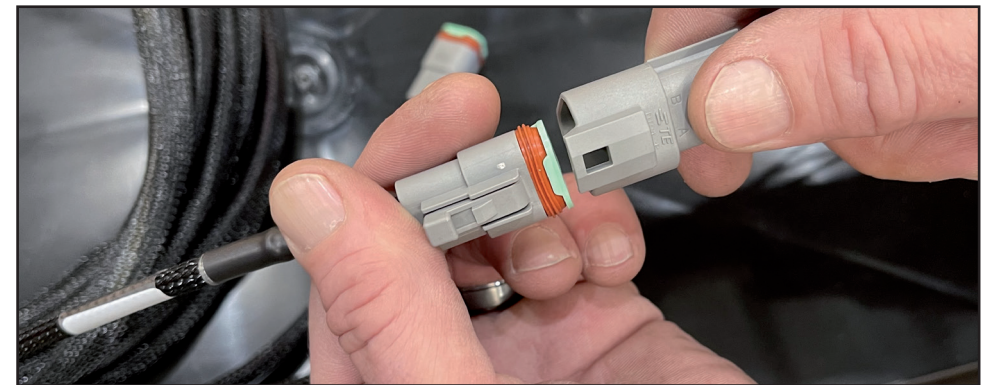
When using a Stacker Section Control configuration, the Section Control module needs to be connected to the controller via a Section Loom and Section Control Adapter Loom. Section Loom Extensions are available if required.

Function	Controller	Order Code	Description	Max Sections
Section Loom	ALL	LL07080	12 Section Loom (6m)	12
		LL07079	6 Section Loom (6m)	6
Section Loom Extension	ALL	LL07014	Section Loom Extension (6m)	12
		LL07021	Section Loom Extension (12m)	12
Section Control Adapter Loom	Topcon Apollo EM24 ECU	TC-1013025-01	Topcon Apollo EM24 Section Adapter	12
	Raven ISOBUS RCM (single product)	LL07019	JDRC2000, Raven RCM Single SC Adapter (47 pin)	12
	Raven ISOBUS RCM (multi-product)	LL07022	JDRC2000, Raven RCM Multi SC Adapter	12
	Greenstar Rate Controller	LL07033	GRC Single SC Adapter (37 pin)	10
	JD Rate Controller 2000 (single product)	LL07019	JDRC2000, Raven RCM Single SC Adapter (47 pin)	12
	JD Rate Controller 2000 (multi-product)	LL07022	JDRC2000, Raven RCM Multi SC Adapter	12
	Trimble Field IQ Rate & Section Control Module	LL07034	Trimble Single SC Adapter	12
	Seed Hawk iCon PM4X ECU	LL07030	Seedhawk Icon SC Adapter	8

1. Connect Section Control Adapter Loom to Controller.
2. Connect Section Looms to main module Adaptor Looms.



3. Connect Section Looms to individual section valve leads.



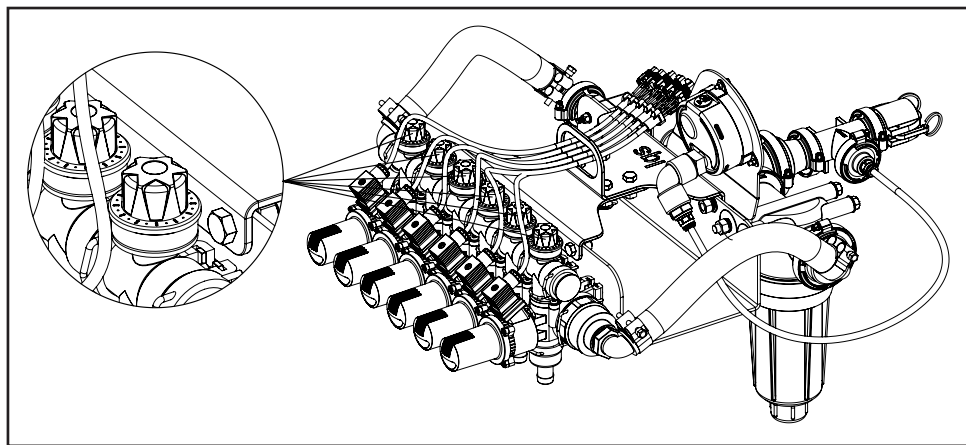
SECTION CONTROL VALVE TUNING

The rate control module is designed to be used in a constant flow configuration. Flow is diverted back to tank when a section valve is switched off. Ensure your control system is configured for this type of application otherwise rates will be incorrect when sections are switched off. (Constant Flow checkbox in Greenstar)

For correct Section Control functionality, the Section Control valves must be tuned. Tuning ensures that the flow of liquid through the valve is the same regardless of whether it is open or closed.

Tune the valves using the following procedure:

1. Connect Rate Control Module to Section Control Module.
2. Fill the product tank with water.
3. Use your control system to run water through the system simulating a typical operating speed and application rate starting with all sections open. **Record the pressure showing on the Section Control Module Gauge.**



4. For each section do the following:
 - a. Shut-off the section from the control system.
 - b. If system pressure goes up, adjust the corresponding Section Control valve by turning the dial anti-clockwise until the pressure reaches the recorded system pressure.
 - c. Similarly, if the pressure goes down, adjust the corresponding Section Control valve by turning the dial clockwise until the pressure reaches the recorded system pressure.

If not using constant flow configuration, set tuning dial to maximum opening setting (11) and plug return line outlet on Section Control Module.

NOTE: See “How to Tune” Video: <https://youtu.be/BHLaWZfpEHQ>

CHECK DISTRIBUTION SYSTEM OUTLETS

Prior to using the system, perform a check using clean water to ensure all outlets are working.

1. Fill the product tank with clean water.
2. Switch Source Selector Valve to “Product” and Function Selector Valve to “Operate” on the front of the module.
3. Use control system to perform a static test of liquid application. (E.g. use Nozzle Flow Test with Greenstar) Start pump just prior to initiating test.
4. While system is running check all outlets are running and clear any blockages.
5. Re-test until all outlets have been checked and cleared.

WARNING: Failure to tune section valves correctly will result in inaccurate application of liquid when using section control.

MONITORING

Monitor application through your control system screen, paying attention to actual rate applied and system pressure.

Things to look out for are:

- Sudden changes in pressure or actual rate applied.
- Low tank level.
- Gradual increases in pressure when all other operational parameters remain the same may indicate outlets becoming blocked.
- Changes in pressure when sections are switched off.

FLUSH SYSTEM & CHECK OUTLETS

- Frequency:
- Prior to initial use
 - When in use, once daily.
 - When the system is to be shut down for an extended period.

More frequent flushing may be required depending on products being applied and operating conditions.

Use your Liquid Systems Rate Control Module to flush the system with clean water. Refer to your Rate Control Module manual for details. For optimal results flush system at a pressure of approx 6 bar.

Alternatively flush system with clean water from an external water source.

! CAUTION: Ensure all sections are switched on before flushing otherwise water will flow back into the product tank.

CHECK & CLEAN INDUCTION FILTER

Frequency - twice daily when system is in operation.

1. Unscrew filter bowl from body.
2. Inspect and clean/rinse screen. Replace screen if damaged.
4. Check seating of O ring.
5. Replace screen and screw bowl back into place.
6. Apply Vaseline to thread to improve seal and make task easier.

Refer to the spare parts section of this manual for replacement parts.

! WARNING: Liquid will escape from the filter during this process. Ensure suitable protective gloves and clothing are worn when performing this task.



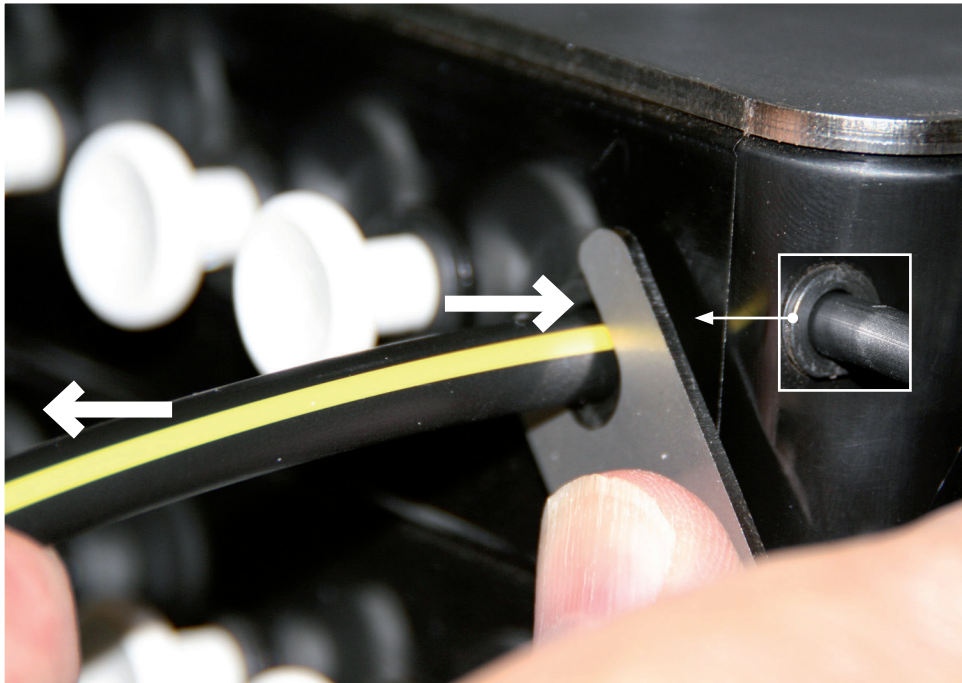
EXTRACTING TERMINAL AND DELIVERY TUBE

The best way to extract tubing from push-in fittings and check valves is to use the extraction tool (Type 1) provided in the support kit.



(Use the Compression Tool to depress the Locking Collets on the STACKER Manifold quick release insert cartridges when inserting or extracting the 8.0mm PE tubing.)

Use the extraction tool to depress the collet by pushing forward. Pull the tube back while the collet is still depressed. See image below. Inset shows collet.

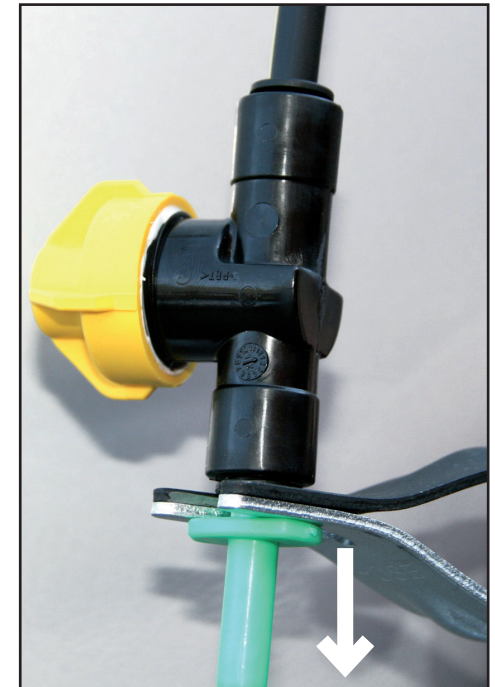
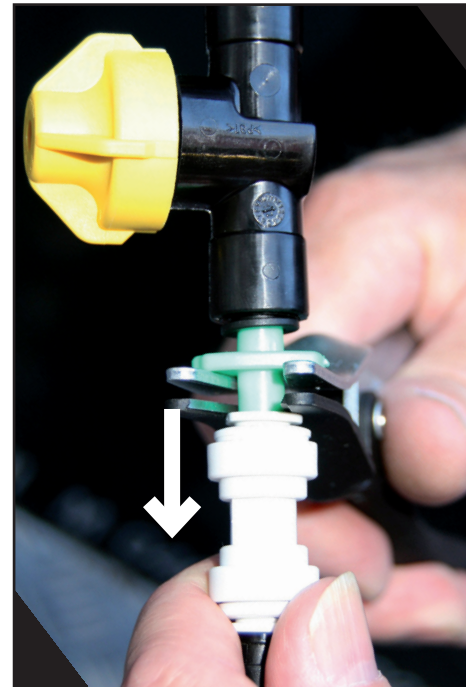


EXTRACTING LINE METERS

When checking line meters, the best way to extract them from push-in fittings and check valves is to use the extraction tool (Type 2) provided in the support kit.



Insert tool between line meter tab and push-in fitting or check valve. Squeeze handles to depress the collet of the push-in fitting and release line meter.



⚠ WARNING: Failing to depress collet when removing tube or line meter will damage the manifold or fitting.

PROBLEM	POSSIBLE CAUSE	RESOLUTION
Pressure changes when sections switch on or off.	Section valves have not been tuned.	Tune section valves as per instructions on page 4.1.
System pressure is too low. i.e. < 0.5bar (< 7psi)	Output rate is too low to produce reasonable pressure with the line meters in use.	Replace line meters with a smaller size. Increase operating speed. Dilute liquid product and apply at a higher rate.
	Flow meter calibration may be incorrect.	Recalibrate flow meter of rate control system.
Sudden drop in system pressure.	Some part of the Stacker system has been damaged and is leaking	Stop product application immediately. Check for leaks while doing a system flush.
System pressure is too high.	Outlets have become blocked.	Perform system flush and check for blocked outlets.
	Line meter orifice size is too small for the rates being applied.	Replace installed line meters with line meters with a larger orifice size.
	Flow meter calibration may be incorrect.	Recalibrate flow meter of rate control system.
	Induction filter has become blocked and needs cleaning.	Unscrew body of induction filter, clean filter screen and replace.
Liquid continues to dribble out of some outlets when liquid application is switched off.	Check valves aren't functioning correctly.	Remove cap on check valve. Clean cap thoroughly to remove any dirt build up. Check valve diaphragm is intact and replace if damaged. If valve spring is not functioning correctly, replace cap.

PART	PART NO.	DESCRIPTION
	BJ-FC100	1" Flange Clamp
	BJ-M100G	1" EPDM Gasket ('O' ring)
	JG-PPM0208W	Equal Tee 8mm
	JG-PPM0408W	Equal Joiner 8mm
	JG-PPM0808W	Plug 8mm
	JG-PM060804E	Stem Reducer OD 8mm-OD 4.0mm
	JG-PM060805E	Stem Reducer OD 8mm-OD 5.0mm
	JG-PM060806E	Stem Reducer OD 8mm-OD 6.0mm
	JG-PM0610080E	Stem Reducer OD 10mm-OD 8.0mm
	JG-5-16SCV	5/16" Single Check Valve
	JG-PM1210E	10mm Bulkhead Connector

PART	PART NO.	DESCRIPTION
	JG-PM2308E	8mm Two Way Divider
	JG-PM2310E	10mm Two Way Divider
	JG-PPMSV040808W	8mm Shut-off Valve
	LL08001	In Line Check Valve
	L08050	Check Valve Elastomer Boot
	TJ-21950-2-NYB	TeeJet 2 PSI End Cap
	TJ-CP21953-VI	Diaph. Viton 21950
	L08109	Air Hose 38-39mmOD wrapping guide - fit 5mmOD tube
	L08112	Adaptor Sleeve -fit Air Hose 31-32/39mmOD
	LL08311	Check Valve Saddle - fit Air Hose 38-39mmOD

PART	PART NO.	DESCRIPTION
	LQ-LM055RED	0.55mm Red Line Meter
	LQ-LM070GRN	0.70mm Green Line Meter
	LQ-LM085BLU	0.85mm Blue Line Meter
	LQ-LM100PUR	1.0mm Purple Line Meter
	LQ-LM110ORN	1.1mm Orange Line Meter
	LQ-LM120YEL	1.2mm Yellow Line Meter
	LQ-LM130WHI	1.3mm White Line Meter
	LQ-LM150PNK	1.5mm Pink Line Meter
	LQ-LM170BLK	1.7mm Black Line Meter
	LQ-LM250GRY	2.5mm Grey Line Meter
	LL08212	Line Locker

PART	PART NO.	DESCRIPTION
	L08077	6.5mm V5 Rubber Union to suit 9.53mm (3/8") SS Tube <i>SS 8.75 ID -- LL 8.9 ID</i>
	L08015	6.35mm (1/4") V3 Rubber Union to suit 6.35mm (1/4") SS Tube <i>SS 6.2 ID -- LL 8.9 ID</i>
	L08016	5mm V4 Rubber Union to suit 9.53mm (3/8") SS Tube <i>SS 8.75 ID -- FT 5.2 ID</i>
	JG-TSNIP	Tube Cutting Tool
	CF-70843	Line Meter Pliers
	LQ-COM-0013-SM	Separator (Compression) Tool
	TJ-AAB126ML-F75-80	F75-80 Flange Strainer BSPT 80 Mesh Filter Screen
	TJ-CP15941-4-SSPP	80 Mesh Filter Screen for AA126 Line Strainer
	TJ-CP15941-3-SSPP	50 Mesh Filter Screen for AA126 Line Strainer
	TJ-CP15941-5-SSPP	100 Mesh Filter Screen for AA126 Line Strainer

PART	PART NO.	DESCRIPTION
	LL08003	Manifold
	L08005	Stainless Steel Manifold Lid
	L08066	Manifold Spacer Plate 12mm
	L08071	Manifold Fitting Gasket Seal
	LL08201	3/4" Barb Fitting
	LL08202	3/4" Plug Fitting
	LL08203	3/4" Nipple Fitting
	LQ-LIQ21	3/4" BSP Plug
	L08023	Manifold Mounting Bracket
	L08025	Manifold Landing Plate
	L08029	Manifold Adaptor Bracket

PART	PART NO.	DESCRIPTION
	LL08080	Stacker Pressure Gauge Assembly
	CF-M12X250 304 SS AT	M12X250 304 SS All Thread Stud
	BL-204402-08100 BL-204402-08200	Delivery Tube 8mm OD x 100m Black/Yellow tube Delivery Tube 8mm OD x 200m Black/Yellow tube
	BL-204390-200R	Terminal Tube 5mm x 2.5mm LLDPE Black/Yell
	BL-204394-200R	Terminal Tube 5mm x 1.2mm LLDPE Yellow
	BL-204395-200R	Terminal Tube 5mm x 1.8mm LLDPE Purple/Black
	BL-204352-200R	Terminal Tube 4mm x 1.8mm LLDPE Purple
	BL-204385-03200R	Terminal Tube 3mm x 1.2mm LLDPE Orange
	PR-T006.3BASA	6.35 x 0.91 SS Seamless Tube
	PR-T009.5DASA	9.53 x 1.63 SS Seamless Tube

PART	PART NO.	DESCRIPTION
	LL03180	Section Valve Motor Assembly
	TJ-430EC-3-D	TeeJet 430 3 way manifold section valve
	LL07069	Mini Din with Deutsch SC (Must be sold with TJ-430EC-3-D)
	AA-LS-DT04-3PKIT	Deutsch connector for section valve
	LL07080	9-12 Section Loom (6m)
	LL07082	8 Section Loom (6m)
	LL07079	2-6 Section Loom (6m)
	LL07014	Section Loom Extension (6m)

PART	PART NO.	DESCRIPTION
	LL07021	Section Loom Extension (12m)
	LL07019	JDRC2000, Raven RCM Single SC Adaptor
	LL07022	JDRC2000, Raven RCM Multi SC Adaptor
	LL07033	GRC Single SC Adapter (37 pin)
	LL07034	Trimble Single SC Adapter
	LL07030	Seedhawk Icon SC Adapter
	TC-1013025-01	Topcon Apollo EM24 Section Adapter

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