EASY Averaging Beam

Installation Manual

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EASY Averaging Beam Installation Manual

Content and structure

This Installation Manual has been developed for operators to provide the necessary information to install the Mini-Line® EASY Averaging Beam, so that it can be used together with the Mini-Line® Grade and Slope Control System.

Safe use

Before starting to use the EASY Averaging Beam, the operator should ensure that it is installed as described in this manual. The manual for the selected Mini-Line® controller should also be read through completely to ensure correct and safe operation of the Mini-Line® Grade and Slope Control System together with the EASY Averaging Beam. Dangerous situations that can arise when using the EASY Averaging Beam are summarised in the Important Safety Information section on p. 7.

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Information about the installation guide

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Symbol overview

This installation manual uses a range of symbols and warning notifications to make the operator aware of important safety measures and information regarding operation.

The following symbols are used in this manual:

Warning!
Indicates important information the operator must be aware of to avoid dangerous situations that can result in death or serious personal injury

Caution!
Indicates important information the operator must be aware of to avoid dangerous situations which can result in material damages

Tip
Indicates information regarding efficient and failure-free operation of the Mini-Line® EASY Averaging Beam

Step-by-step instructions
Indicates a step-by-step instruction, where a particular order of actions is required or recommended

Setup

Appendix

Important Safety Information

The installation of the EASY Averaging Beam must never prevent the free movement of the tow arm and screed

If welding on the paver or EASY Averaging Beam or Mountings, remove all electrical equipment and disconnect the negative terminal of battery of the paver. Place the negative electrode close to the welding point

Make sure the screed rests solidly on the ground before performing work on the system

Read and understand the manual for the controller used

Position grade sensors within their working range and so that there is at least:

- 50 cm / 20" between two sensors
- 50cm / 20" between a sensor and a heat source, e.g. exhaust or joint heater
- 25cm / 10" between a sensor and reflecting surfaces

When the screed is lifted, the Sensor Beams must always be folded, so that the sensors do not make contact with the ground

The greater the distance between the sensors, the greater the effect of the EASY Averaging Beam

Remove all equipment, including the Sensor Beams before cleaning the asphalt paver

Introduction

Introduction to EASY Averaging Beam

The EASY Averaging Beam in the Mini-Line® series is designed to ensure optimum results for every paving job. The EASY Averaging Beam must be used with a Mini-Line® Grade and Slope Control System with four Mini-Line® grade sensors, each supplying measurement results to a Mini-Line® controller. The Mini-Line® controller produces an average of the four measurements, so that a smoothening effect is achieved.

The design of the EASY Averaging Beam with the use of four sensors produces reliable evening out in both large and small paving jobs, as opposed to beams with fewer sensors, where the distance between the sensors is often too great when the beam is used to its full extent on larger pavers.

The EASY Averaging Beam is a robust construction, yet at the same time compact, as well as easy to install.

The two-part design of the EASY Averaging Beam makes it unique and particularly easy to mount and use. The two Sensor Beams can be disassembled and the telescopic arm can be pushed in, so that the complete EASY Averaging Beam can easily be packed up in the luggage compartment of a normal car. This makes it easy to transport the beam from one paving job to the next, and the beam can easily be stored on site in case of larger jobs, so that it is always accessible.

At the same time, the two-part design makes it easy to access the paver, while asphalt is being applied, without having to step over the averaging beam, thereby reducing the risks associated with such dangerous situations. The two-part design also ensures the user-friendliness of the beam on both small and large pavers.

The EASY Averaging Beam has internal wiring and Snap Connectors for the sensors, reducing the set-up time for sensors and controller to a minimum, as well as protecting the cabling during paving.

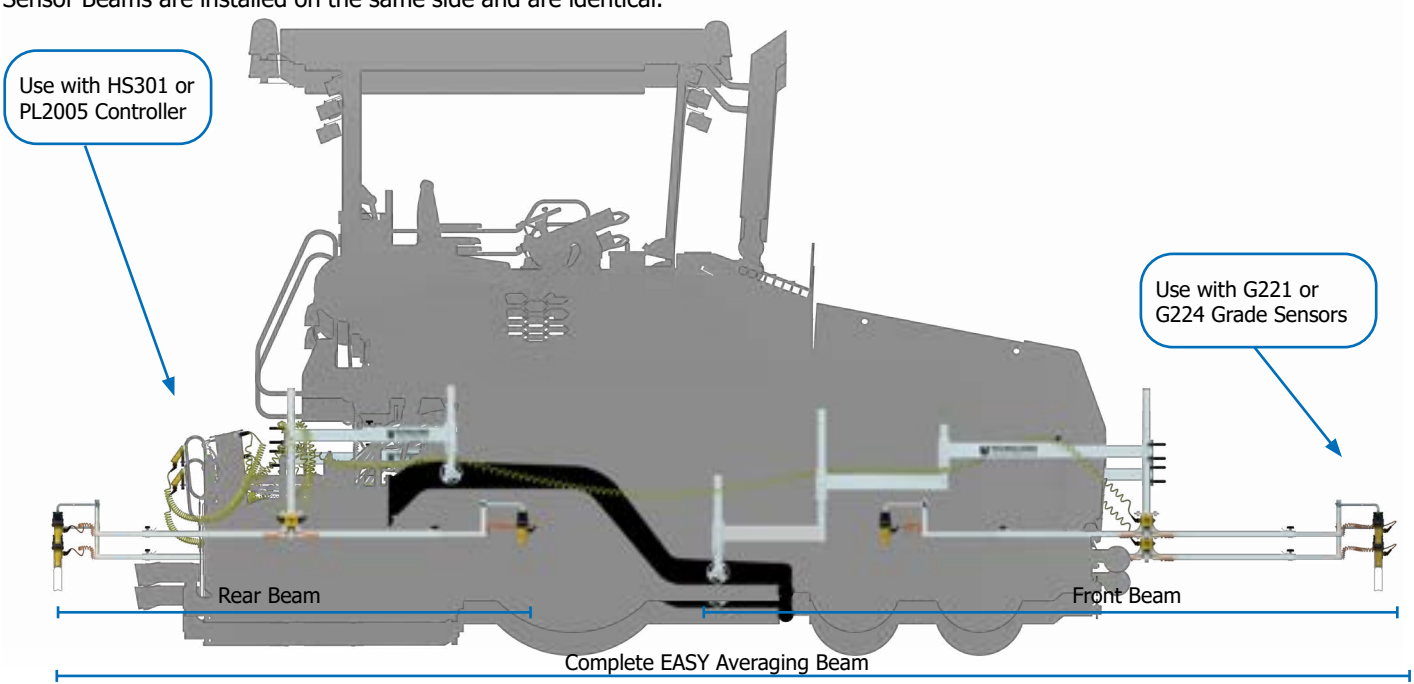
Finally, the EASY Averaging Beam provides the operator with total flexibility during the paving job, as the beam can either be used as a complete beam with four sensors or be used with fewer sensors as required, by connecting and disconnecting sensors during the paving process. Connected sensors are averaged automatically when connected.

Overview

Overview of the EASY Averaging Beam

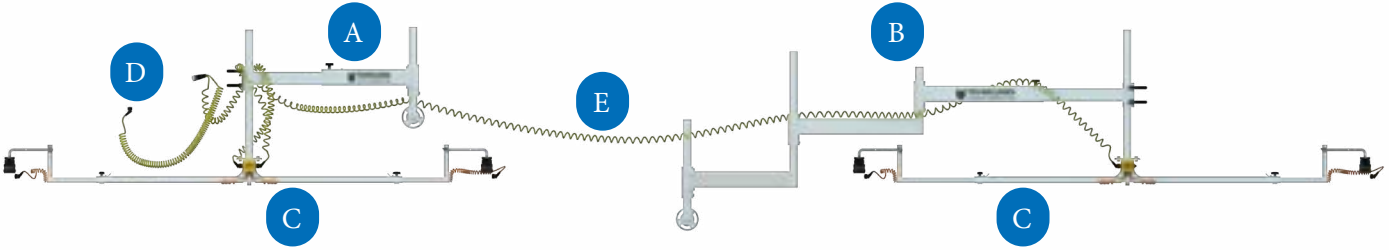
A complete EASY Averaging Beam for four sensors comprises two Sensor Beams, each of which can hold two sensors. Both Sensor Beams are installed on the same side and are identical.

Sensor Beams are mounted with Front and Rear Beam Mountings that can be bolted or clamped on to the tow arm.



Parts

Main Parts and Part Numbers



S-50311 EASY Averaging Beam

Ref.	p/n	Pcs	Description
A	SP-50787	1	EASY Rear Beam Mounting
B	SP-50790	1	EASY Front Beam Mounting
C	S-50315	2	Sensor Beams with Snap Connectors
D	S-50433	1	V-Cable, 2.2m+4.0m / 7.2 ft+13.1 ft
E	S-50280/6.0	1	I-Cable, 6m / 19.7 ft

Accessories (not in picture)

Ref.	p/n	Description
-	SP-40125	Clamping Plates Kit (Short, 2 pcs w.nuts)
-	SP-40126	Clamping Plates Kit (Long, 2 pcs w. nuts)

Components

A SP-50787 Rear Beam Mounting

Tow Arm Bracket incl. support ring

Telescopic Arm

Mounting Tube

3 x Bolt with Shim, M16x30,
A2 Stainless

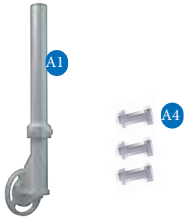
Box 1

Components

B SP-50790 Front Beam Mounting

Tow Arm Bracket incl. support ring

3 x Bolt with Shim, M16x30, A2 Stainless



Telescopic Arm, incl. inner ring

Mounting Tube

Box 2

Long Swing Arm

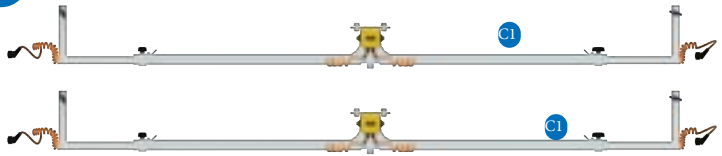
Short Swing Arm

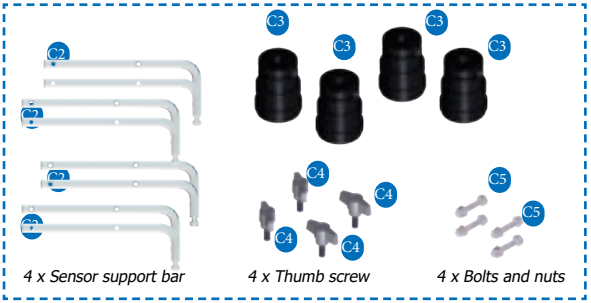
2 x Support Ring for Swing Arms

Box 3

Components

C 2 x S-50315 Sensor Beam





Box 4

D S-50433 V-cable

E S-50280/6,0 I-cable

Box 5

Tools Required (not included)

EU

19 mm

24 mm

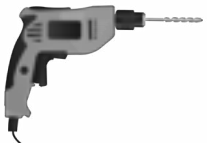
Drilling Machine with 14 mm drill

Diestock tool, 16 mm

4 mm

US

0.7 - 1.5”



Drilling Machine with 7/32” drill

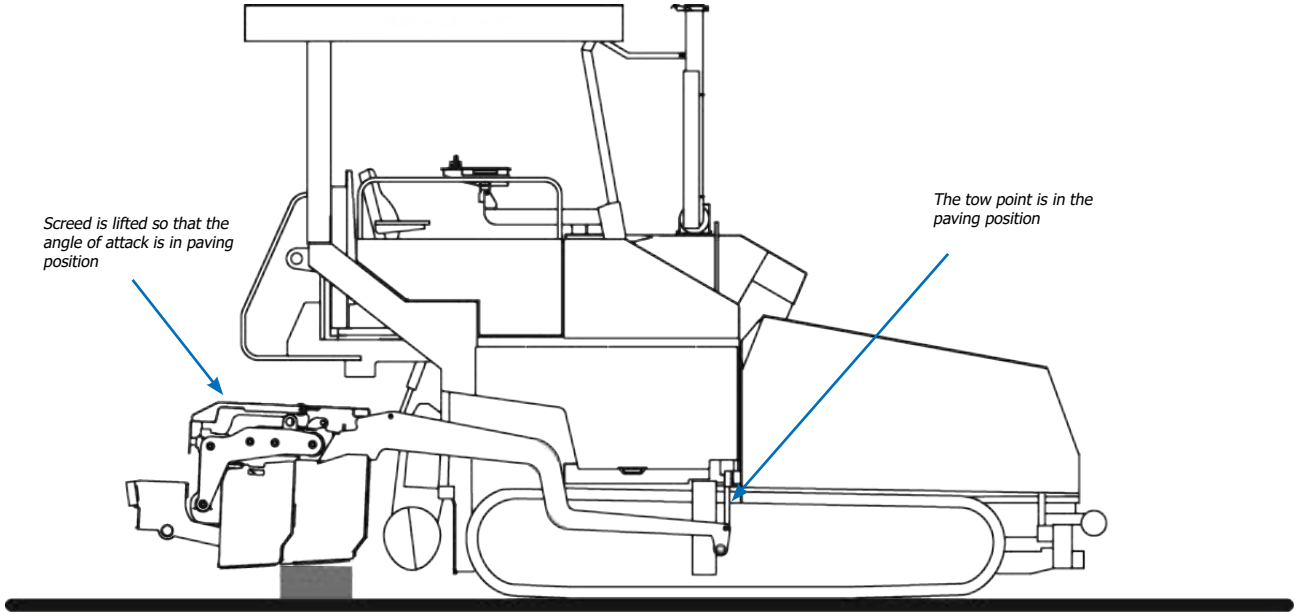
Diestock tool, 5/8”

3/8 - 16 UNC

Installation

Getting Ready for Installation of the EASY Averaging Beam

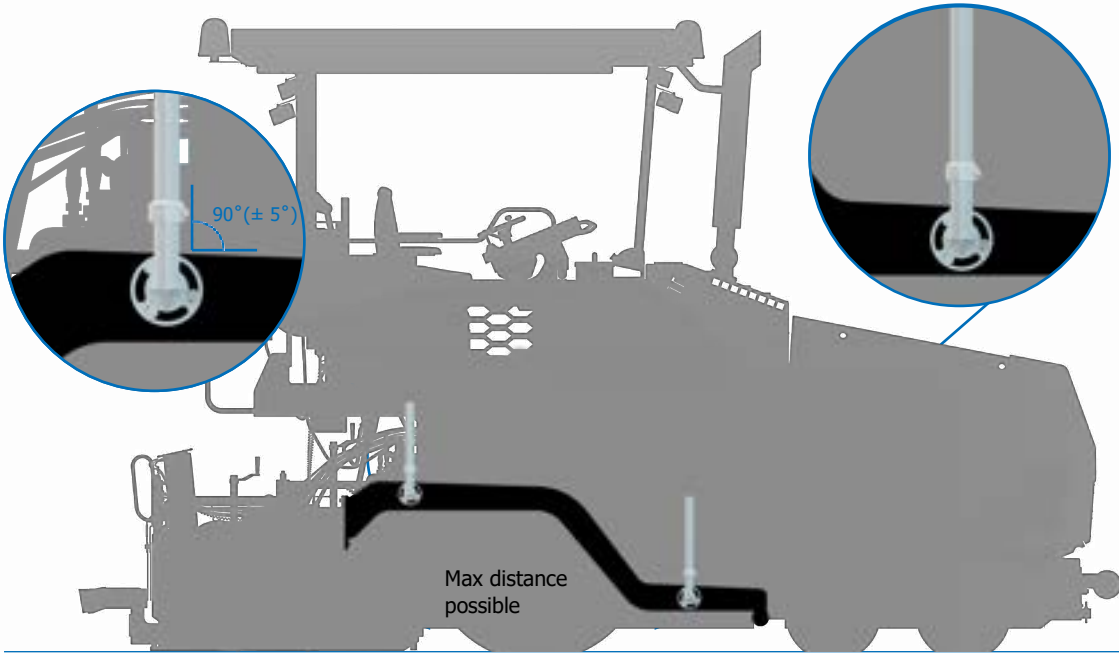
Position the tow point as when paving, lifting the screed to a typical paving height.



Installation of Tow Arm Brackets with bolts (standard)

1 Mount the Tow Arm Brackets on the tow arm with the accompanying bolts.

- Position the Tow Arm Brackets as far a part as possible without preventing the free movement of the tow arm or screed
- Position Tow Arm Brackets as vertical as possible

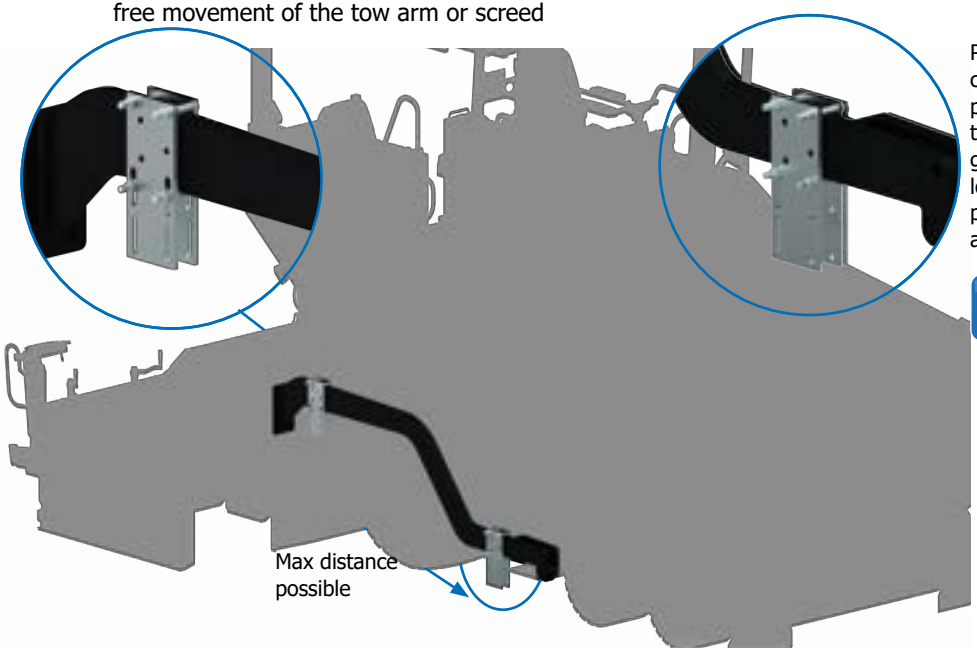


Adjust the Tow Arm Bracket rightward or leftward to achieve a position as perpendicular as possible.

Installation of Tow Arm Brackets with Clamping Plates (sold separately)

1 To prevent drilling holes in the tow arm, the Tow Arm Brackets can be mounted with a Clamping Plates Kit (SP-40126 (Long) or SP-40125 (Short) - sold separately).

- Mount the Clamping Plates on the tow arm with the accompanying bolts
- Position the two sets of Clamping Plates as far apart as possible without preventing the free movement of the tow arm or screed



Position the bolts as close to the tow arm as possible, and ensure that the plates do not touch the ground when the screed is lowered. You can flip the plates any way required to achieve this.

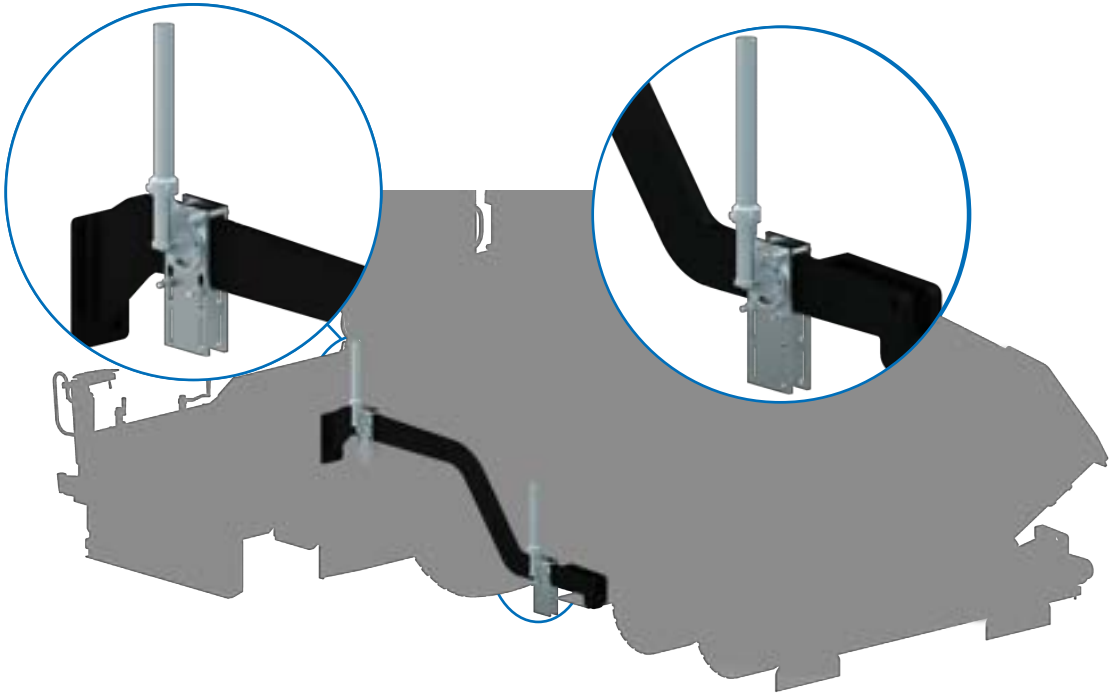
Clamping Plates are available in two different sizes. Measure the height of the Tow Arm, where the Clamping Plates will be mounted:

- Tow Arm height < 22.6 cm/8,9” Use Clamping Plates Short
- Tow Arm height > 22.6 cm/8,9” Use Clamping Plates Long

1b

Mount the Tow Arm Brackets on the Clamping Plates with the accompanying bolts.

- Position the Tow Arm Brackets as vertical as possible



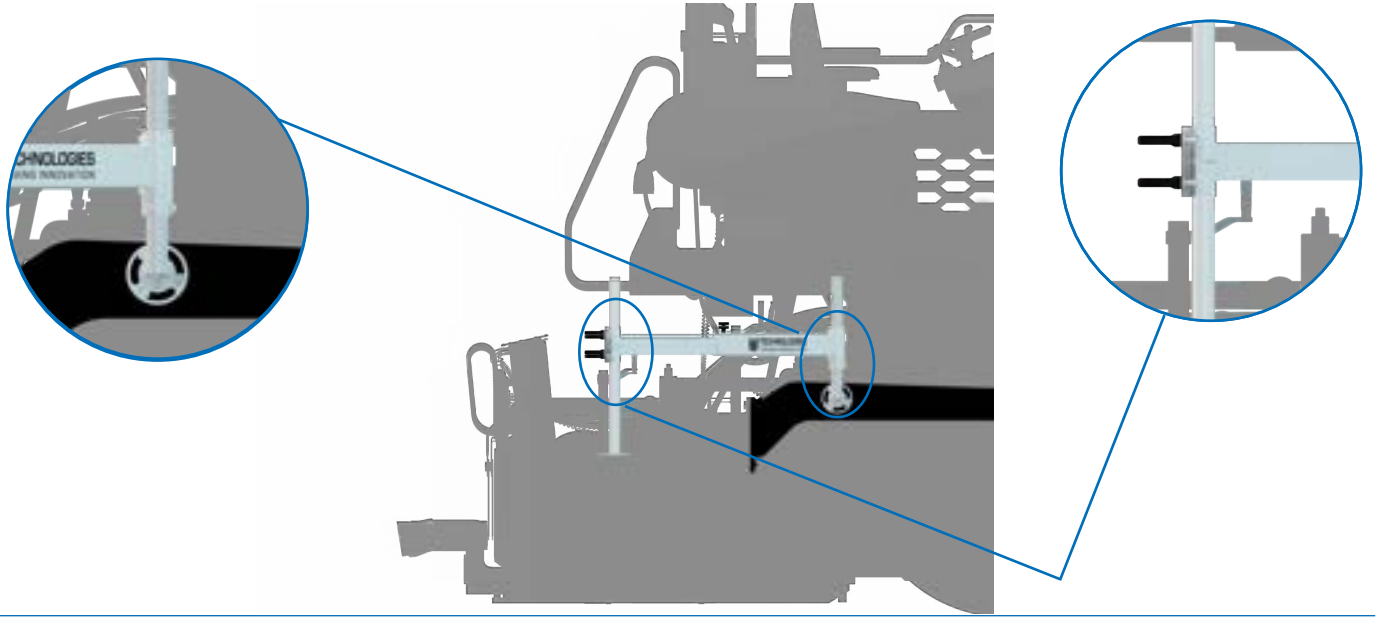
Adjust the Tow Arm Bracket rightward or leftward to achieve a position as perpendicular as possible.

Installation of Rear Beam Mounting

19 mm or 0.7 - 1.5”

2 Place the Telescopic Arm (from Box 1, without the inner ring) on the rear Tow Arm Bracket, so that it rests on the support ring and secure the bolts.

3 Insert the Mounting Tube into the Telescopic Arm and tighten the handles.



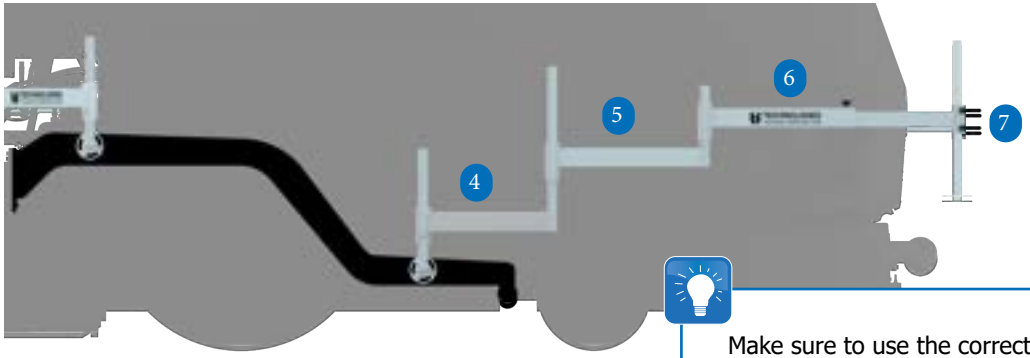
Installation of Front Beam Mounting

4 Place the Long Swing Arm (from Box 3) on the Tow Arm Bracket, so that it rests on the support ring and secure the bolts.

5 Place the Short Swing Arm (from Box 3) on the Long Swing arm and secure the bolts.

6 Place the Telescopic Arm (from Box 2 with inner ring) on the Short Swing Arm, and secure the bolts.

7 Insert the Mounting Tube into the Telescopic Arm and tighten the handles.



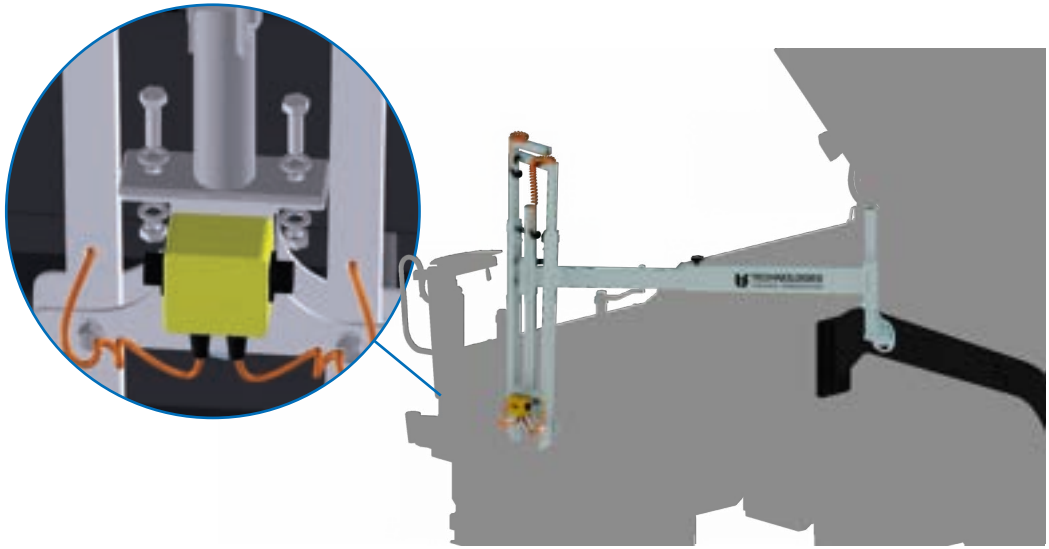
Make sure to use the correct Telescopic Arm with the inner ring for the Front Beam Mounting. Inner ring must be mounted in the Telescopic Arm, for it to fit on the Front Beam Mounting

Installation of Sensor Beams

19 mm or

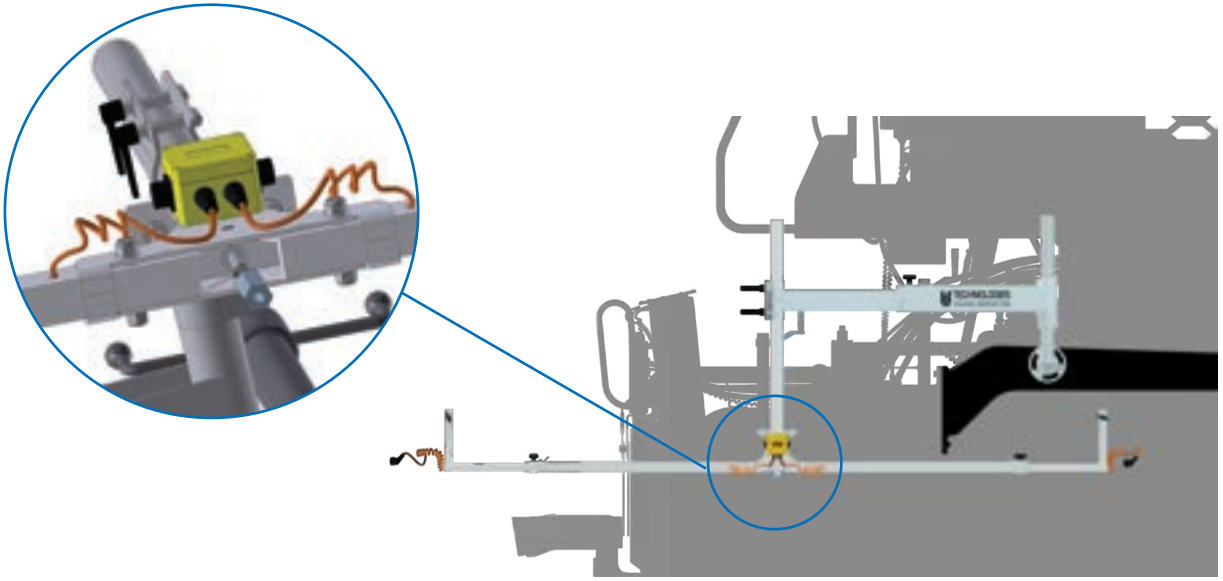
0.7 - 1.5”

8 Secure the bracket on top of the Sensor Beam (from Box 4) to the flange of Mounting Tube with the accompanying bolts and nuts (from Box 4). This must be done while the Sensor Beam is still folded.



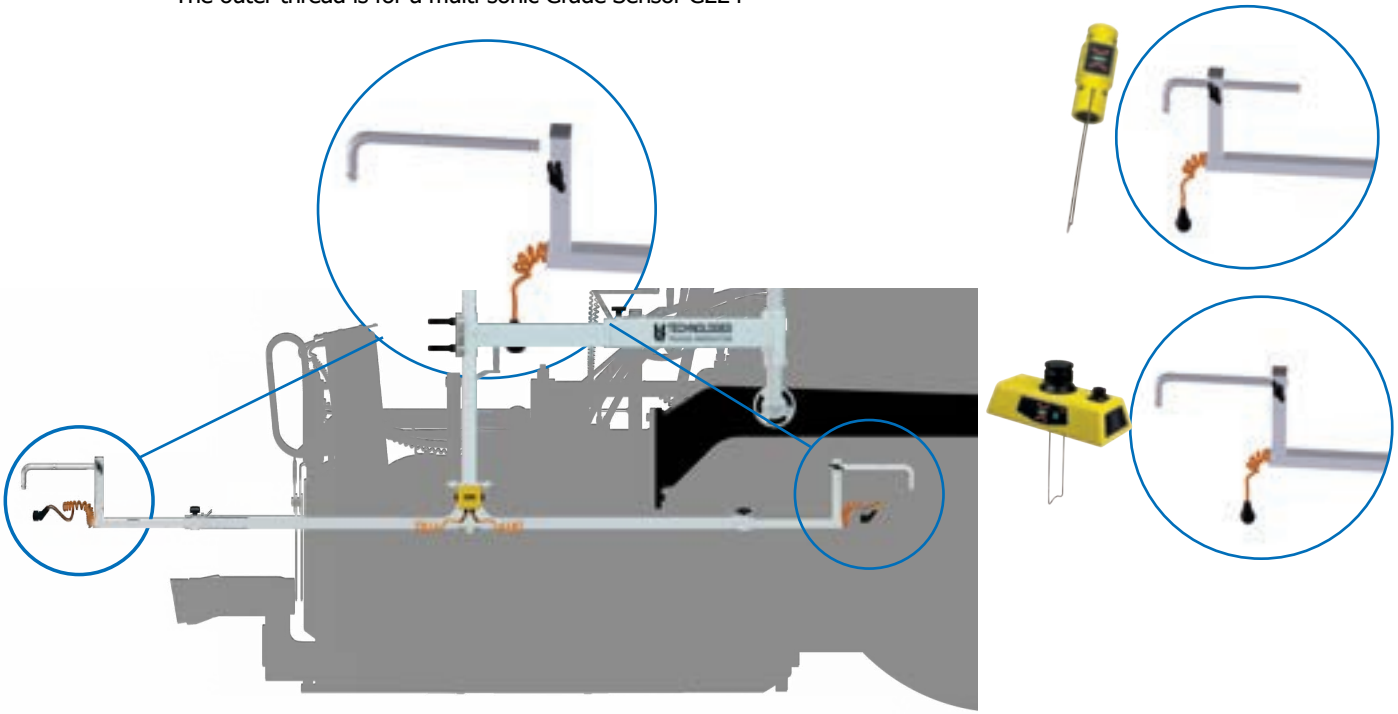
9 Unscrew the retaining nut in the bottom of the Sensor Beam and unfold the Sensor Beam by pulling the arms. Tighten the retaining nut, so that the Sensor Beam is held in the extended position.

19 mm or 0.7 - 1.5”



10 Insert a sensor support bar in the hole on the vertical part of the sensor arm, and tighten the accompanying thumb screw (from Box 4).

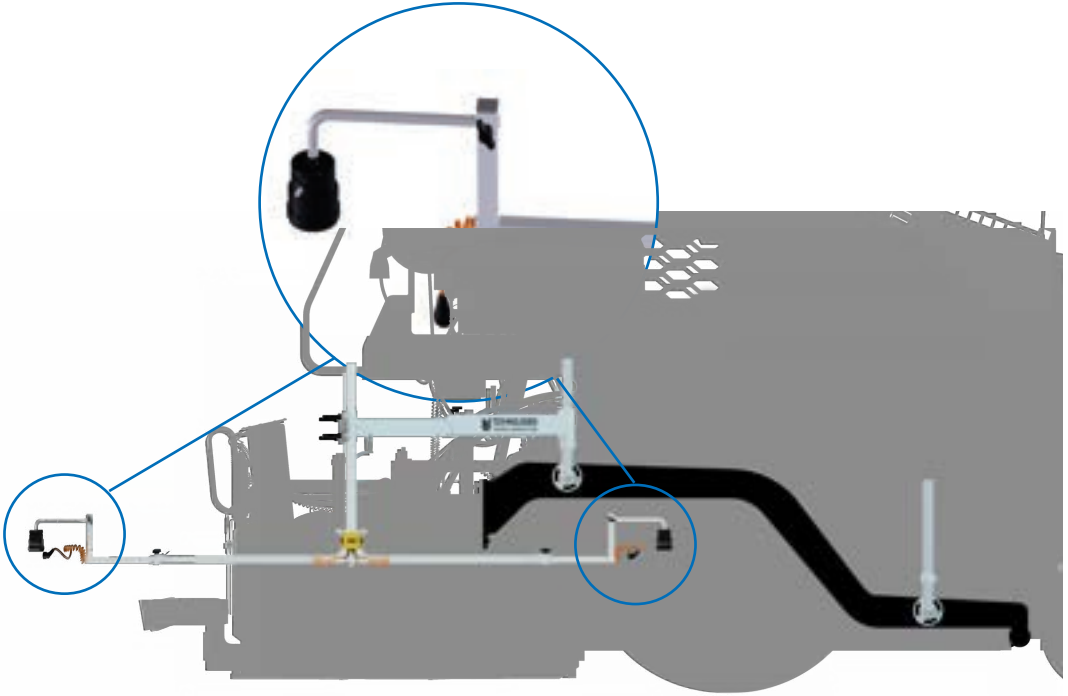
- The inner thread is for a single-sonic Grade Sensor G221
- The outer thread is for a multi-sonic Grade Sensor G224



11

Insert the sensor support bar in the Snap Connector and tighten the screw in the Snap Connector.

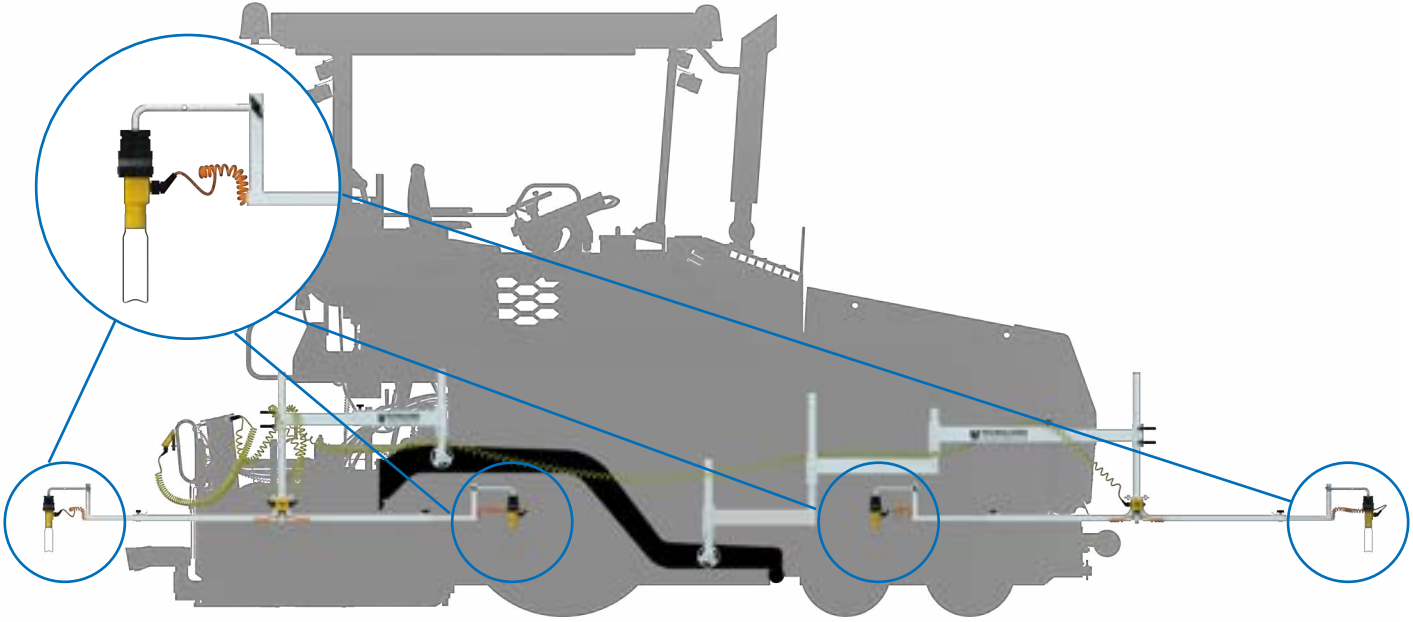
4 mm or 3/8-16 UNC



Setup

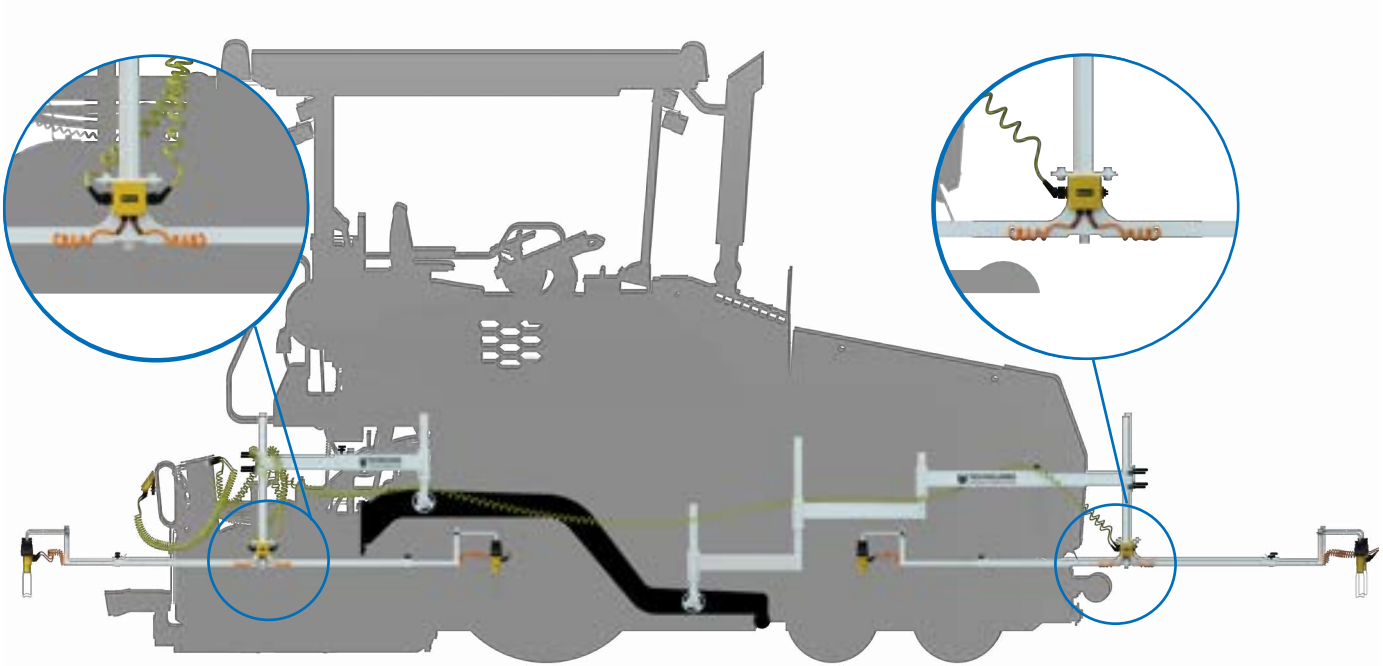
Wiring and system setup

12 Mount the Grade Sensors (not included) in the Snap Connectors and connect the orange cables.



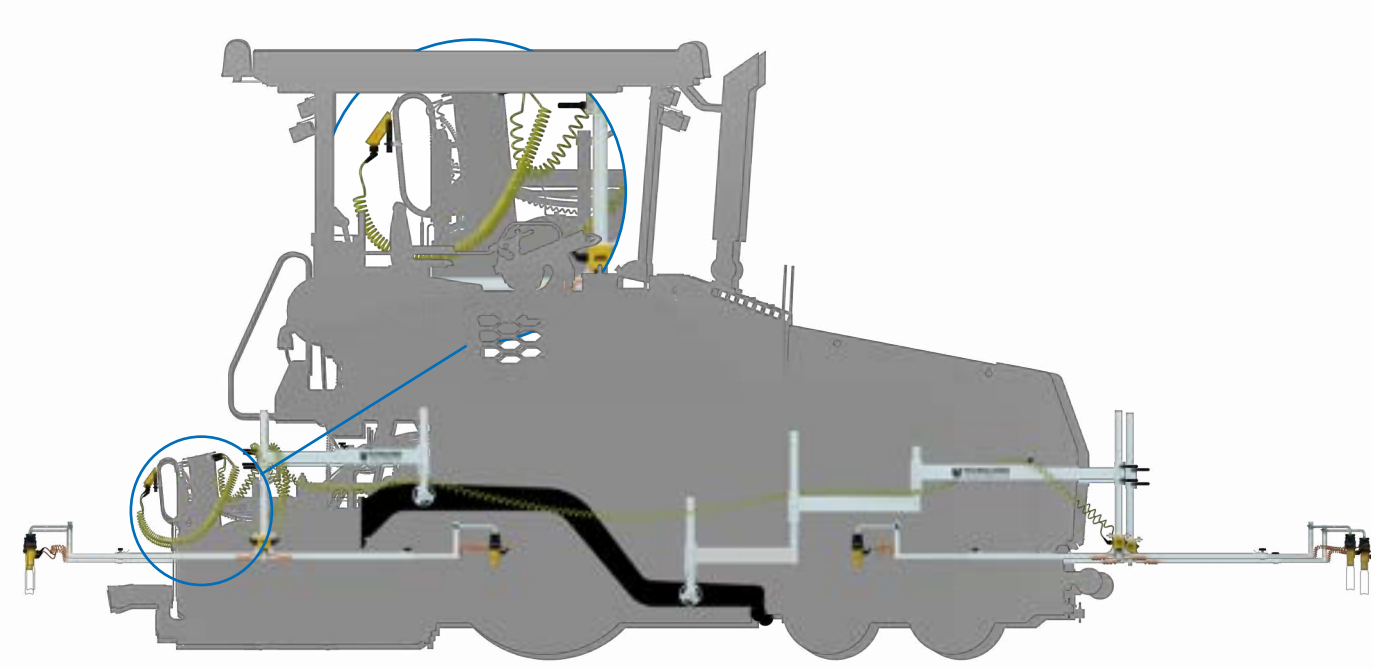
13

Connect the Connector Boxes on the Sensor Beams with the long I-cable (From Box 5)

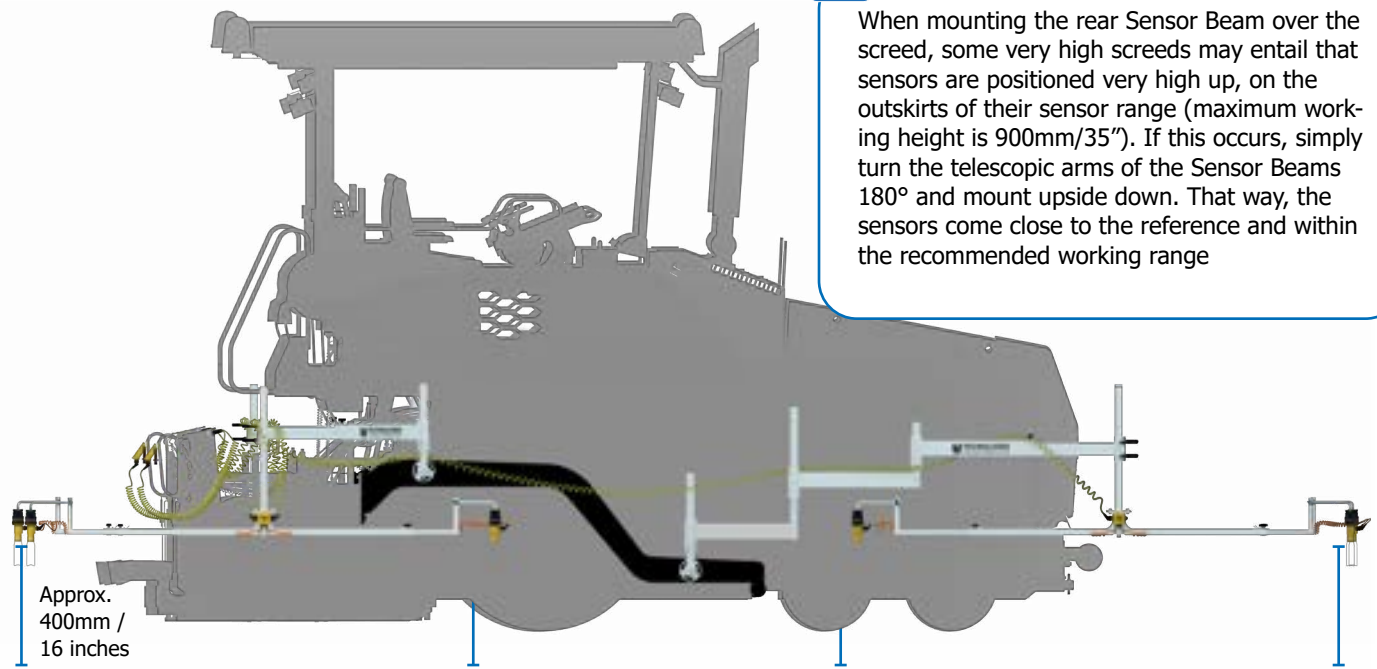


14

Connect the Mini-Line® controller to the Connector box on the rear Sensor Beam
- The HS301 controller is connected with a V-cable (from Box 5)
- The PL2005 controller is connected with an I-cable



15 Make sure the four Grade sensors are positioned within their working range



When mounting the rear Sensor Beam over the screed, some very high screeds may entail that sensors are positioned very high up, on the outskirts of their sensor range (maximum working height is 900mm/35”). If this occurs, simply turn the telescopic arms of the Sensor Beams 180° and mount upside down. That way, the sensors come close to the reference and within the recommended working range

IMPORTANT: Sensor location and balance point

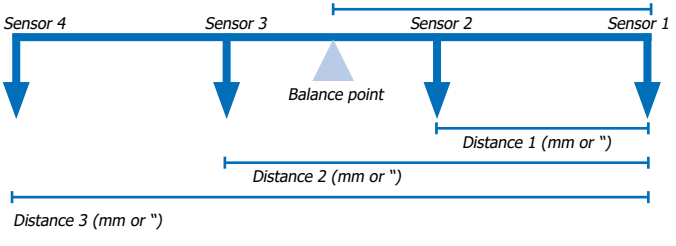
The combined Averaging Beam will have a balance point that is dependent on the location of the sensors, and is significant for the regulation. It is important that the balance point is located correctly to ensure a good result.

Balance point of the Averaging Beam

The balance point is important for the regulation and corresponds to the influence the location of one sensor has on the regulation when a single sensor is used (instead of the Averaging Beam with four sensors).

When the sensors are evenly distributed across the length of the Averaging Beam, the balance point will be in the middle of the Averaging Beam. If, for practical reasons, the sensors must be located at varying distances from each other, the balance point can be calculated so that it is correctly positioned in relation to the regulation.

$$\text{Balance point mm or " from sensor 1} = \frac{\text{Distance 1} + \text{Distance 2} + \text{Distance 3}}{4}$$



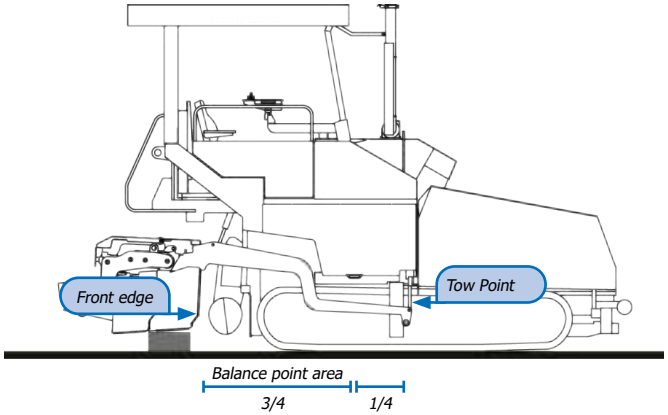
When the sensors are evenly distributed, the balance point is in the middle.

In the event of an uneven distribution of the sensors, the balance point is not in the middle of the beam.

Location of the balance point

The balance point must always be located between the tow point and the front edge of the screed in order to follow the movements of the screed. Position the balance point inside the rear ¾ of the distance between the tow point and the front edge.

If the balance point is positioned too close to the tow point, regulation speed is reduced. You are therefore not recommended to place the balance point inside the last ¼ of the distance between the tow point and the front edge of the screed, as this location results in overly slow regulation.



On the other hand, if the location of the sensors entails that the balance point is positioned very close to the front edge, the regulation becomes very aggressive. In such cases, the operator should be careful to adjust the control parameter "Sensitivity" of the controller and to adapt the speed of the paver, in order to prevent this resulting in over-compensation and an uneven road.[1]

If you are in doubt about the location of sensors and calculation of the balance point, position the four sensors evenly spaced, so that the balance point will always be in the middle of the Averaging Beam. The middle of the Averaging Beam (= the balance point) should then be positioned between the tow point and the front edge of the screed

The greater the distance between the four sensors, the greater the effect of the Averaging Beam

[1] The location of the sensors must always fit with the controller, and the control parameter "Sensitivity" should be adjusted if necessary when the balance point is moved. See the controller's manual.

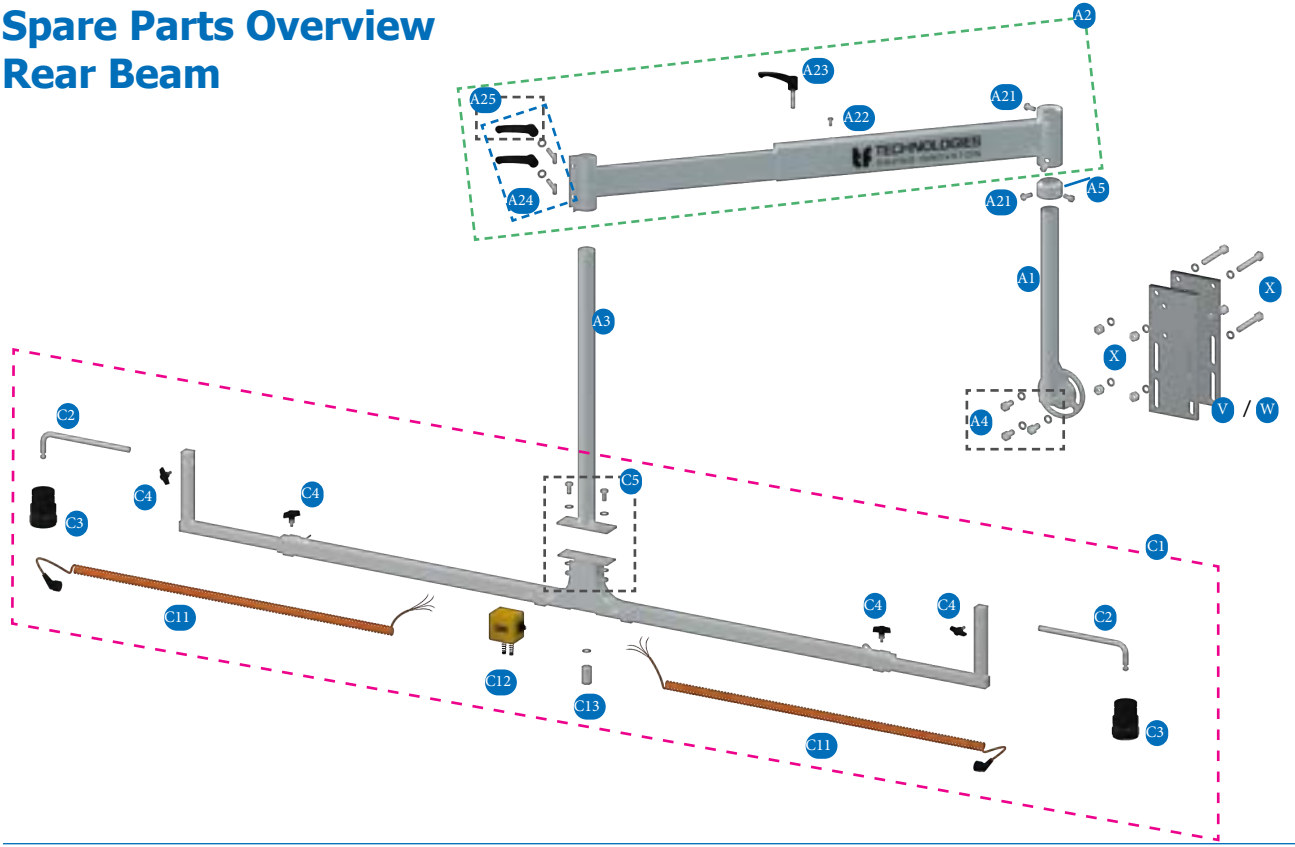
Appendix

Spare Parts List

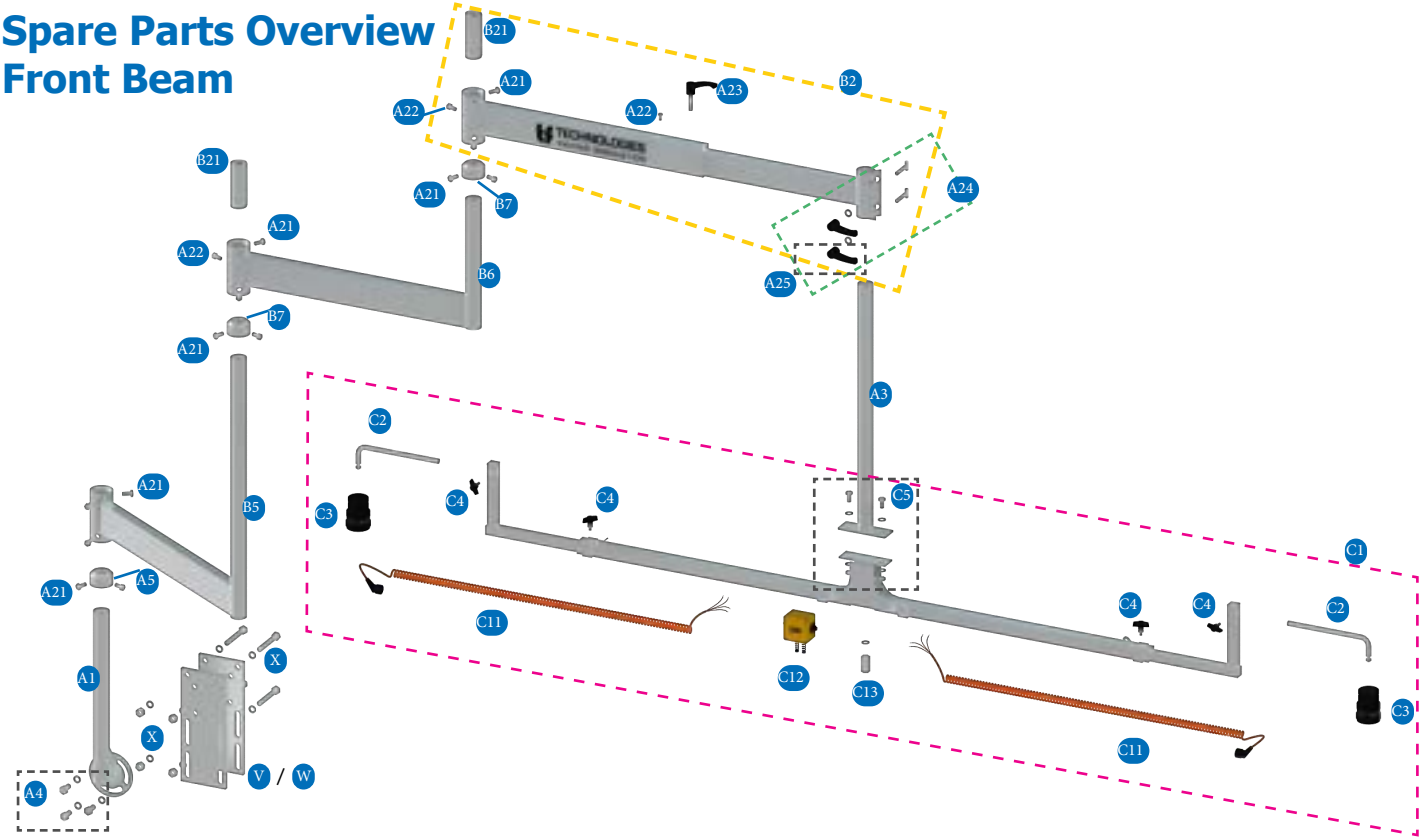
A range of spare parts is available for the EASY Averaging Beam.

	P/N	Item
A1	SP-40108	Tow Arm Bracket
A2	SP-40123	Complete Telescopic Arm for Rear Beam
A21	SP-40110	Bolt for Support Ring/Telescopic Arm, Short & Long Swing Arm, M12X25
A22	SP-40113	Bolt M8x14
A23	SP-51623	Handle for Telescopic Arm M12x20
A24	SP-40112	T-Bolts w/ M12 Handles & Washers
A25	SP-51626	Handle on Telescopic Arm for Mounting Tube, M12
A3	SP-40106	Mounting Tube
A4	SP-40122	Bolts kit for Tow Arm
A5	SP-40109	Support Ring for Tow Arm
B2	SP-40111	Complete Telescopic Arm for Front Beam, incl. Inner Ring
B21	SP-40115	Inner Ring
B5	SP-51616	Long Swing Arm
B6	SP-51617	Short Swing Arm
B7	SP-40114	Support Ring for Swing Arm
C2	SP- 40107	Sensor Support Bar
C3	S-50531	Snap Connector
C4	SP-40117	Thumb Screw for Sensor Beam
C5	SP-40119	Bolt mounting kit (Sensor Beam to Mounting Tube)
C11	SP-40116	Cable for Sensor Beam
C12	SP-40118	Connector Box
C13	SP-40120	Retaining Nut for Sensor Beam
V	SP-51620	Clamping Plate (Long, 1 pcs)
W	SP-40124	Clamping Plate (Short, 1 pcs)
X	SP-40121	Bolts & Nuts Kit for Clamping Plates

Spare Parts Overview
Rear Beam



Spare Parts Overview
Front Beam



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EASY Averaging Beam

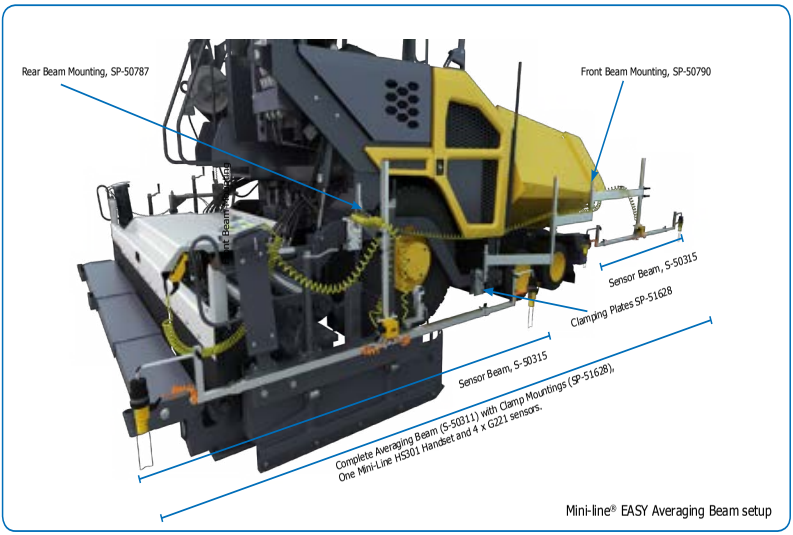
Mini-Line®

The EASY Averaging Beam is able to average out the deviations of the existing pavement surface thereby obtaining a smoother mat. It is designed to feature four sensors that take individual measurements across the entire length of the asphalt paver, and the average of these measurements constitutes the base of grade regulation. Rough spots in the existing foundation, which would normally affect the quality of the new road, are effectively smoothed out.

Its main part consists of two horizontal Sensor Beams fully-fitted with Snap Connectors, Connector Boxes and cabling integrated into the beams. The two beams are easily mounted with the corresponding rear beam and front beam mountings.

The split beam setup ensures the EASY Averaging Beam fits any paver, and makes it very easy to install. The Sensor Beams are telescopic and foldable, which makes them easy to transport, as they fit in the trunk of a normal car.

EASY Averaging Beam Specifications	
Part Number	S-50311
Application	Grade control Non contact ground sensing
Maximum Total Length	9-11m / 29.5-36ft (depending on paver size)
Weight	78kg / 172 lbs
Storage Temperature	-40°C to 85°C/-40°F to 185°F
Operating Temperature	-10°C to 70°C/14°F to 158°F
Type	Split Beam



Mini-line® EASY Averaging Beam setup

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