

LD Sorting Gate Installation Guide

Index

1. Allflex Livestock Intelligence

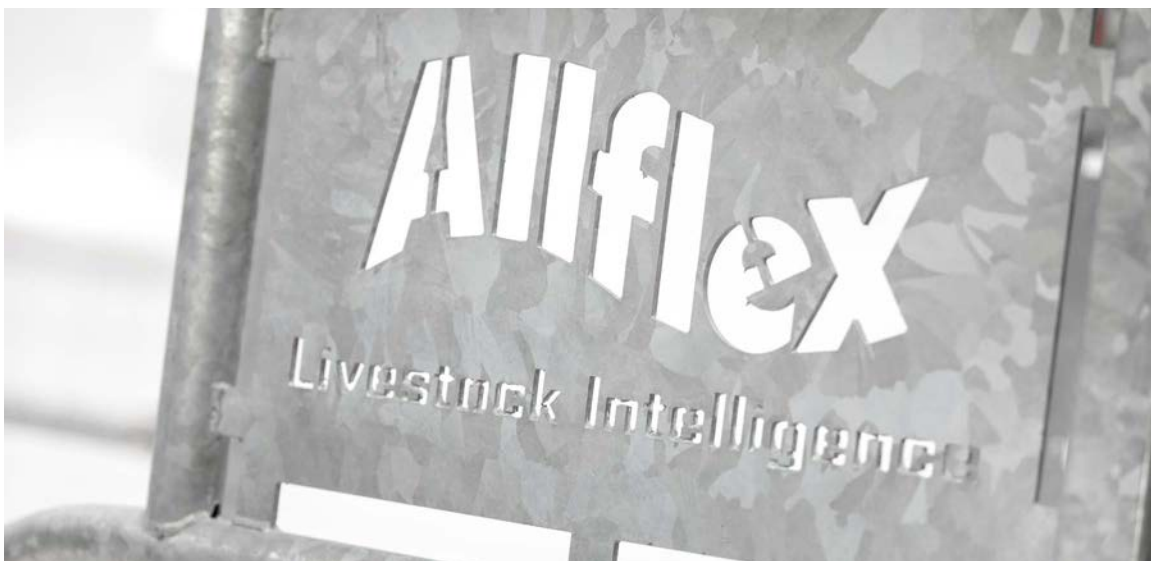
Sorting Gate

This Guide has been designed to help users and technicians with the installation and operation of the Allflex Livestock Intelligence LD Sorting Gate.

Please read through this guide fully before attempting the assembly and installation of the Sorting Gate.

1.1 Overview

Sorting Gates that filter off cows directly after milking are useful in streamlining daily operations within the dairy herd. One or more Sorting Gates can be a very useful enhancement to any Heetime®, DataFlow™ II or SenseHub™ monitoring systems on farm.



1.2 Sorting Gate Features

The sorting gate enables the automatic separation of cows according to a set of predetermined criteria. Cows may be separated manually based on the farmer's decision or automatically based on reports generated. Automatic sorting eases and simplifies work, saves precious time and ensures a calm environment for the cows.

The sorting gate identifies the cows passing through it by using IR identification units and sorts the cows designated for separation. Typical sorting gate decisions include the separation of cows for AI, veterinarian inspection, or for group changes.

The gate itself is 6 meters long and can be easily assembled at the milking parlor exit or at any other location where cows pass on a regular basis. The sorting gate may be constructed with either a left or right sort depending on the holding pen location. A three-way sorting gate is also available that sorts to two different holding areas, one on the right and the other on the left side of the gate.

KEY FEATURES

- ▶ HR LDN and cSense Flex Tag compatible.
- ▶ Heatime, SenseHub & DataFlow II integrated.
- ▶ Gate status indicator control panel.
- ▶ Pneumatic operation.
- ▶ Left or right sorting.
- ▶ Manual operation option.
- ▶ Two-way and Three-way sorting models available
- ▶ Modular Construction for easy Installation

1.3 Sorting Gate Location

There are 3 main requirements for the correct location ensuring the successful installation of the sorting gate. Finding the correct sorting gate location is critical for its proper and efficient operation. When selecting the gate's location please use the following parameters:

- **MAINS POWER AND AIR COMPRESSOR**

The sorting gate requires a 230v Mains Power supply & an Air Compressor to function. For the gate to work successfully, the Air supply must be between 6 to 8 bar of pressure to ensure correct operation is achieved.

- **CONCRETE PATHWAY**

Ideally, the sorting gate should be installed on a level concrete surface with a minimal size of L 6500mm x W 1200mm x D 100 mm. The concrete surface must be grooved to prevent cows from slipping.

- **SHADING**

The gate's identification system uses two infra-red (IR) ID units. For correct operation, these ID Units require that direct or reflected sunlight will not shine on the ID units. If the sorting gate cannot be in a shaded area under an existing roof, a roof must be constructed over it.

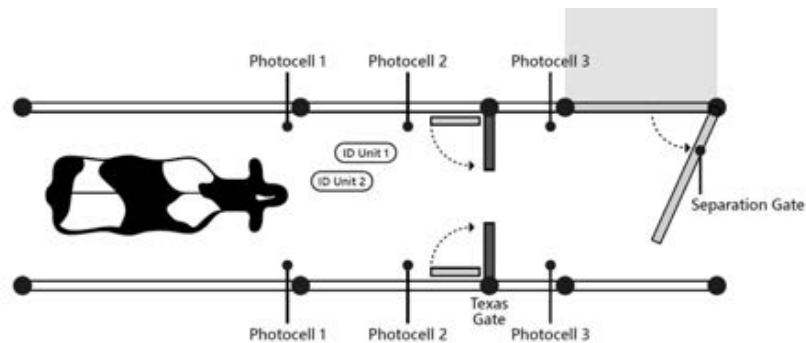
1.4 Sorting gate Operation

The Sorting gate comes in two different variations with the option to use Heatime, DFII or SenseHub monitoring systems.

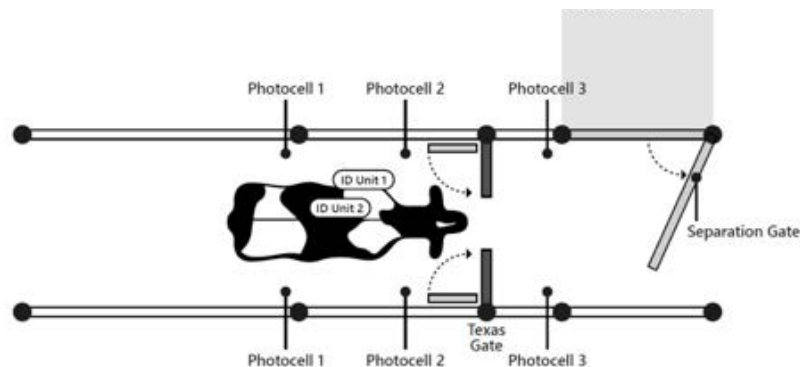
- Sorting to the Left or Right (2-Way) – Shown in diagrams below
- Sorting to both the Left and the Right (3-Way)

The operation is the same for all models of sorting gate.

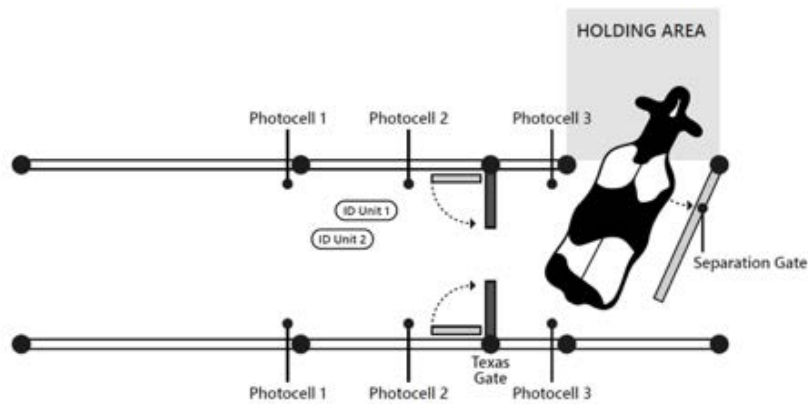
1. The cow enters the race and triggers Photocell 1. The cow is then identified by the ID units. The cow continues through the race and covers the second photocell. If this cow is to be separated the separation gate now opens.



2. The cow proceeds through the race past Photocell 2. If this cow is for separation, then the Texas Gate closes behind the cow. There is a limit switch sensor which tells the system when the Texas gate is completely closed. The Texas gate will continue to cycle (open and close) until the Limit Switch signals the complete closure of the Texas gate.



3. The cow is separated through the separation gate and as Photocell 3 is uncovered, the separation gate closes behind the cow.

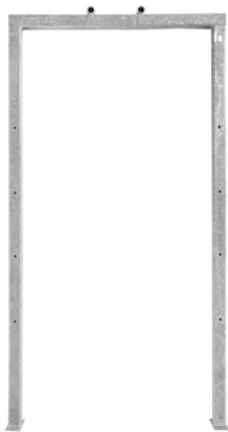


4. There is limit switch fitted to the separation gate which tells the system when the gate has completely closed. Only when the separation gate is completely closed, will the Texas gate be allowed to open for the next cow to pass.

THE TEXAS GATE REMAINS OPEN ONLY BETWEEN COWS THAT ARE IDENTIFIED AND THAT ARE NOT TO BE SORTED.

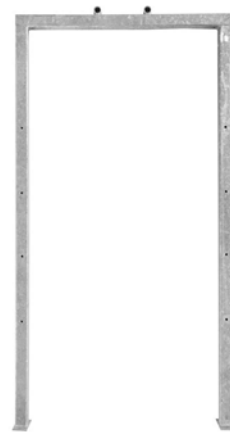
2. **Sorting Gate** assembly

2.1 Sorting Gate Framework Components



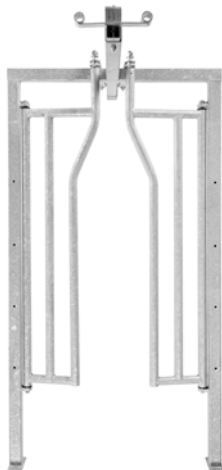
1 x Support Frame with Hinges

FRAME A



3 x Support Frames

FRAME B



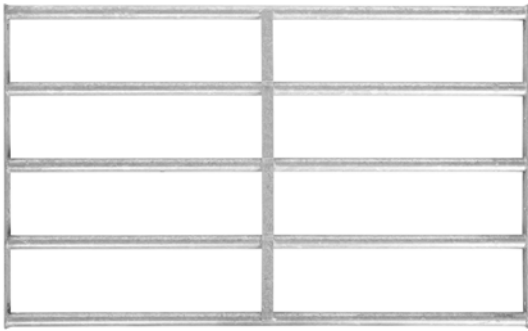
1 x Texas Gate Assembly

FRAME C



1 x Pair of Stabilizer Bars

FRAME D



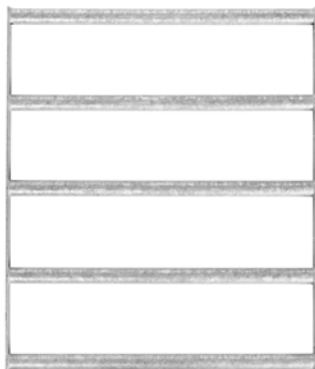
2 x Large Framework
(Length 1775mm)

FRAME E



2 x Medium Framework
(Length 1590mm)

FRAME F



2 x Small Framework
(Length 940mm)

FRAME G



2 x Separation Gates

FRAME H

For the 2-way version, the 2nd Separation gate is replaced by 1 x extra medium sized framework (**FRAME F**) and fitted using the extra 4 x Bolt a & 4 x Bolt B

2. Sorting Gate Assembly



2 / 3 x Air Rams (including air connectors, securing brackets, couplings and securing pins) for the Texas Gate & Separation Gates



2 / 3 x Solenoids (including air connectors & pneumatic exhausts) for the Texas Gate & Separation Gates



2 / 3 x Limit Switches for the Texas Gate & Separation Gates



6 x Photocell Brackets for the fitting of the Photocells to the framework



2 x rolls of Air Pipes to connect the Air Rams to the Regulator & Solenoids



20mm & 25mm Black Flexible Conduit for neatly concealing all cables on the gate



2 x Steel Poles for mounting of the IDU510 ID Sensors



2 x Metal Trunking (including metal joiner) to hold cabling and Air Pipes on top of the gate



16 x Plastic End Caps to cover all exposed inner framework



1 x roll of 2 core black power cable for wiring in the Limit switches and Solenoids



16 x (3-way) / 20 x (2-way) 80mm Bolts including washer & nyloc nut (**Bolt A**)



16 x (3-way) / 20 x (2-way) 90mm Bolts including washer & nyloc nut (**Bolt B**)



1 x (2way) / 2 x (3way) 150mm Bolts including washers & nyloc nut (**Bolt C**)



1 x 160mm Bolts including washers & nyloc nut (**Bolt D**)



20 x 80mm Thunderbolts Anchors (**Bolt E**)



8 x 50mm Masonry screws (**Bolt F**)



10 x 5.5 x 35mm Tek Screws (**Bolt G**)

2.2 Additional Components



1 x DF1010 Control Unit



2 x IDU510 ID Units



1 x Power Supply Unit



6 x Photocells
Sensors



6 x Photocell Cables



2 x Crossed Clamps



1 x Air Pressure
Regulator



1 x Outdoor Steel Box



For the SenseHub version of Sorting Gate -
1 x SenseHub Sort Gate Controller is required
+ extra Ethernet cable for connection to
the customers regular SenseHub Controller



For Heatime / DFII version of Sorting Gate -
1 x DF800 Mastercard is required + Extra
RS485 Cable to reach from the DF1010
to the DF800 Mastercard (which will be
located next to the customer PC).

2.3 Installation tools

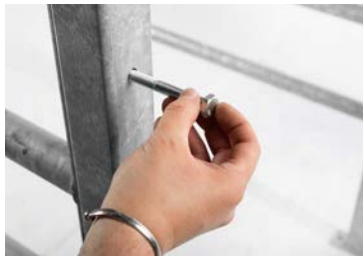
- Safety Goggles
- Dust Mask
- 3-step ladder
- Regular and Philips Screwdrivers
- Range of Spanners
- Socket Set
- Allen Keys
- String for Leveling
- Spirit Level (at least 60cm long)
- Wire cutters
- Measuring Tape
- Wire Stripper
- Electric Grinder / Hacksaw
- Electric Drill
- Drill Bits for Masonry
- Drill Bits for Metal
- Step Drill Bit
- Multimeter
- Large Black Plastic Cable Ties
- White Masking Tape for labeling
- Electric Impact Wrench Inc range of sockets
- Mallet
- Grease for lubricating the moving parts
- A Range of Hex Nut Driver Bits
- Curved File

2.4 Assembly of Framework

For Safety reasons, the LD Sorting Gate should always be assembled by 2 competently trained personnel

FOR THE PURPOSE OF THIS ASSEMBLY GUIDE, A 3WAY SORTING GATE IS SHOWN

Tips for bolting the framework together



Position the Framework so that all the fixing holes are aligned. Push the bolt through the framework until the threads are visible.



Fit the washer to the bolt followed by the nyloc nut



Using the spanner & ratchet / Impact driver, tighten the nut fully so the framework is securely fitted together



1. Find the Support Frame with the 4 x Hinges attached (**FRAME A**), stand up and hold in an upright position.



2. Fit 1 of the Stabilizer bars (**FRAME D**) to the top of the single Support Frame (**FRAME A**). This can be achieved by sliding the stabilizer bar inside the open corner of the support frame. This can then be secured into place by using a mallet

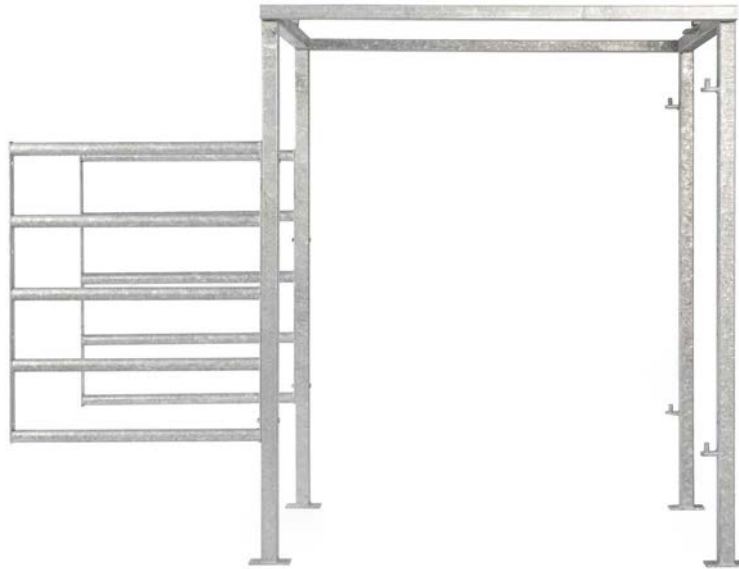


3. Take 1 of the Support Frames (**FRAME B**) and fit to the Stabilizer Bar as in the previous step. Repeat the process with the 2nd stabilizer bar (**FRAME D**) until this section is complete (as in the picture). Again, a mallet can be used to ensure all pieces are securely attached.



4. Once both Stabilizer bars (**FRAME D**) have been secured into place, fix into position using 4 x **BOLT G** (1 at each corner). This will stop the stabilizer bars from becoming loose during operation of the gate

- 5.** Fit the 2 x Small pieces of Framework (**FRAME G**) to the Support Frame using 8 x **BOLT A** and tighten to secure in place.



- 6.** Carefully and safely, lift and place the Texas Gate Assembly (**FRAME C**) into position against the small framework (**FRAME G**).



THE TEXAS GATE IS VERY HEAVY, USE CAUTION WHEN LIFTING

Ensure the gate is fitted with the correct orientation (see picture) as incorrect fitting will mean the gate will not function correctly!

The Texas Gate will open away from the already constructed end of the race



Hold the Texas Gate Assembly (**FRAME C**) in position and for safety, attach the 8 x **BOLT B** so there is no danger of the Texas gate becoming loose and falling



7. Proceed to locate and fit the grease nipples to the location on the Texas Gate Assembly (**FRAME C**). Each Hinge of the Texas gate requires 1 x Grease Nipple to be fitted.



8. Attach the 2 x Medium Sized Framework (**FRAME F**) to the Texas Gate Assembly (**FRAME C**) using the 8 x **BOLT B** used in the previous step. This can be achieved by loosening 1 side (4 x bolts) and then re-fitting these once the **FRAME F** is in position. Tighten the nuts and bolts to secure in place and then repeat this process for the opposite side.

- 9.** The next Support Frame (**FRAME B**) can now be placed up to the medium sized framework (**FRAME F**) and held into position



- 10.** Attach the 2 x Large Sized Framework (**FRAME E**) to the Support Frame using the remaining 8 x **BOLT B**



- 11.** The final Support Frame (**FRAME B**) should now be fitted to the race using the remaining 8 x **BOLT A**



- 12.** The separation gates (**FRAME H**) can now be fitted onto the hinges of the Support Frame (**FRAME A**). Firstly, remove the roll pins found in the top hinges of the frame.

- 13.** Lift the Separation gate into position so that the upper and lower couplings line up with the hinges of the frame.

The Separation gates should be fitted to the framework from inside the race. The sorting gate is designed so that the separation gates open inwards to the race when a cow is to be sorted.



14. Place the separation gate onto the hinges ensuring that these gates can move freely without any resistance



15. Place the separation gate onto the hinges ensuring that these gates can move freely without any resistance



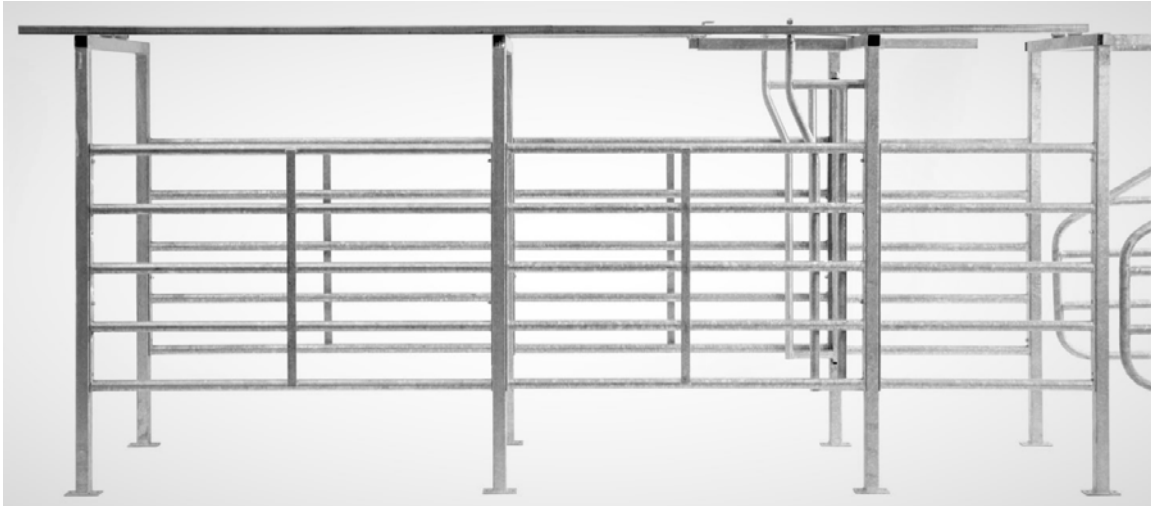
16. Repeat the process to fit the 2nd Separation gate.

For the 2-way version, the remaining piece of framework should be fitted to the side where no sorting of cows is required.

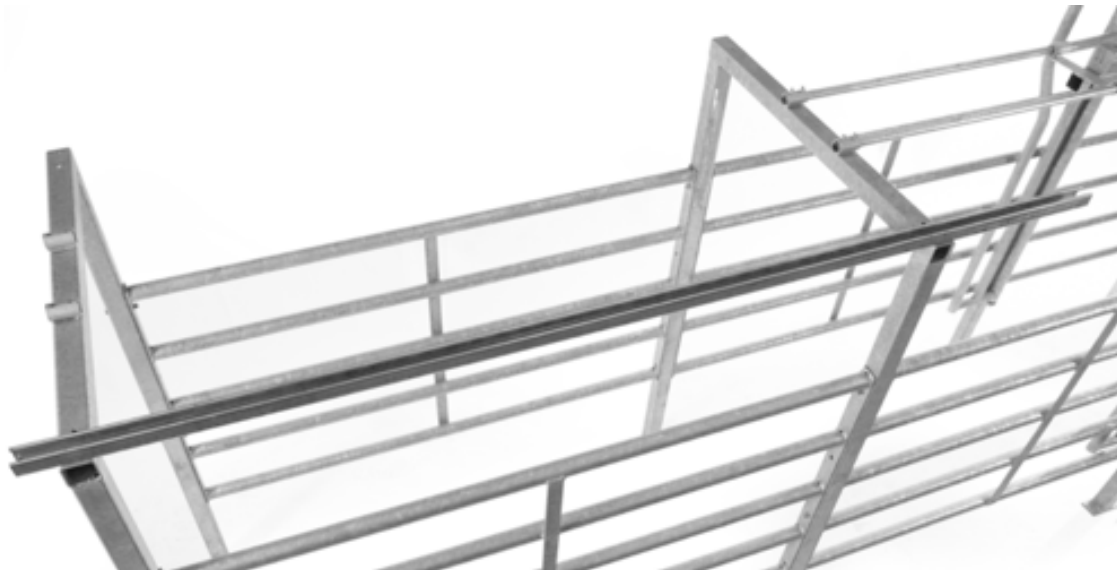
17. The metal trunking which will hold the cabling (Photocells, Limit switches, IDU510's) and air pipes can now be fitted to the assembled framework. This can be mounted on either side of the sorting gate depending on the location it is being installed.

Trunking 1

Trunking 2

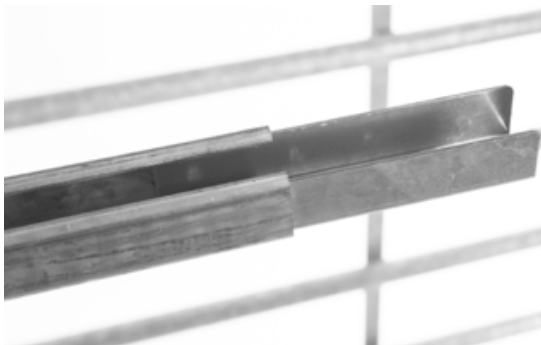


18. Position 1 piece of the trunking to it sits on top of the 1st & 2nd support frames (**FRAME B**) at the entrance to the sorting gate





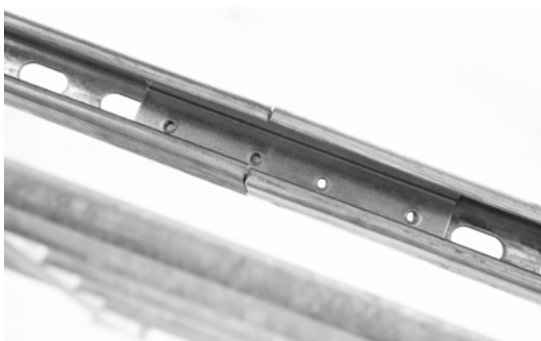
19. Once the trunking is correctly positioned, use the Tek Screws (**BOLT G**) to secure the trunking to the 2 x Support Frames (**FRAME B**)



20. Slide the metal joiner inside the 1st piece of trunking.



21. Take the 2nd piece of trunking and lay it on top of the Texas Gate Assembly. Position it so it meets with the 1st piece of trunking



22. Proceed to connect the 2 pieces of trunking together using the metal joiner. Once connected, secure the 2nd piece of trunking to the top of the Texas Gate Assembly (**FRAME C**) using 1 x Tek Screw (**BOLT G**)

2.5 Securing the gate to the floor

Now that the Framework has been completed, the gate can now be secured to the floor. Position the Sorting gate at a location which will ensure efficient cow flow



1. Once in the desired location, check that the feet of the gate are all in line. You can check that the gate is aligned correctly by using the levelling string. Tie the string to the corners of 1 side of the gate and see if this is touching each foot along the gate. If needed, move the framework so all 5 of the feet are perfectly in line.



2. With a spirit level, check the corners of the gate to ensure it sits perfectly upright.

3. The gate can now start to be secured to the floor. Take the Drill & 8mm masonry drill bit and proceed to drill pilot holes for the bolts. Start by drilling the holes and fitting the 10 x masonry bolts (**BOLT E**) to 1 side of the gate only (5 feet), using the impact driver to secure the bolts into the concrete surface. Re-check the alignment of the gate after each application to ensure no shifting has occurred.

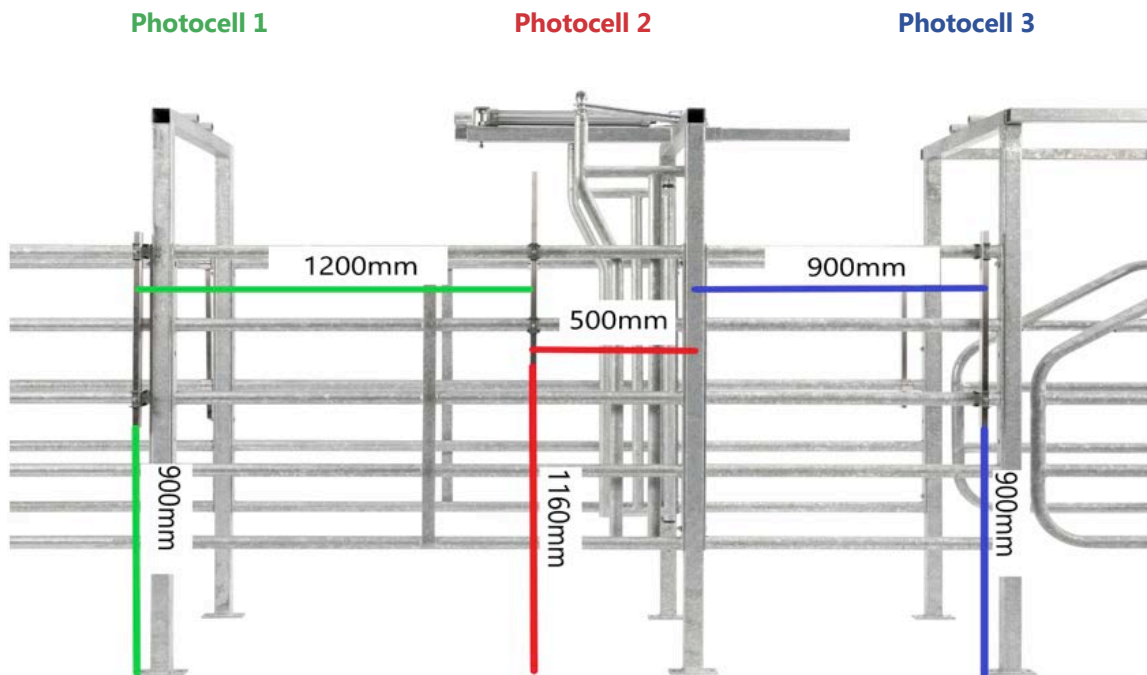


4. Before securing the other side, take a tape measure and ensure the internal width is 920mm at every point at floor level of the race. Again, use a spirit level to check the frame is perfectly upright. Proceed to drill the pilot holes & fit the remaining 10 x masonry bolts (**BOLT E**) to the 5 feet.

5. If fitting to a surface with concrete slats, drilling is not possible as this may crack and damage the slats. Instead, use the included additional clamping system to secure the Sorting Gate to the floor.

2.6 Fitting of the Photocells

Tip: Before Installation of the photocells, use a marker pen and mark all photocell cables (while still coiled) so that the location on the gate can be easily identified for wiring into the DF1010 - E1 (Emitter), E2, E3 & R1 (Receiver) R2, R3.

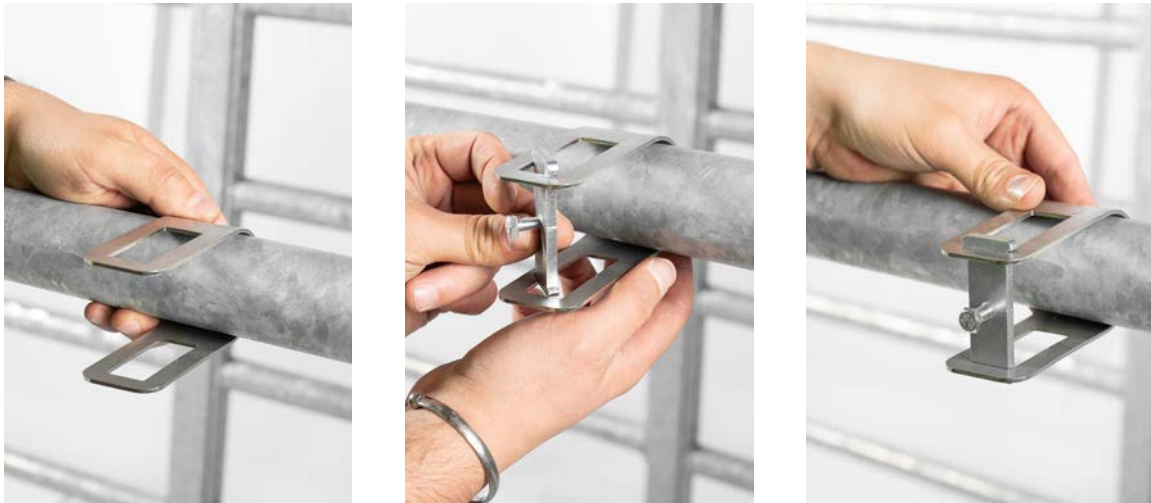


Important – The correct position of the Photocells is key to the successful operation of the Sorting gate. Always ensure the Specified measurements are used when positioning the photocells on to the gate.

Photocell 1 – This should be positioned 1200 mm from Photocell 2. The bottom of the bracket should be 900mm from the floor

Photocell 2 – This should be positioned 500mm from the centre of the Texas Gate Assembly Framework. The bottom of the bracket should be 1160mm from the floor

Photocell 3 – This should be positioned 900mm from the centre of the Texas Gate Assembly Framework. The bottom of the bracket should be 900mm from the floor



1. Fit the 6 x Photocell bracket U Clamps to the outside of the race framework as in the images above (3 to each side of the race). The U Clamps should be fitted over the pipework and the metal plate placed inside.



2. Slide the Photocell bracket through the U Clamps. Tighten the screw slightly to hold the bracket in position. Use the tape measure and spirit level to check the position of the bracket to ensure all Photocells will be perfectly aligned.



3. Fit the 6 x Photocell bracket U Clamps to the outside of the race framework as in the images above (3 to each side of the race). The U Clamps should be fitted over the pipework and the metal plate placed inside.

Ensure the correct Photocells are fitted. 1 pair of Photocells will contain 1 x Emitter & 1 x Receiver.

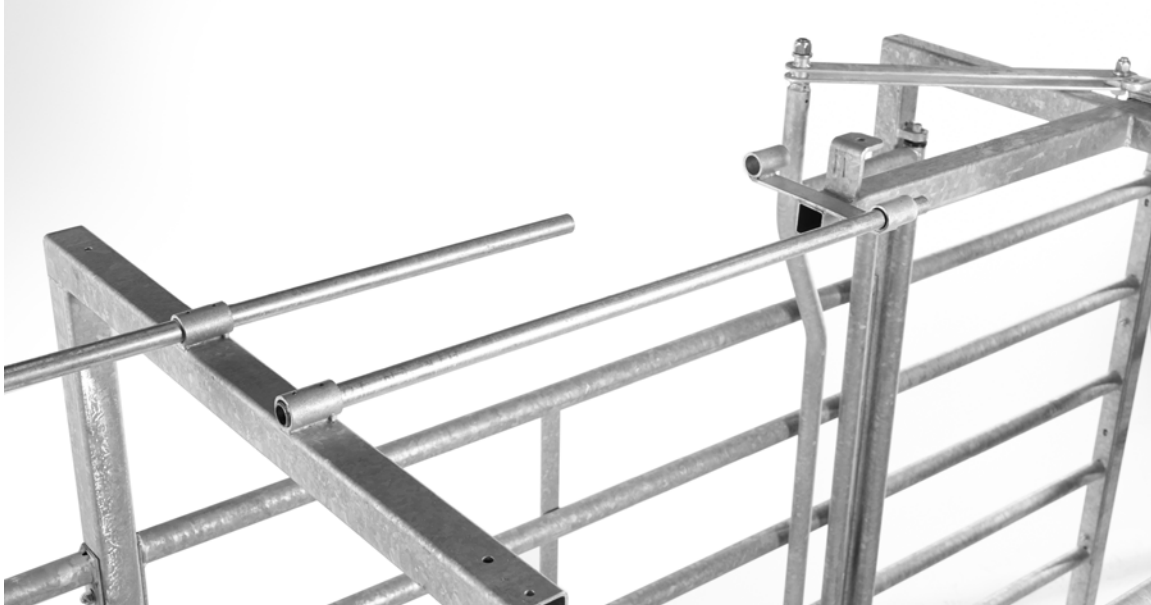


4. Feed the Yellow Photocell Cable through the bracket and attach to the Photocell Emitter ensuring the 4pins inside the connector are aligned.



5. Position the Photocell Emitter and secure to the bracket using the 2 x screws provided. Repeat this process until all 3 x Emitters & 3 x Receivers are all securely fitted into the photocell brackets. Ensure all the Emitters & Receivers are fitted to the same side of the brackets as incorrect placement will result in misalignment of the photocell beams.

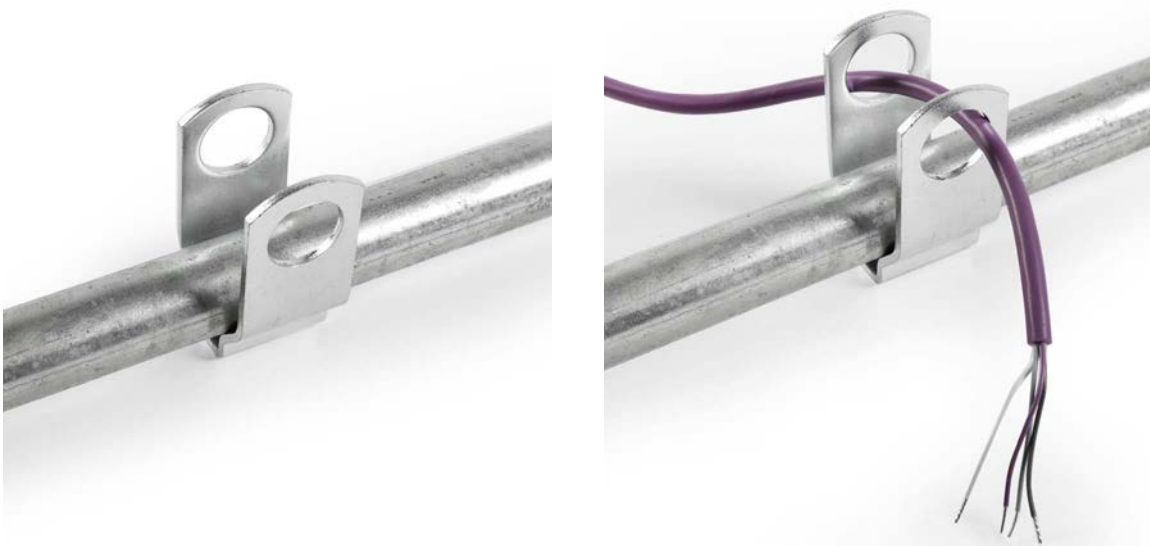
2.7 Fitting of the IDU510 ID Units



- 1.** Take the 2 x Steel poles which are supplied with the framework and fit to the sorting gate. This can be achieved by sliding the poles through the loops found at the top of the 2nd Support Frame (**FRAME B**) and Texas Gate Assembly (**FRAME C**)



- 2.** Secure the 2 poles into position by fixing the 4 x securing screws provided



- 3.** Take 1 of the metal Crossed Clamps and hold in position on 1 of the steel poles.
Start to feed the purple cable through the holes of the crossed clamp until all the cable is through.



4. Fit the metal body of the IDU510 into the crossed clamp. Once fitted, loosely fix into position by tightening the screw found on the underside of the clamp. Repeat the process so that the 2nd IDU510 is fitted to the other steel pole.



5. Position the IDU510's so that the 1st sensor is 800 mm from the Texas Gate Assembly (**FRAME C**). Fit the 2nd Sensor 850mm from the Texas Gate Assembly. Once the position is correct, fully tighten up the securing screws of the crossed clamps so both of the IDU510's are locked into place.

6. Measure the distance from the IDU510 sensors to the point where the cables can enter the metal trunking and cut 2 pieces of the 25mm flexible conduit to this size.

Feed the IDU510's purple cable all the way through the length of conduit. Repeat this for the 2nd IDU510 and proceed to fit the 2 pieces of conduit snugly over the metal body of the 2 x IDU510 units. Neatly secure the conduit to the steel poles using cable ties so all cabling is protected and hidden away.

2.8 Fitting of the Air Rams

For the 3-way sorting gate, there are 3 Air Rams which are used to power the Texas Gate and the 2 separation gates.

For the 2-way sorting gate, there are 2 Air Rams, 1 for the Texas Gate & 1 for the Separation Gate.



Separation Gate Ram
(Connector on side)



Texas Gate Ram
(Connector on top)

1. Unpack the rams and proceed to attach the blue air connectors (2 per ram). This can be achieved by removing the red protective covers & screwing the connectors into the ram and tighten with a spanner to ensure an air tight fit is achieved.

The securing bracket can now be fitted to the end of the rams by using the 4 x Hex head bolts provided with them. The Texas gate ram and separation gate rams need to have the bracket fitted at different positions as in the images above.



2. Screw the coupling onto the end of all the rams and lock into place. The Rams are now ready to fit to the gate.

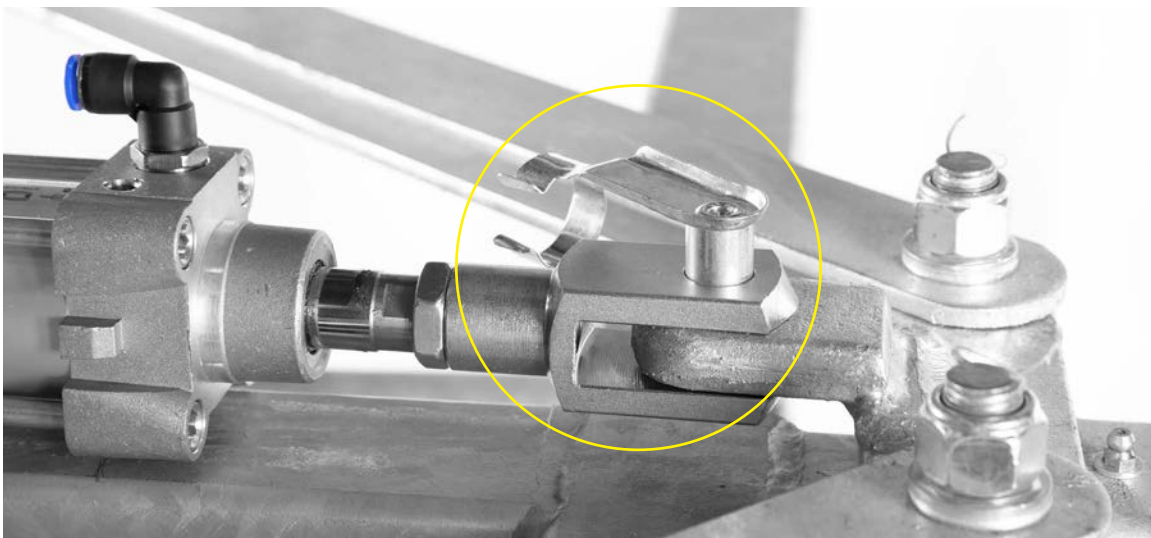


3. Take the Large Air Ram and place onto the top of the Texas Gate Assembly (**FRAME C**) with the air connectors facing up. Position this so that the rear bracket lines up with the fixing point on the gate.



- 4.** Pack 2 of the washers underneath the securing bracket of the ram. Use a spirit level to check the ram is perfectly level. If required, add more washers until the ram sits level. Feed 1 x **BOLT D** through the securing bracket & Framework. Fit the nyloc nut and tighten to secure in place.

Placing the washers underneath the ram is critical as allows the ram to work freely without rubbing on the framework



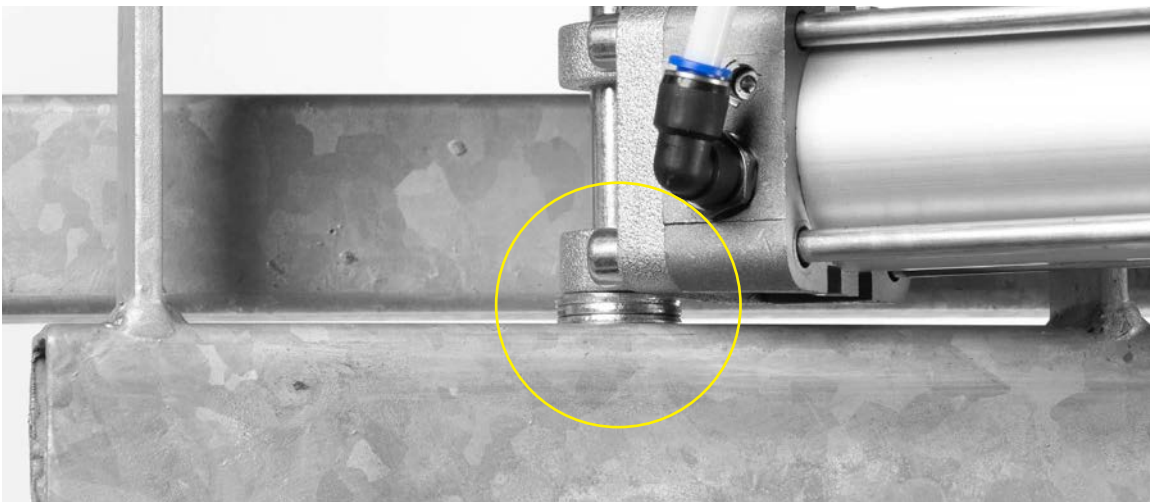
- 5.** The Piston arm coupling can now be fitted to the Texas Gate frame. Line up the coupling to the frame and secure in place using the pin provided with the ram. Once fitted clip the pin onto the arm of the ram.

- 6.** The Air pipes can now be fitted to this Ram by simply pushing the pipe into the connector. Ensure each pipe is well connected and will not pull out. Neatly fit the remaining air pipe into the metal trunking to where all the pipes and the cabling will exit the gate.

Caution – Do not allow the Air pipes to develop any kinks as this will severely affect the operation of the air rams



The smaller air rams can now be fitted to the separation gates.



7. Position the securing bracket of the ram to the fixing point found on the separation gates. Again, several washers will need to be packed underneath this end so the ram sits perfectly level.

Once the correct alignment has been achieved, place 1 x BOLT C through the separation gate & ram. Fix in position by attaching and tightening the nyloc nut.

Placing the washers underneath the ram is critical as allows the ram to work freely without rubbing on the framework.



8. Secure the piston arms to the metal plate found on the framework (**FRAME A**) This can be achieved by lining up the coupling with the hole on the plate and securing in place by using the pin provided. Once fitted secure the pin by clipping this to the arm of the coupling.



9. The Air pipes can now be fitted to the air rams. Insert the pipes into the connectors ensuring an air tight fit is achieved and the pipes will not come loose.

Please ensure enough excess is kept free so the separation gate can move freely without pulling out or damaging the pipes.

Fix the pipes to the framework using cable ties and proceed to feed down the length of the gate, firstly inside the stabilizer bar (**FRAME D**) and then into the metal trunking.

2.9 Fitting of the Limit Switches

For a 2-way Sorting gate – 1 x Limit switch for Texas Gate & 1 x for the Separation gate.

For a 3-way Sorting gate – 1 x Limit Switch for Texas Gate & 2 x for the Separation gates.

1. Take the limit switch / switches for the separation gates and proceed to lengthen the arms. This can be achieved by loosening the screw with a Phillips head screwdriver. Extend the arms so they sit at the maximum length possible.



2. The separation gate limit switches can now be attached by fitting them to plates at each corner of the Support Frame (**FRAME A**). Mark the position and drill pilot holes into the mounting plate on the framework. Fix the limit switch to the plate using 2 x Tek screws (**BOLT G**) Repeat the process and fit the limit switch to the 2nd Separation Gate.



Separation Gate Closed Position



Separation Gate Open Position



3. With the final limit switch (Texas Gate), completely loosen the screw so that the arm comes free. For this switch the arm needs to be positioned at a 45-degree angle. Once correct, re-tighten the screw.



4. Mark the position of the switch onto the underside frame of the Texas Gate Assembly (**FRAME C**). The fixing points for this limit switch need to be 355mm from the edge of the Texas Gate Frame. Drill pilot holes and proceed to fit the switch to the underside of the frame using 2 x Tek screws (**BOLT G**)

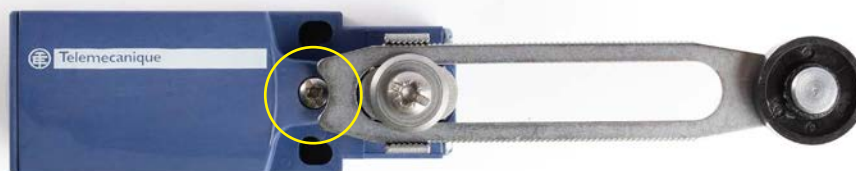




Texas Gate Closed Position



Texas Gate Open Position



- 5.** All Limit switches can now be wired using the black 2- core power cable. Remove the cover of the Limit switch by loosening the screw which holds the cover plate on.



- 6.** With a screwdriver, pierce a hole into the white plastic bung found at the rear of the limit switch and proceed to feed the cable through. Using the wire strippers, strip the cable back and fit to the connections inside the limit switch. Once wired in, proceed to neatly feed the cables through the Trunking to where all the cables will exit the gate.

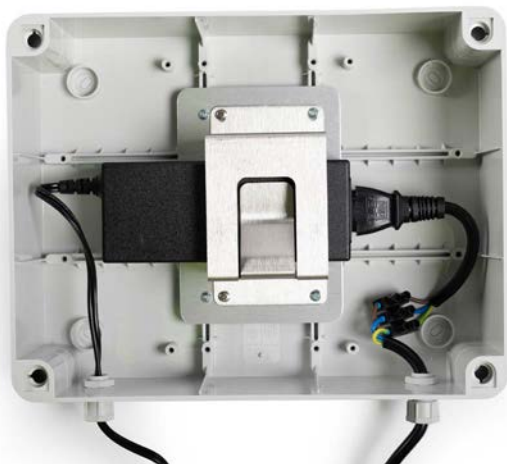
Measure the cables so they run all the way to the DF1010 control box. Cut the cables and mark each 1 with the position of the switch on the gate. This is so they can be easily identified for wiring into the DF1010 later.

3. Installation of **Air and Power Supply**

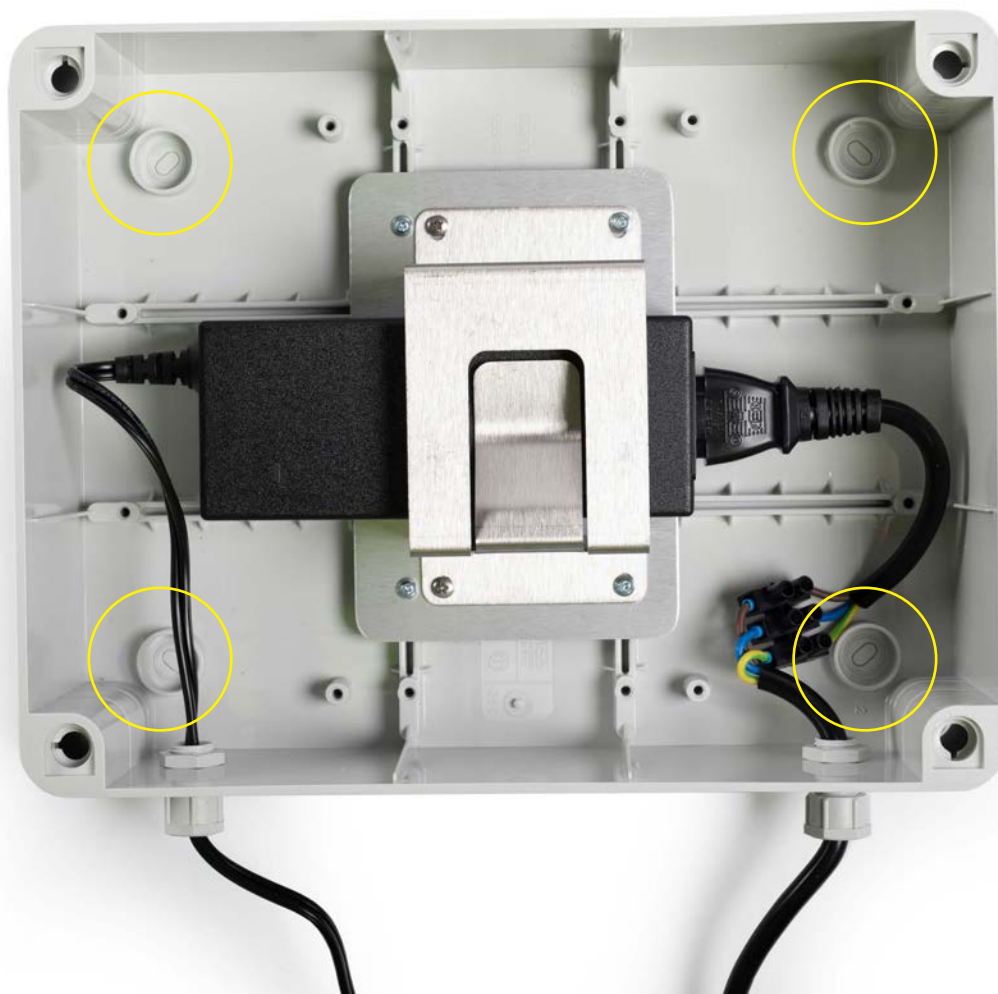
3.1 Installing the Power Supply

We Recommend locating the Power Supply & Air Supply close to the Outdoor Steel Box containing the DF1010 & Solenoids. This will cut down on the time taken to install and the amount of cabling required.

The Power Supply will need to be mounted within reach of a fully tested and working mains supply socket.



1. Ensure the Power supply is not connected to the mains supply. Remove the cover of the Power supply unit by loosening the screws located at each corner of the box.



2. Locate a suitable position for the power supply to be mounted. Proceed to drill through the plastic case at each corner and into the wall. Fix the box to the wall using 4 x masonry securing screws (**BOLT F**).

Replace the lid of the power supply and tighten up the 4 x securing screws.

3.2 Installing the Air Supply



1. Unpack the Regulator and proceed to fit the 2 x brass air fixings by screwing them into either side of the regulator. Use a spanner to secure the fixings into place.

2. To mount the regulator to the wall, fit the mounting bracket by removing the large black nut, placing the metal bracket onto the regulator and then securing in place by replacing and tightening the nut. Mark and proceed to drill pilot holes and fix to the wall using 2 x masonry securing screws (**BOLT F**).

3. Fit the 2 x Air connectors to the regulator by screwing these into the brass fixings on the sides. Measure and cut to size, enough 8mm air pipe so that the customers compressor can be connected to the left-hand side of the regulator. Once cut, fit the air pipe into the connector ensuring an air tight seal is achieved.

4. Take the remaining 8mm air pipe and connect to the right-hand side of the regulator. Run this air pipe all the way from the regulator to the position where the steel box (containing the solenoids) will be mounted.

4. Installation of **Electronics**

4.1 Fitting of the DF1010 and Solenoids

- 1.** Firstly open the steel box by unlocking it with the black plastic keys provided.



- 2.** Fix the Metal plate to the bottom of the box using the 8 x screws included with the box.





3. Take the DF1010 and position inside the box as in the image above. Ensure to leave enough room so that the 4 x securing clips on the outside of the DF1010 can be accessed.



4. Unclip the 4 x clips of the DF1010 to carefully remove the lid assembly and place underneath the main housing.

Check again the positioning of the DF1010 inside the steel box. If correct proceed to drill through the case of the DF1010 and the steel box at the 3 points circled here.

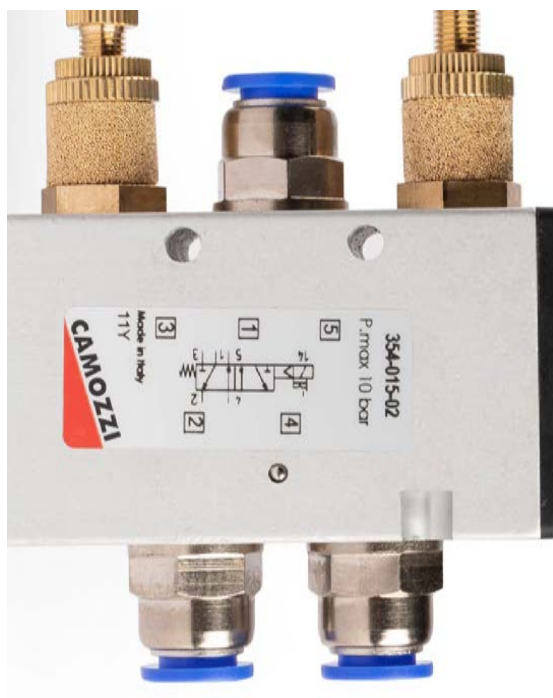
Secure the DF1010 to the steel box using the 3 x nuts and bolts provided.



5. The Solenoids can now be fitted to the steel box into the positions shown.

For a 2- way sorting gate, 2 solenoids are provided.

For a 3-way sorting gate, 3 solenoids are provided.



6. Position 1 of the solenoids into the steel box. The solenoids have 2 holes in the body which can be used as fixing points. Take the drill and place in the hole of the solenoid. Drill through the steel box so that 2 fixing points have been made.



7. Fit the solenoid to the box using the 2 x nuts and bolts provided. Repeat the process until all the solenoids are securely fixed inside the steel box.

8. All the excess length of bolts for the DF1010 & Solenoids will now need to be removed from the sides and back of the box. Using a grinder or hacksaw, proceed to cut all excess bolts off ensuring no sharp edges are left.



9. Using the drill, metallic drill bits & then the step drill bit, proceed to make 4 x 25mm holes into the bottom plate of the steel box, Fit the black conduit connectors into these holes & secure in position using the nut included. This will be where all cabling (running through the conduit) will enter the steel box.



10. Now use the drill and a 9mm drill bit and drill holes into the bottom plate of the steel box. For the 3-way gate, drill 7 holes (3 x air rams + Regulator) and for the 2-way gate drill 5 holes (2 x rams & 1 x regulator) This is where the air pipes of the regulator & rams will enter the box.

Use the round file to ensure no sharp edges are left as this may damage the air pipes



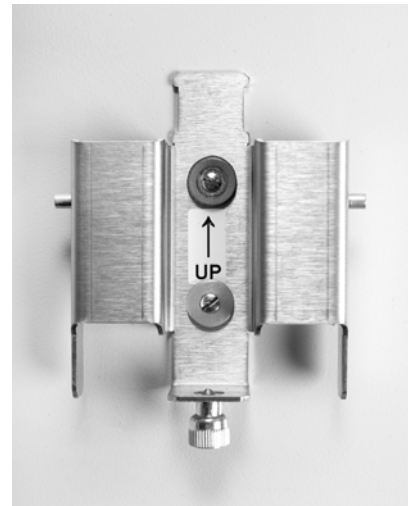
11. The Steel Box can now be mounted to the wall.

Position the steel box into the desired location and mark the wall at the 4 fixing points.

Proceed to drill pilot holes into the wall and secure the box in position using 4 x Masonry screws **(BOLT F)**

4.2 Fitting of the Sorting Gate Controller

For Customers Using Heatime / DFII systems, The Sorting Gate Controller is not required and is replaced by the DF800 Mastercard (Section 4.3)



1. Remove the SenseHub Sorting gate controller and metal mounting bracket from the box.



2. Fit the SenseHub Sorting Gate Controller to the metal bracket. Position onto the inner door of the steel box ensuring when the door is closed, there will be plenty of clearance between the DF1010 & Controller. Mark the position of the metal bracket and proceed to drill through the door. Fix the bracket to the door by using the 2 x nuts and bolts provided. Once secured, cut off the excess bolts from the door using a hacksaw / grinder ensuring no sharp edges remain.

Ensure the Sorting gate Controller is fitted to the lower part of the door so it will comfortably fit underneath the DF1010 when the door is closed.



3. Fit the Sorting gate controller by sliding this onto the bracket and fixing in place by tightening the silver securing screw.

4. Take the Extra Ethernet cable and fit 1 end into the PSE port of the regular Sensehub Controller. Run the cable all the way to the location of the steel box as this will required for fitting to the SenseHub Sorting gate Controller.

An ethernet cable must be run between the Sorting gate Controller (attached to PD Port) and the regular SenseHub Controller (attached to PSE Port). The ethernet cable must be neatly secured ensuring it is not positioned to within 1 meter of high voltage cables when run parallel.

4.3 DF800 Mastercard

For Customers using Heatime / DFII, the DF800 Mastercard must be used. The Mastercard will need to be installed close to the customers PC (running the Heatime / DFII Software) and with access to a main power socket.

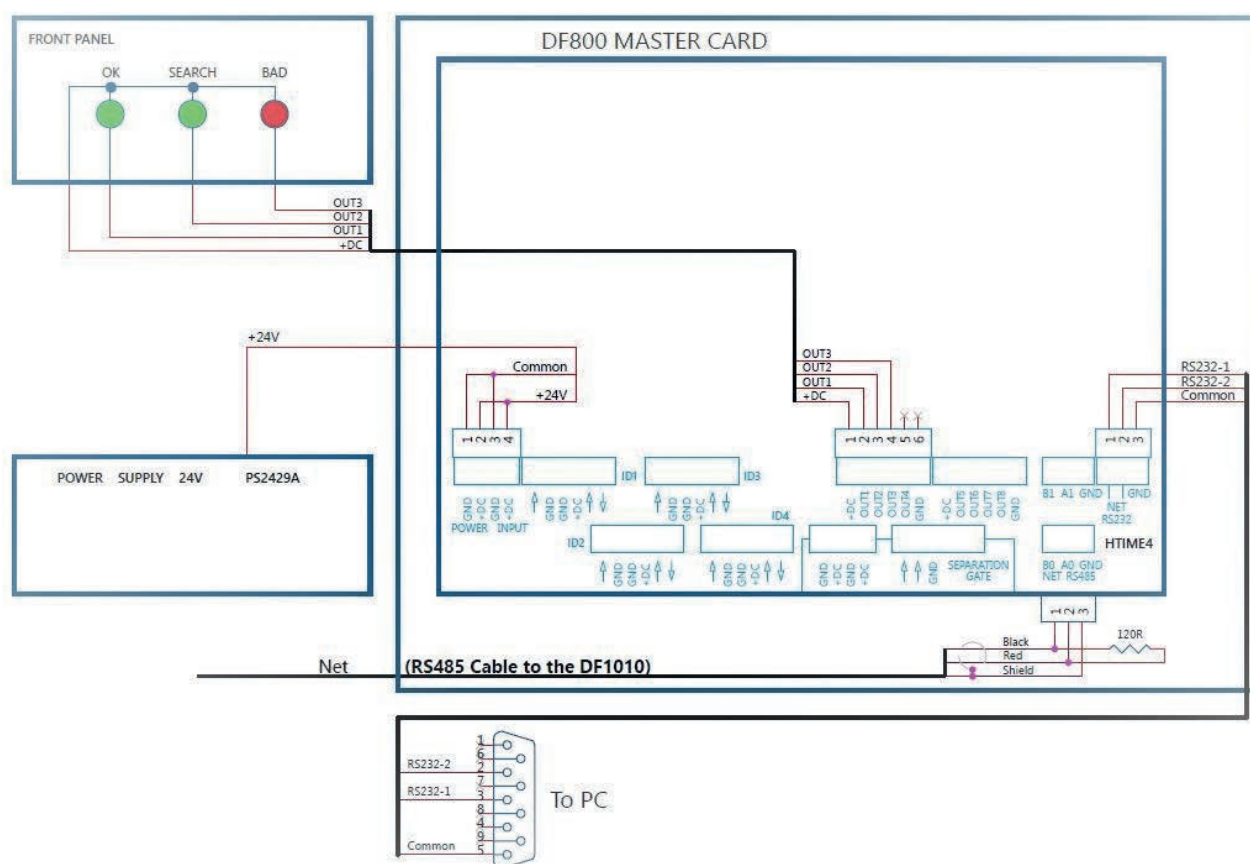


DF800 Mastercard Complete with Power lead & RS232 Serial Cable

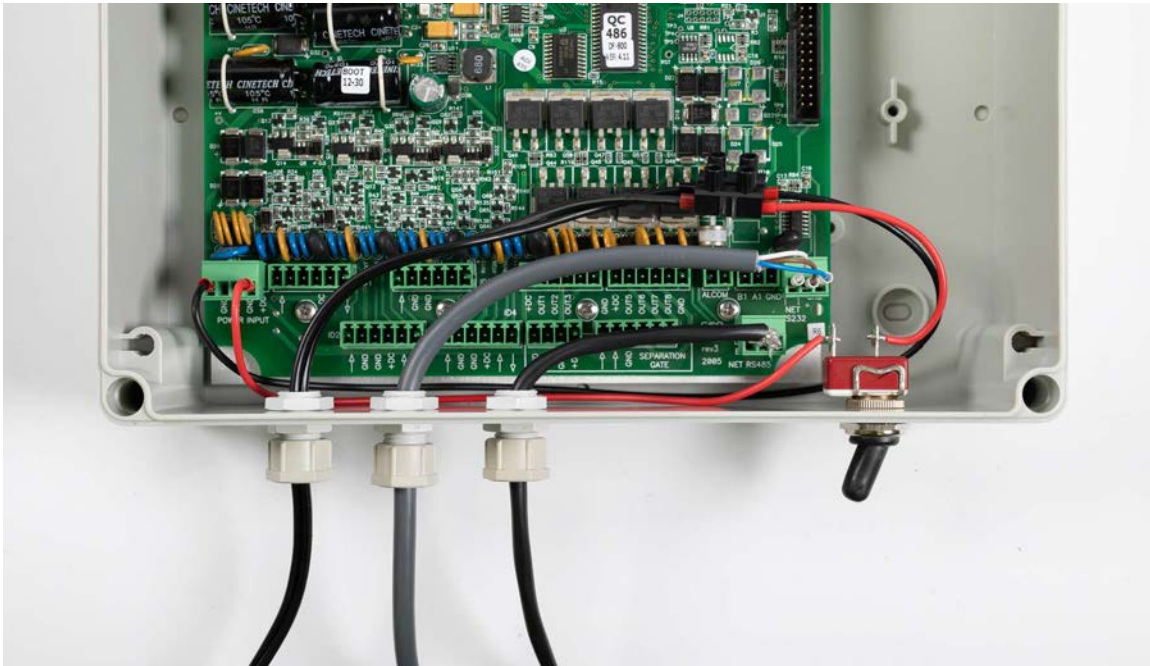
1. Confirm the position of the DF800 so it can be easily connected to the customers PC via the RS232 serial lead. Remove the front cover of the DF800 by unscrewing the screws found at each corner of the box.



2. Place the DF800 into the mounting position and using a drill and masonry bit, drill into the wall at the 4 points (1 in each corner). Fix in position using the screws & plugs that are included to securely mount the box to the wall.



Wiring Schematic of the DF800 Mastercard. A larger copy can be found in section 6



3. Feed the Power, RS485 & RS232 cables into the DF800. This is achieved by loosening the 3 securing nuts found at the bottom of the case and feeding the cables through. Using the Wiring schematic for reference, fit the power supply, the NET RS485 cable and the RS232 Serial cable to the connection points of the DF800.
4. Once all connections are complete, replace the front cover of the DF800. Connect the RS232 serial cable to the customers PC.
5. Neatly and securely, run the RS485 cable all the way from the DF800 so it reaches to the DF1010 located inside the steel box.

An RS485 cable must be run between DF800 Mastercard and the DF1010 control box so communication between these can be achieved. The RS485 cable must be neatly secured ensuring it is not positioned to within 1 meter of high voltage cables when run parallel.

4.4 Solenoids

Each Solenoid will need to be wired into the DF1010 control box. Air pipes will also need to be fitted to each solenoid with 2 x feeds coming from each air ram on the gate and 1 x feed exiting the solenoid.



1. Measure the 2 x air pipes coming from each air ram so they will comfortably reach the solenoids. Cut the pipes and feed through the 9mm holes created earlier in the steel box.

Insert the pipes into the 2 x air connectors which are located together on the solenoid. Repeat until all air pipes are fitted to each of the solenoids.



2. The solenoids must now be linked together. Measure and cut the air pipe and connect together using the T-section connectors as shown in the picture above.



3. The remaining Air Pipe coming from the Regulator can now be connected to the T connector



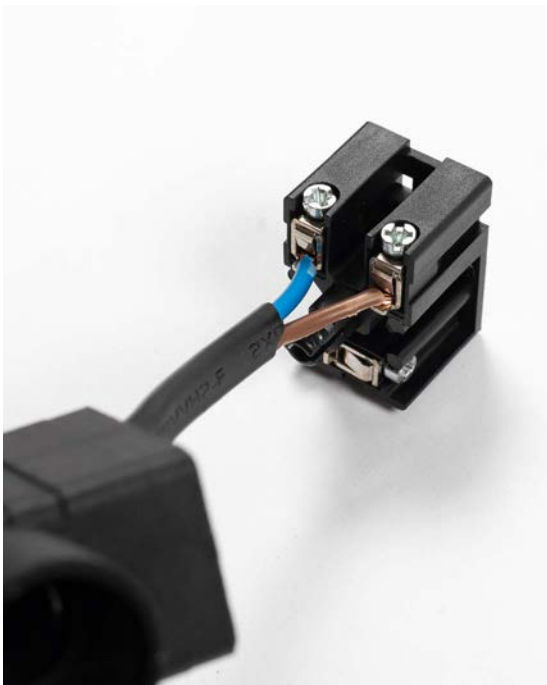
4. Remove the black connection plug from the Solenoid by loosening the screw and pulling the plug away from the solenoid.

5. Remove the seal and the connection block from the housing





6. Take the 2-core power cable and feed through the housing of the plug. Using the wire strippers, strip the wires back.

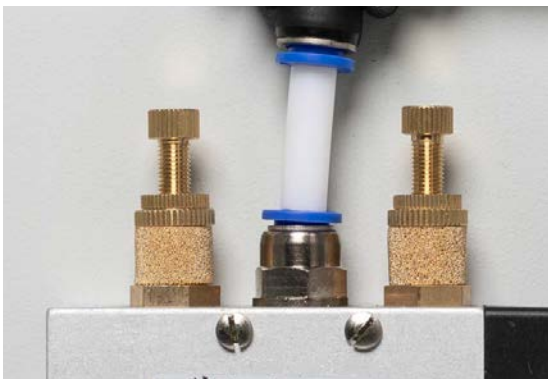


7. Fit the wires into the connection block as shown in the diagram.

Once connected, re-fit the plug back together.



- 8.** Re-connect the plug to the solenoid and secure in place by tightening up the screw. Once connected, measure the cable and cut to size so it will comfortably reach the DF1010 control box.

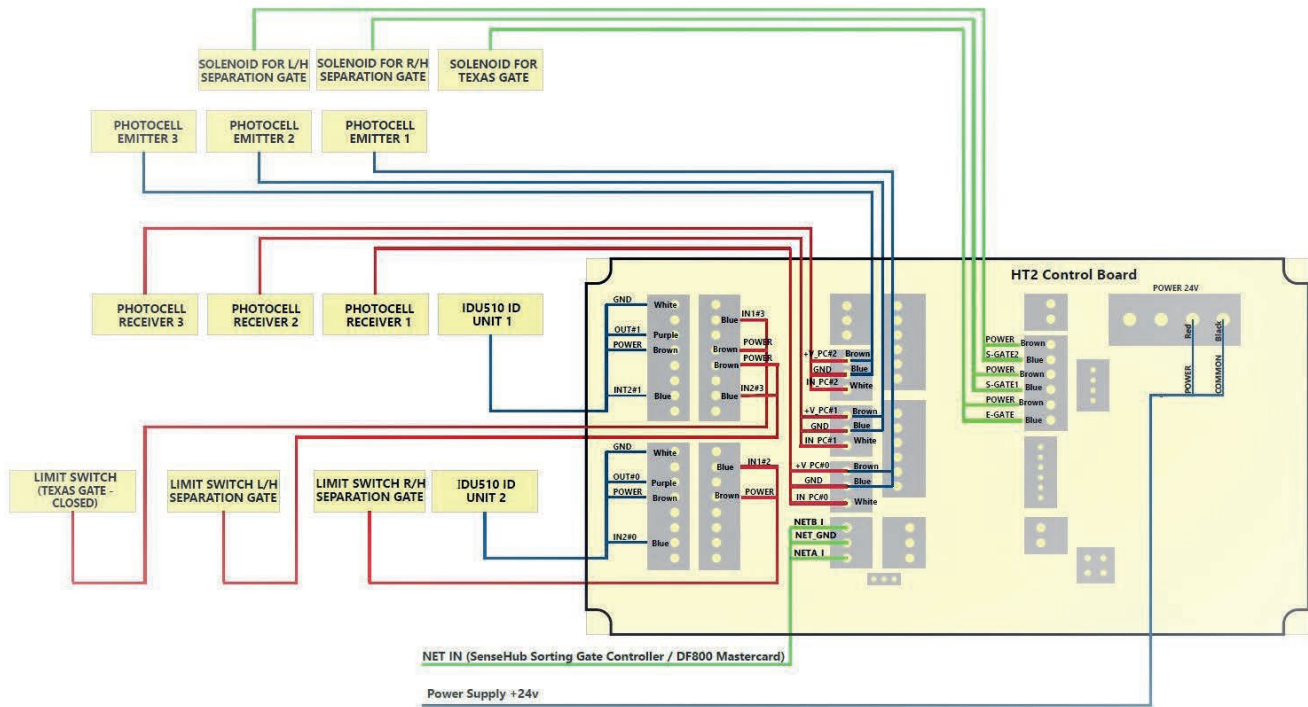


- 9.** Unwind the brass Pneumatic exhausts until they are in a fully open position. Re-tighten by 2 full turns so they are positioned at an optimum level for powering the air rams.

- 10.** Repeat until all the solenoids are completed and ready for connecting into the DF1010.

4.5 Wiring of the DF1010

Wiring Schematic of the DF1010. A larger copy can be found in section 6



The Wiring Schematic showing connection points for the Power Supply, Photocells, IDU510 ID Units, Solenoids, Limit Switches and SenseHub Sorting gate controller / DF800

Before commencing with the wiring of the DF1010, all cabling exiting the sorting gate must be neatly and securely fed through the remaining 25mm black flexible conduit and into the steel box.

1. Measure the distance from the exit of the metal trunking to the entrance of the steel box containing the DF1010. Cut 4 pieces of the 25mm black flexible conduit ensuring they will comfortably reach from the trunking to the steel box.

Group the cables as follows:

Limit Switch cables into 1 piece of 25mm conduit

Photocell cables into 1 piece of 25mm conduit

IDU510 cables into 1 piece of 25mm conduit

Power Supply & Sensehub Ethernet cable / DF800 RS485 cable into 1 piece of 25mm conduit



2. Using the tape, tape each group of cabling together at multiple points down the full length of the cables and proceed to feed these through the conduit. Once completed, feed through the conduit connection points at the bottom of the steel box.



3. Attach the conduit into the connection points at the bottom of the steel box. Continue until all 4 x pieces of conduit are attached to the connection points and all cabling is inside the steel box ready for wiring into the DF1010.



4. Now all the cabling is positioned, fix all air pipes and cabling (situated in the metal trunking) in place using the large black cable ties. This will keep these out of view and safe whilst the gate is in operation.

Neatly Cable tie all the flexible black conduit together so it is out of view and there is no possibility of damage by any means.

5. Open up the DF1010 by unclipping the 4 x clips found at the side of the case. Take a stanley knife and carefully remove the tops from all of the green input grommets. This will make it easier for inserting the cabling.

Before cutting any cabling, ensure each individual cable is sufficiently marked showing the description of that part and the position it is found on the sorting gate.

Wiring the DF1010 in an incorrect manner will cause the Sorting Gate to malfunction.



6. Attach the Ethernet cable (from the regular Sensehub Controller) to the SenseHub Sorting Gate Controller. The Controller lights will become active as the boot up process begins.

Ensure this ethernet cable is plugged into the PD Port on the Sorting gate Controller.

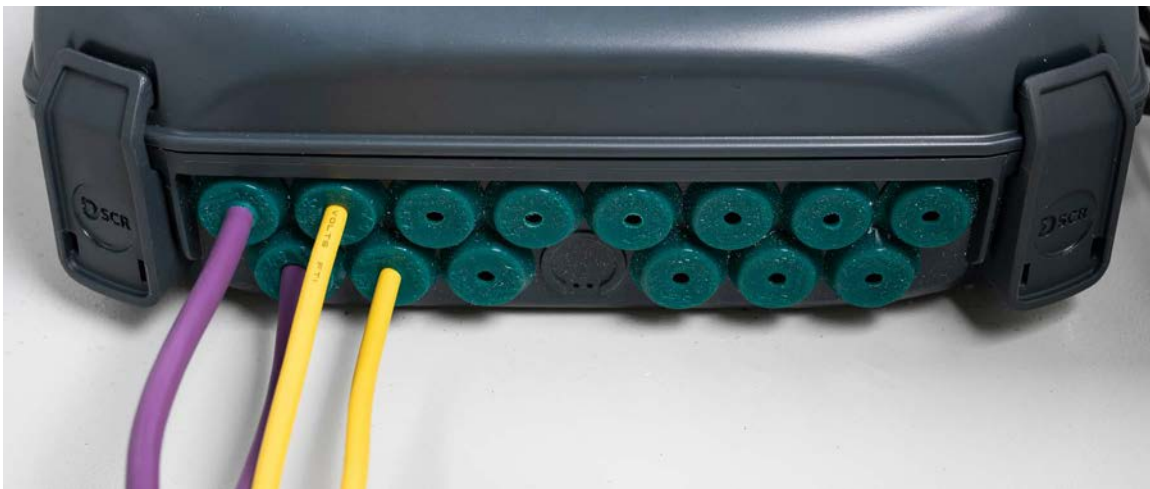


7. Insert the cables from the Power Supply and the Sensehub Sorting Gate Controller through the 2 grommets found at the right-hand side of the DF1010

Wire into position as described in the wiring schematic.

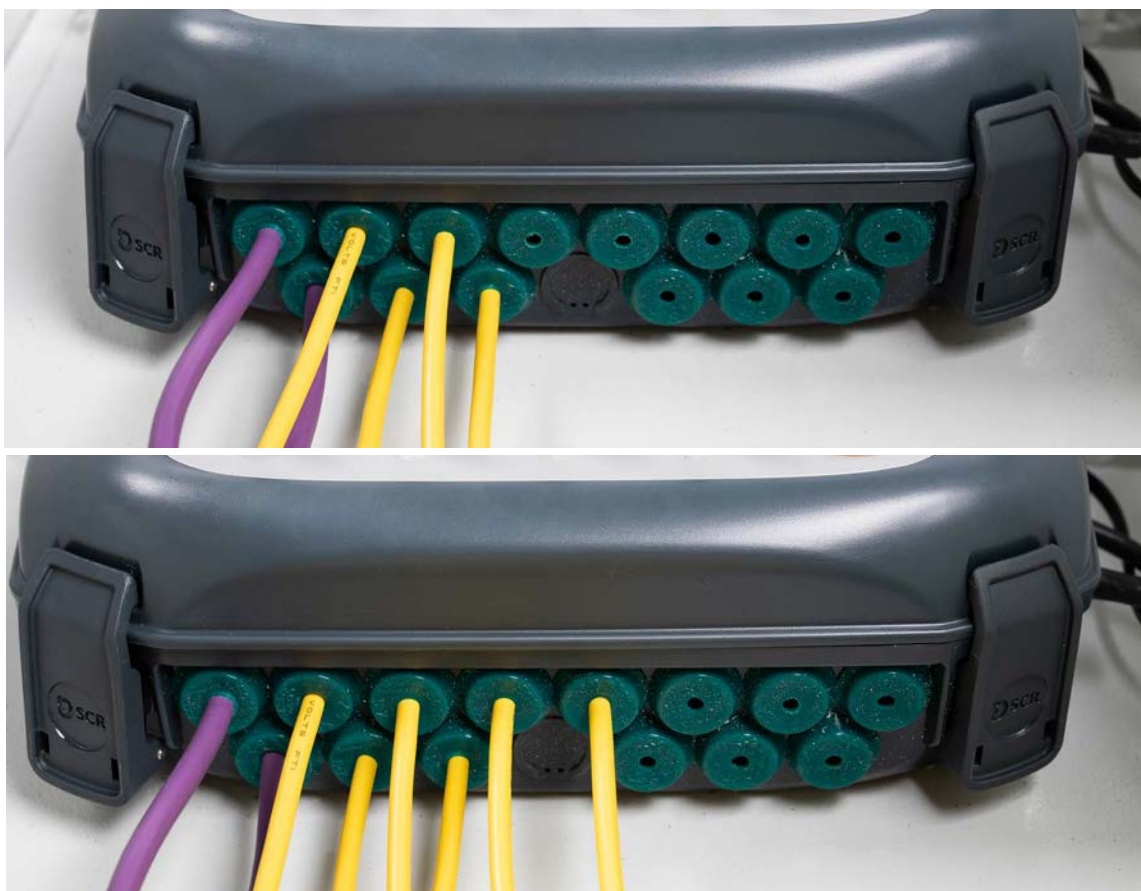


8. Take the 2 x purple cables of the IDU510's and feedthrough 2 of the green grommets found at the left and then into the case of the DF1010. Measure the cable to the connection point of the DF1010 ensuring enough cable is retained so it can neatly run down inside the steel box. With the wire cutters, cut the cable back to size. Take the wire strippers and strip the cable back to expose the wire. Wire into the correct connection point on the DF1010 as shown in the wiring schematic.

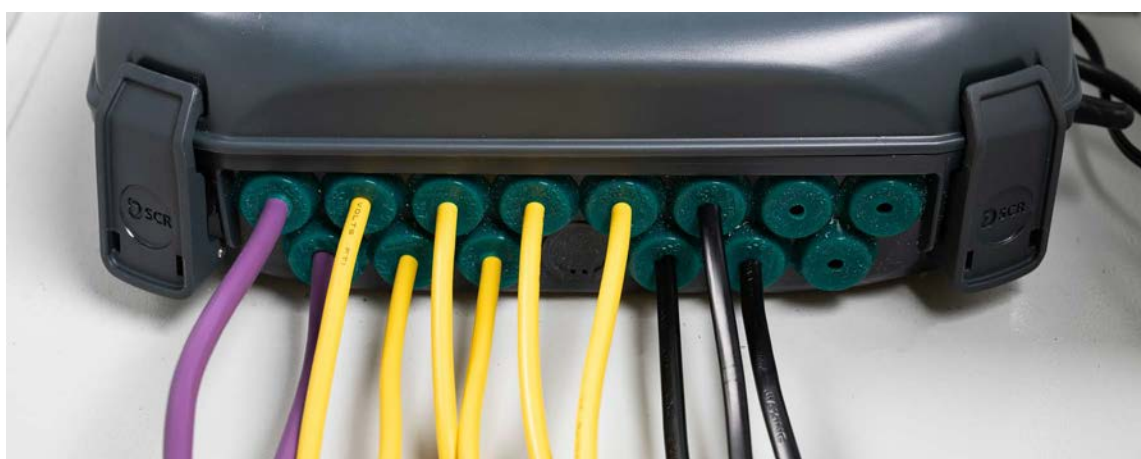


9. Find the 2 x cables from Photocell 1 (E1 & R1) and feed through the green grommets and into the case of the DF1010. Measure the length and strip the cables back. Fit to the correct connection points of the DF1010 as described in the wiring schematic.

When wiring in the Photocell Cables, the white wire from the Photocell Emitters is not required. This can be secured away from the board by taping it to the yellow insulation of the photocell cable.



10. Repeat the process for **Photocell 2 (E2 & R3)** and **Photocell 3 (E3 & R3)** by feeding the cables through the green grommets and into the case. Wire into the DF1010 as described in the wiring Diagram.



11. Fit the cables for the limit switches into the DF1010. Wire onto the board as described in the wiring schematic.



12. Fit the cables for the solenoids into the DF1010. Wire onto the board as described in the wiring schematic.



13. Neatly group the cables together and run them down the sides of the steel box, Cable tie all the cables so the are neatly and securely placed inside the box.

4.6 Powering up the Sorting Gate

- 1.** Turn on the Air compressor and immediately check the regulator to ensure the gate is receiving the right amount of pressure for correct operation. Check all connections on the rams and solenoids to check for no leaks.
- 2.** Plug in the Power supply to the mains. The DF1010 inside the steel box will now power up.
- 3.** Switch on the DF800 Mastercard located near the customers PC. The lights on the front will illuminate as it powers up.
- 4.** Put the Sorting gate into manual mode by clicking the switch on the front of the DF1010. Making sure no person or cow is inside / near the sorting gate, commence to test the operation of each gate by using the switches on the DF1010. If the gates do not operate correctly, try adjusting the exhaust valves on the solenoids to fine tune the operation of the air rams
- 5.** Check the operation of the IDU510's by breaking the beam of Photocell 1. Once the beam is broken, the IDU510's will start to flash as they search for a tag.

5. General Maintenance & Troubleshooting

5.1 Maintenance

WEEKLY MAINTENANCE TASKS

- Check Alignment and position of all Photocell brackets
- Clean the 6 x Photocells with a damp cloth to remove any debris
- After cleaning of the photocells, check the lights of each emitter go out when the beam is broken
- Clean the 2 x IDU510 ID units with a damp cloth to remove any debris
- After cleaning of the IDU510's, check the lights flash by breaking the beam of Photocell 1.
- Grease all moving parts such as the Texas Gate (nipples & slide mechanism) and hinges of the Separation Gates.

MONTHLY MAINTENANCE TASKS

- Drain the Air Pressure Regulator to remove any moisture build up in the system
- Check the Condition of the floor to ensure the feet are firmly secured and no cracking of the surface has occurred
- Check all air pipes to ensure no kinks or splits are present
- Check all the Framework Nuts and Bolts to make sure they are still firmly in place
- Clean the framework of the gate to allow general visual inspection.

Please do not power wash, steam clean or jet wash any of the electronic components.

5.2 Troubleshooting

1. One of the gates, (either the Texas or Separation gate) opens and closes repeatedly as if there was a cow blocking the complete closure of the gate (but no cows are present)

It is possible that the Limit Switch is not detecting that gate is correctly closed. Refer to the Wiring Diagrams and proceed to check the connections into the DF1010 are correct. Re-check all wiring into the Limit switch ensuring the correct terminals have been used (terminals 21 & 22)

2. There are cows in the Sorted Cows Area that should not be there, these cows were sorted unnecessarily.

If after checking all the reports used for sorting during this shift and there is still no reason for these “extra” cows, check the position of all photocells (as seen in section 2.6) and in addition ensure that all photocells are clean and free from any debris.

3. There are cows missing from the Sorted Cows Area, these cows were required but not sorted.

If after checking all the reports used to sort cows and confirming the required cows appear in these reports, check the read range of the IDU510 ID Units. This can be done by covering Photocell 1 & using an Allflex CSense tag, moving it slowly through the gate. The IDU510's should flash rapidly when the tag passes from Photocell 1 and continues until the tag reaches the Texas gate assembly. This test should be repeated throughout the full width of the race to ensure no dead spots are present. If the range is found to be inadequate, please go to question 4.

Also check the position of all photocells (as seen in section 2.6) and in addition ensure that all photocells are clean and free from any debris

4. The cow moves through the race but the IDU510's do not read the tag.

Check that the SenseHub / Heatime system is online and that there is a live connection the sorting gate. This can be checked by seeing if the IDU510's become activated when Photocell 1's beam is broken. If this does not occur, please perform a system reboot by power cycling the sorting gate power supply. The regular SenseHub controller will also need to be re-booted by power cycling the POE adaptor. If using a Heatime / DFII system, power cycle the DF800 Mastercard instead.

5. As the Texas Gate / Separation Gates are activated, the air rams are not working or moving very slowly.

Check the Air pressure regulator and note the output of the compressor. The ideal operating pressure for the gate should be between 6 to 8 bar. All air pipe to ensure no leakage is occurring. Open the steel box and check all pneumatic exhausts on the solenoids (as in section 4.4) to ensure they have been sufficiently opened.

6. As the cow is passing through the Texas gate, the gate closes on the back end of the cow.

Check the position of Photocell 2. If the position is correct, try moving the Photocell bracket closer to the Texas Gate Assembly by 50mm. This will mean the Texas gate will close later ensuring the cow has passed freely first.

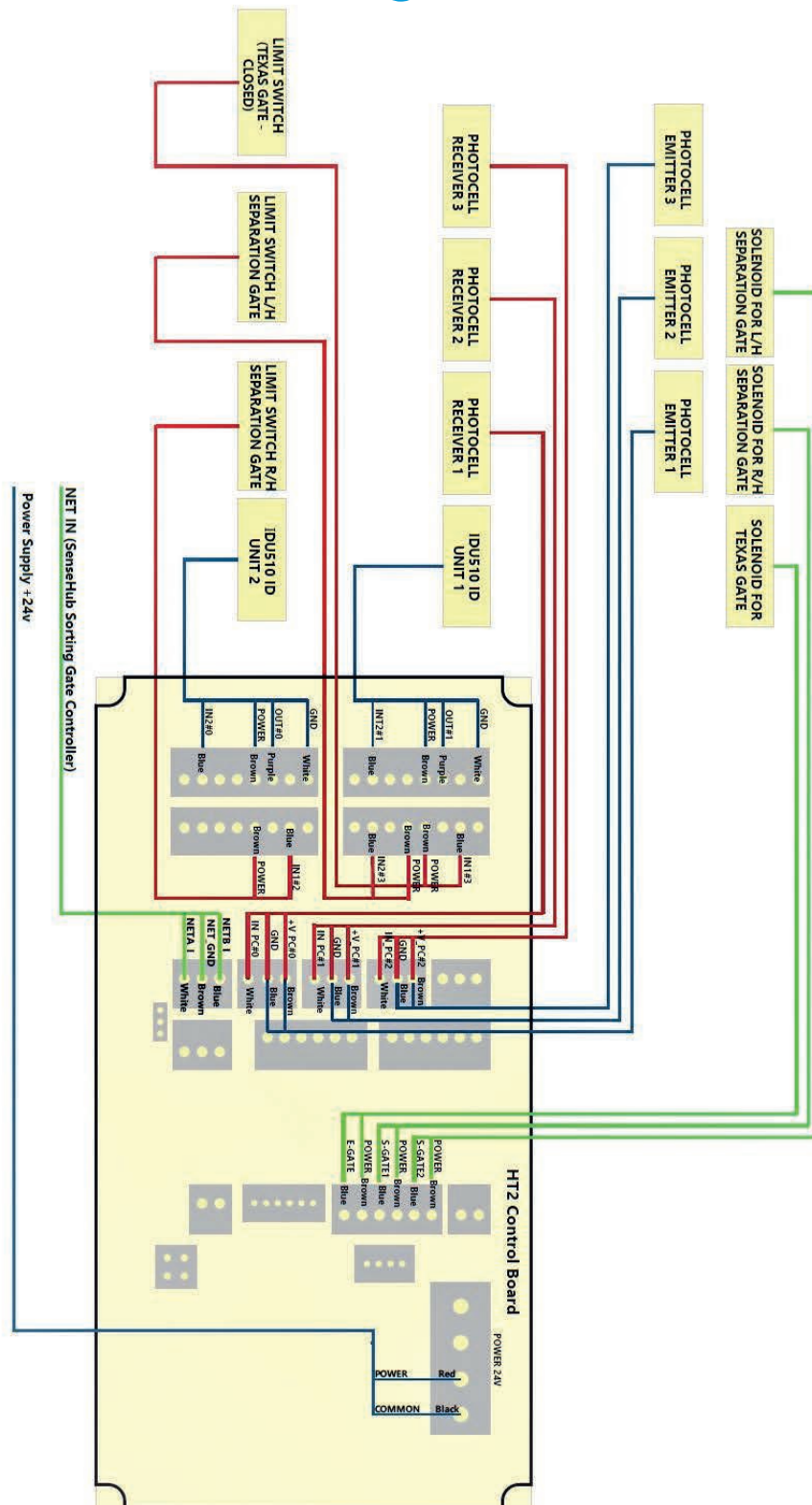
7. As the cows are passing through the sorting gate, the IDU510's are only intermittently reading the tags

The read range of the IDU510's may be affected. To increase the read range, unscrew and remove the cover plate on each ID unit. Take out the filter paper (found on the bottom of the internal housing) and **carefully** remove the perforated centre **only**. Refit the paper back into the IDU510's and replace the cover plate (Please see pictures below). This will now increase the read range of the ID units.

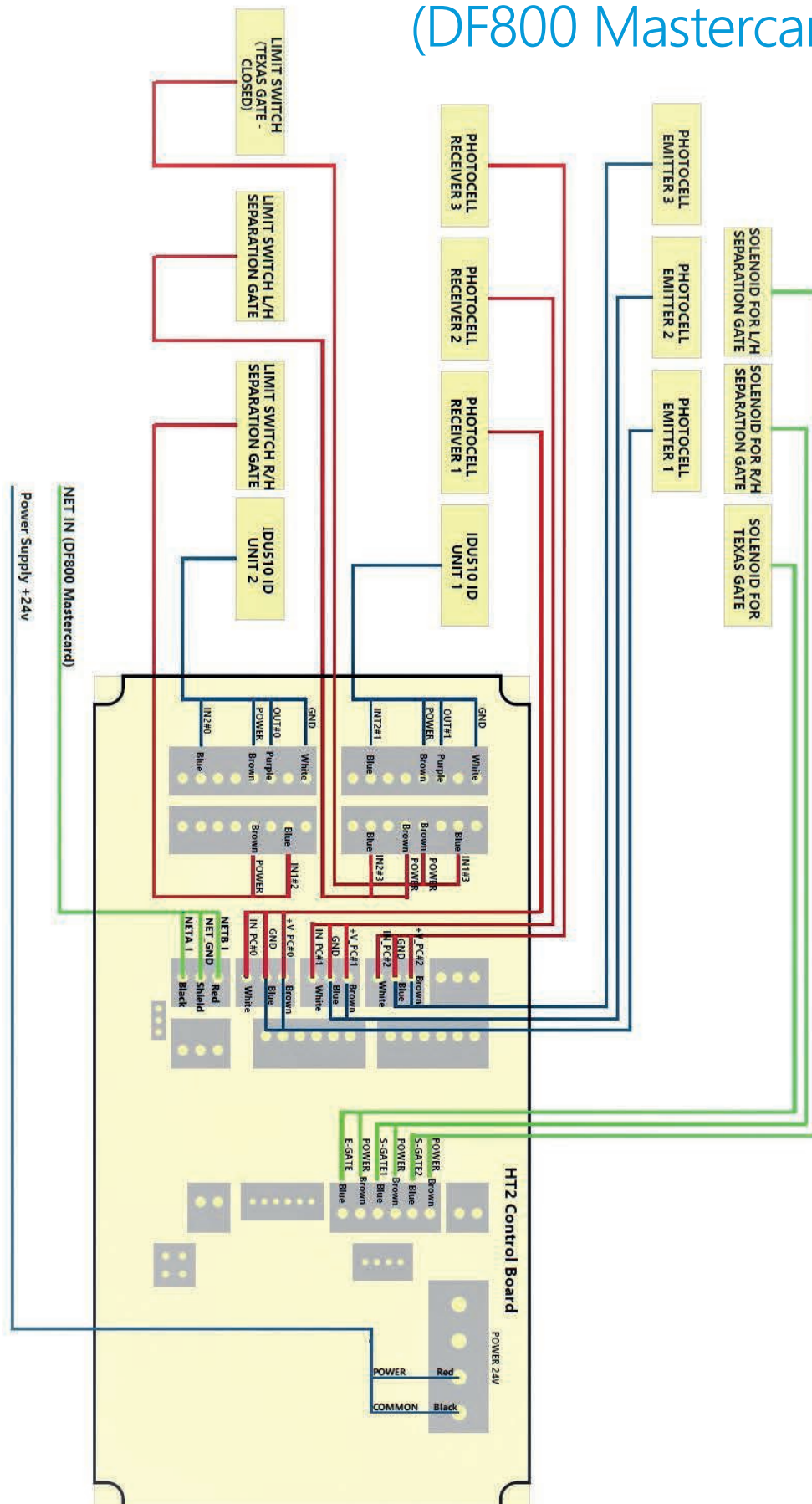


6. Wiring Schematics

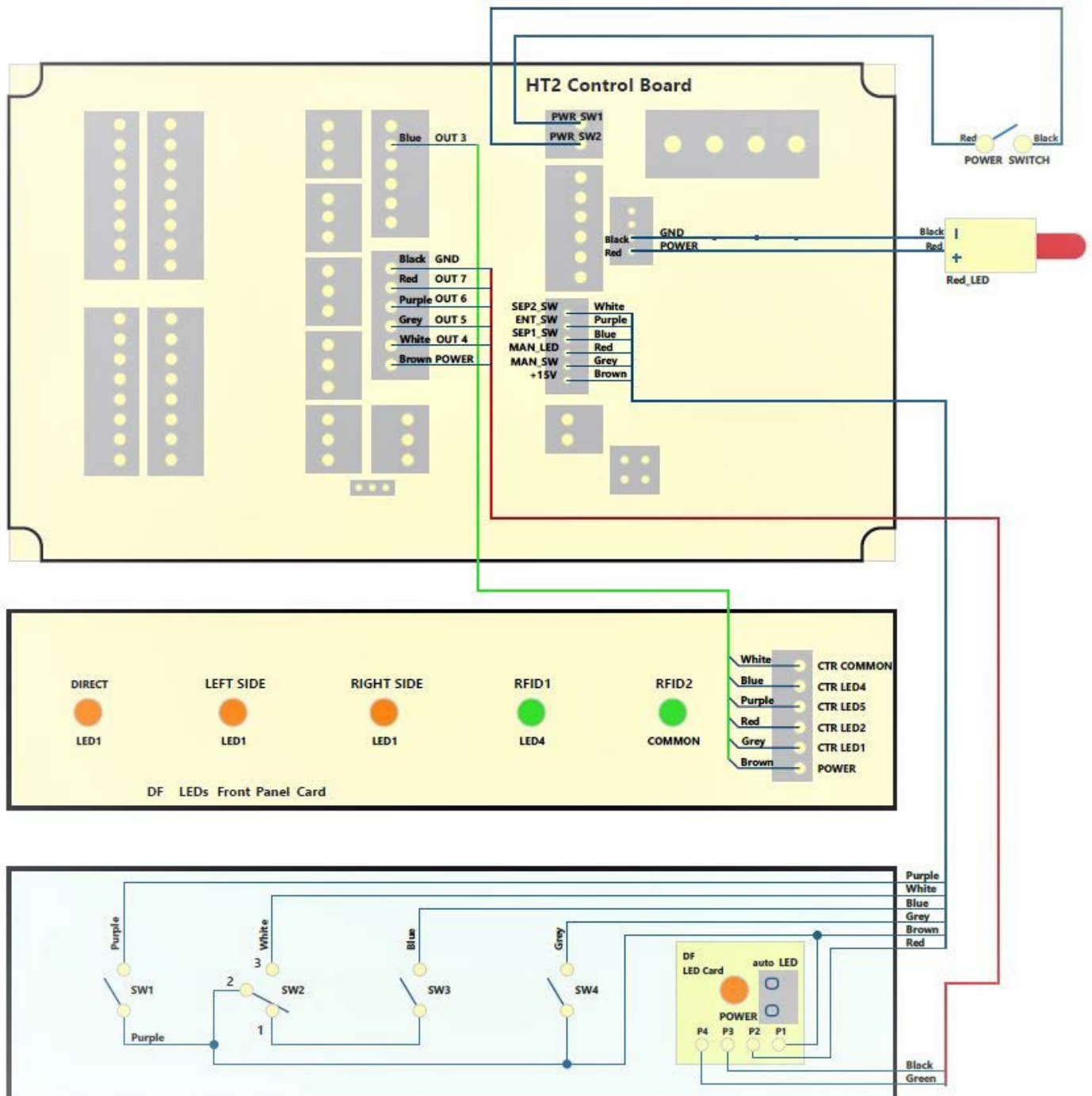
6.1 DF1010 Control Board Schematic (SenseHub™ Sorting Gate Controller)



6.1 DF1010 Control Board Schematic (DF800 Mastercard)



6.2 DF1010 Lid Schematic



6.3 DF800 Mastercard Schematic

