FEED CONTROLLERS

FASTFEED v1.6

Installation & Operation Manual

CE

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1.0 OPERATING INSTRUCTIONS

The Davlec Fastfeed is a sophisticated, micro-processor based feeder control, designed to operate a wide range of feed dispensers. Rations from 0-15 units of feed can be entered for each feeding stall at the press of a single button.

1.1 Normal Mode of Operation

Fastfeed is simplicity itself to operate. The installing engineer will have set up the unit to suit the type of feed dispensers and the parlour size, and in the case of Auger-feeders, will have performed the initial calibration process.

When the Fastfeed is ready for operation, the top left hand corner of the display will show either "L1" or "R1". The bottom line of the display will show "Enter feed". The letters "L" and "R" refer to the left and right hand side of the parlour. If the display shows "L1", then the Red LED above the left arrow will be switched on. Pressing the right arrow key will result in the LED above the left arrow being switched off, the LED above the right arrow switching on and the stall display now showing "R1". To switch back to the left hand side of the parlour simply press the left arrow.

Each cow entering the parlour can be fed between 0-15 units of feed simply by pressing the appropriate key on the keyboard. Say the first cow is to receive 5 units. Pressing the "5" key will result in the feed column displaying the number 5. The stall display will now have changed to "L2" indicating that the Fastfeed is ready to receive the feed amount for the cow in the second stall. Say this animal is to receive 14 units of feed. Pressing the "14" key results in the feed display showing the number 14. The stall display now shows "L3" indicating that Fastfeed is ready to receive the feed amount for the third stall.

On say an 8 a-side parlour, another 6 numbers have to be entered corresponding to the number of units of feed required for each of the remaining 6 animals. If for any reason there is an empty stall, then pressing the "0" key will ensure that no feed is dispensed to that stall.

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As soon as the amount of feed has been entered for the last stall, the bottom line of the display will change to the message "Start feeding?". If the operator is not certain about the amounts of feed he has entered, then he can restart the process by pressing the "X" key which is used to indicate a "No" answer. If he presses the "X" key then Fastfeed will go back to the beginning, stall display will show "L1" and the bottom line of the display will show "Enter feed".

If the operator is happy that he has entered the correct amounts of feed, he can initiate the feeding process by answering "Yes" and pressing the tick key. At this point the bottom line of the display will change to the words Feeding and the row of LED's above the main display will indicate the state of the feeders. For Pulse type feeders, the LED's will switch on and off to show that the feeders are being operated. In the case of Auger Feeders, the LED's will indicate when the Auger motors are running.

When all feed has been dispensed the stall display will change to "R1", and the bottom line of the display will change to "Enter Feed". This indicates that Fastfeed has automatically switched over from the left to the right hand side and is ready to accept feed amounts for the right hand side. The operator can override this automatic side change by pressing the left and right arrow keys.

1.2 Batch mode of operation

There will be occasions when the operator will wish to feed the same number of units to each stall. This is very easily accomplished by pressing the "Batch" key. The stall display will now change to either "LB" or "RB" depending on which side of the parlour is being fed. To feed 3 units to each stall, simply press the "3" key. The bottom line of the display will now change to "Start feeding?". If the feed amount is correct, then feeding can be initiated by pressing the "Yes" key.

To revert to the normal mode of operation, simply press the "Batch" key again and the display will now return to either "R1" or "L1" depending on which side of the parlour is selected.

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1.3 Cow Totalizer

Pressing the "Cow" key will result in the display showing the total number of cows milked since the counter was last reset. The bottom line of the display shows the message "Press X to clear". If the operator wishes to leave the counter at its current value then he should press one of the arrow keys. If the operator wishes to reset the counter then he should press the "NO" key.

1.4 Feed Totalizer

In the same way, pressing the "Feed" key will indicate the total number of portions of feed dispensed since the counter was last reset. Again the operator has the option to leave the counter at its current value or to reset it to 0 either by pressing the "No" key.

1.5 Calibration Mode - Auger Type Feeders Only

Pressing the "Cal." key will result in the bottom line of the display changing to the message "Calibrate (Y/N)". Please note that this will only work if the Fastfeed has been set up for "Auger" type feeders. If the operator does not wish to proceed with the calibration, then he should press the "No" key. If he wishes to calibrate, then he should press the "Yes" key.

The bottom line of the display will now change to the message "Seconds per portion". Auger type feeders vary dramatically in the rate which feed is dispensed. Some will take as little as 1 second to dispense 500 grams while others will require 25 seconds. The operator must be aware of the approximate running time of the auger to dispense the required portion size. Let us say for instance that a portion size of 500 grams is required and that this takes approximately 5 seconds. The operator now presses the 5 key. The display will change to a 5. If this has been entered correctly, then the operator can then proceed to the next stage by pressing the "Yes" key. If the number has been entered incorrectly then he can start again by pressing the "No" key.

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As soon as the number of seconds per portion has been entered correctly, the bottom line of the display will change to the message "Portion size" and the portion on the bottom line display will show the default value of 500 grams. The default value can be entered by simply pressing the "Yes" key. If another value of grams per unit is required then this can be entered on the keyboard. Again if the amount entered is correct, the operator can proceed by pressing the "Yes" key. If the amount entered is incorrect then he can start again by pressing the "No" key.

Please note that the number of seconds per portion must be in the range of 1 to 25 seconds and the grams per portion can not exceed 1000 grams. When the number of seconds per portion and the number of grams per portion have been entered and the "YES" key pressed, the display will now show "Drop calibration...portions YES/NO". This allows the operator to proceed with the Fastfeed running the feed dispensers for weighing the feed or to skip this process and just enter weights into the Fastfeed. Pressing the "Yes" key will now result in the bottom line of the display changing to the message "Dropping 5 x portions".

The Fastfeed will now dispense 5 units of feed to each stall. If the seconds per portion have been set to, say, 5 seconds then the auger motors will be run for a period of 25 seconds. In certain circumstances, particularly on larger parlours, the installing engineer may have selected a feeding batch of either 4 or 6, which means that the feed dispensers will be operated in groups of 4 or 6. As soon as all the feeders have been operated, the bottom line of the display will change to the message "Enter weight".

The operator must now weigh the contents of each manger in turn and enter the feed amount using the keyboard. If the actual amount of feed is say 2450 grams then this amount should be entered on the keyboard. When the amount has been entered correctly, the operator can proceed to the next stall by pressing the "Yes" key. If the amount is incorrect then the operator can start again by pressing the "No" key. The weight for each manger is entered in turn for the first side of the parlour.

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Please note that the accuracy of the calibration depends on the accuracy of the original estimate of the running time per unit of feed required. If for instance, we have selected 500 grams per unit the Fastfeed will expect a weight of approximately 2500 grams. If the actual weights show a variation of more than say 20% i.e. are either below 2000 grams or above 3000 grams, then the calibration process will not be as accurate as possible, and the operator should recalculate the number of seconds per portion and restart the calibration process.

Let us assume that we originally set the Fastfeed for 5 seconds per portion and 500 grams per portion. If the estimate of the running time per unit has been accurate, then we would expect to be getting 2500 grams in each manger. If we are actually getting weights of, say, 5000 grams then the auger is obviously running for twice as long as is required and the calibration process should be started again using, say, 2 seconds per unit. If on the other hand the weights are of the order of 1250 grams, then the augers are obviously running for half as long as they need to and the calibration process should be repeated using 10 seconds per unit. The calibration process can be terminated at any time by switching off the power to the Fastfeed, waiting 10 seconds, and switching the power on again. The operator can then go into the calibrate mode again simply by pressing the "Cal." key. If the amount of feed in the manger is within 20% of the expected amount, then the actual amounts can be entered for each stall in turn. The operator can then go on to repeat the process for the second side of the parlour. As soon as the calibration process has been completed for the second side, the Fastfeed will revert to its normal mode of operation.

1.6 Power Supply Considerations

Fastfeed has been designed to be as immune as possible to the affects of surges on the mains supply. However, during severe electrical storms, transients may cause the units to "Lock up". The display will appear to freeze and pressing the keys will have no effect. The unit can be reset simply by switching off the power for approximately 10 seconds and switching it back on again.

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1.7 Emergency Standby

In the event of a fault in the Fastfeed control box, a manual standby system is provided. To use the standby, the operator should first switch off the power, remove the lid of the unit and disconnect it from the base. A manual side selector switch is located on one side of the Fastfeed control box, toggle this to select the left or right side of the parlour. The push button will operate the feeders for however long the button is pushed in. All feeders will operate at once.

2.0 ROUTINE MAINTENANCE AND SERVICE

The Fastfeed is housed in a strong, waterproof enclosure. It must be noted however, that this enclosure is not suitable for washing with a high pressure hose. Any cleaning required should be done using luke warm soapy water and a soft cloth. Direct blows to the front of the unit should be avoided and sharp objects should not be allowed to come in contact with the waterproof membrane.

Fastfeed is fitted with devices which are designed to minimise the effect of electrical interference. No devices are available which will protect against violent transients such as are caused by thunder storms. During a thunder storm it is recommended that the system power unit is disconnected from the mains supply.

The waterproof membrane which is the front label of the Fastfeed should be checked at regular intervals to ensure that it is not damaged. If the membrane has been accidentally punctured, then your installing agent should be contacted as soon as possible in order that a replacement label can be fitted. In most cases this should be a simple matter of peeling away the old label and fixing on a new one. If the membrane remains punctured for a long period of time water may get into the box and may cause long term and expensive damage to the unit.

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3.0 FASTFEED SETUP

3.1 Entering System Setup Menu

To enter the system setup menu press the "LEFT" arrow key and the "RIGHT" arrow key together. The display should now read "Parlour Size ... XX Stalls a side". To exit the setup menu press the "LEFT" arrow key and the "RIGHT" arrow key together.

3.2 Parlour Size

To adjust the parlour size use the numeric keys "0" to "9". To delete a value press the "NO" key.

3.3 Types of Feeders

The Fastfeed can operate the two main types of feed dispensers available, Vacuum (Pulse) or Auger. Vacuum feeders rely on a solenoid being energised usually for a couple of seconds to deflect a chamber of feed to a drop chute. No individual stall calibration can be done for these type of feeders on the "Fastfeed".

Auger type feeders generally use a small electric motor to drive an auger shaft that drags feed out of a storage bin to a drop chute. The speed of the motor and the length of time it runs corresponds to the amount of feed dispensed. The Fastfeed allows individual calibration for each stall as it is in direct control of the motors in auger type feeders. Please refer to section 1.5 for calibrating feeders.

By default the Fastfeed will be set to auger feeders but this can be changed to pulse feeders by pressing the "NO" key.

3.4 Feed Multiply

The feed multiply effectively gives a coarse calibration for pulse feeders. Most pulse type feed dispensers are set to dispense 1 lb. or 0.5 kg of feed. Some dispensers however will only deliver a quarter or a half of this amount at each operation and some method is required of increasing the number of times the dispenser is operated,

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in order to dispense reasonable amounts of feed. When the feed multiply is set to "x1" and the cow in stall L1 is programmed for five units of feed, the Fastfeed will send five pulses to the feed dispenser. If the feed multiply is set to "x2", then the Fastfeed would send ten pulses to the feed dispenser. In exactly the same way selecting "x4" will give twenty pulses. Where "Auger" type feed dispensers are being controlled, the feed multiply has the effect of doubling or quadrupling the portion time.

3.5 Feeding Batch Size

The feeding batch size refers to the amount of feeders operated at once. In the case of auger feeders the power transformer may not be adequate to operate all feed dispensers in one go. For example, if each feed dispenser is rated at 25W in an 8 a side parlour and the transformer has a maximum power output of 125W then selecting a batch size of "4" will operate only four feeders at any time therefore maximising the load on the transformer to 100W at any time. Selecting a batch size of "6" will operate six feeders at once.

3.6 Pulse Time for Vacuum Feeders

If pulse type feeders have been selected as mentioned in section 3.3, then a pulse time needs to be set. The default setting is "2" seconds but this can be increased up to "20" seconds or decreased down to "1" second.

3.7 Enticement (Single Shot)

The enticement option provides a single portion of feed to stall 1 on either the left or right side of the parlour when a new side of cows are being entered. The enticement option as the name suggests entices the first cow down to the first stall by the sound of feed hitting the feed trough. The second and subsequent cows should follow the first cow. The single feed portion will be deducted from the total feed allocation for that cow in stall 1. Pressing the "NO" key toggles the enticement option on and off.

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3.8 Quick Feed

The quick feed option allows the dispensing of feed immediately after you have pressed a ration amount on the numeric keypad.

3.9 Power Supply Specification

Where a Fastfeed is required to replace an existing controller, a new power unit may not be required. The Fastfeed main panel will function at D.C. voltages in the range of 12 to 24 volts. Please note that if the power unit gives an unsmoothed full waved rectified output, the peak voltage should not exceed 24 volts, i.e. the R.M.S. voltage should not exceed 17 volts.

In the case of pulse type feeders, these are vacuum or compressed air operated and controlled by a solenoid valve. These valves will be either 12 or 24 volts D.C. Solenoid valves nominally rated at 12 volts are usually operated from an unsmoothed 15-17 volt R.M.S. power supply. The Fastfeed and the solenoids can usually be operated from the same power supply providing suppressors have been fitted in accordance with the schematic diagrams at the end of this manual. Fastfeed will operate the solenoids so that all even stalls are operated together, and all odd stalls are operated together. Thus on an 8-a-side parlour, with all feeders dispensing feed, the maximum number of solenoids switched on at any time is four. If each of these is rated at 0.75 amps, the maximum load is 3 amps. Allowing 1 amp for the Fastfeed itself, the power unit must therefore be rated at 4 amps. The output voltage must be suitable for the solenoid valves, and in turn, the voltage of the Fastfeed output relay panel must be selected to suit the power unit. The power supply is connected to the + and - terminals on the output relay card, and the link to the left of the card and immediately above the fuse holder is not removed. For further information, see section 8 and the schematic diagrams at the end of this manual.

In the case of auger type feeders, it is possible to operate the system from a single supply connected as above. However, the recommended method is to have a separate 16 volt R.M.S. 2 amp. power unit to supply the Fastfeed, and a separate power unit to supply the auger motors. In this case, the relays on the relay card

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will be operated from the 2 amp supply, and a 12 volt relay card is therefore suitable, even if the auger motors are 24 volts. The 2 amp power unit is connected to the terminals marked + and - on the relay card. The link above the fuse holder is removed, and the positive terminal of the auger motor power supply is connected to one of the terminals marked "Feeder Power Supply", preferably to the M5 stud at the top left hand corner of the card.

When calculating the power supply capacity, please remember that all feeders on each side of the parlour will operate together. If each motor is rated at 3 amps, on an 8-a-side parlour, the power unit needs to be rated at 24 amps. To ensure accuracy of feeding, the auger power supply should have a regulated output. For 12 volt motors, a Davlec PU1225 can be used. This has a 12 volt 25 amp capability. For further information, see section 8 and the schematic diagrams at the end of this manual.

4.0 INSTALLATION

4.1 General Information

The Fastfeed is normally installed on the bridge arm at the cow entry end of the parlour. In certain circumstances, the customer may have special requirements regarding the location of the unit. Fastfeed is housed in a strong, waterproof enclosure. The waterproofing of this enclosure is however, only as good as the arrangements that are made to connect conduit to it. Two 20mm conduit adapters are supplied to accommodate the conduit from the feeders on each side of the parlour. It is strongly recommended that these adapters should be fitted at the back of the box as close as possible to the bottom. There is adequate space on both sides of the output relay card for this to be accomplished. In most cases the cables from the power unit can also be brought in via one of these 20mm conduits. In some cases it may be necessary to bring a two core cable from the power supply, and a compression gland is supplied for this purpose. Please note that if the compression gland is being used, a round sheathed two core cable should be used and not two individual wires. It is impossible for a compression gland to provide a waterproof seal around two individual wires. In the very rare and extreme cases where it is necessary to drill the top of the box, then all the conduit

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joints must be adequately sealed together with any inspection elbows or tees above the control box. A little care during this part of the installation process will pay dividends in terms of the long term reliability of the control box.

4.2 Power Supply Cable Sizes

During the installation process, the lid of the control box may be detached from the output relay panel and taken to a safe place. The D.C. power supply should be connected to the terminals marked "+" and "-" at the bottom left hand corner of the output relay card, taking care to ensure that the correct polarity is observed. The size of the power cable will depend entirely on the types of feed dispensers. For "Pulse" type dispensers, where the solenoids are normally taking less than 1 amp each, then 2.5 mm square cable is perfectly adequate. In the case of "Auger" type dispensers, where the individual running current may be as high as 3 amps, a considerably larger cable may be required. It is advisable to follow the manufacturers recommendations on these cable sizes.

4.3 Common Earth Connections

The common earth connections from each side of the parlour are connected to the terminals marked "E" again at the left hand corner of the output relay panel. In general, the earth wire should be of the same size as the power supply cable, i.e. for "Pulse" type dispensers 2.5mm square cable is normally adequate, with a larger conductor being required for "Auger" type feed dispensers. It should be noted that the larger the number of dispensers, the more current is required in the common earth connection and therefore the greater the cable diameter required. On auger installations where there are more than six feeders on each side, it would be advisable to connect the common negatives of all the motors on each side, directly to the negative terminal of the power unit. This will reduce any voltage drops through the connections on the Fastfeed relay card. It is advisable to connect one wire from the first feeder on each side of the parlour and another from the last feeder. The earth connections can then be daisy-chained to the remaining feeders.

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4.4 Connecting Individual Feeders

The individual feeders may then be connected to their respective output terminals which are labelled quite clearly on the output relay card. The Fastfeed follows the conventional numbering system where stall "Left 1" is the stall furthest away from the operator on the left hand side of the parlour, as viewed from the cow entry end of the parlour. In the case of "Pulse" type dispensers where the solenoid current is less than 1 amp, then 1 mm square cable is perfectly adequate. In the case of "Auger" type feed dispensers then the conductor needs to be larger. Again the manufacturers specification should be followed.

4.5 Fitting Fuses and Suppressors

The output relay card is fitted with a 3 amp fuse which protects the control box only. The installing engineer should ensure that the power unit has its own adequate means of protection. The relay card has over current protection on each feeder output with a breaking limit of 3 Amps. "Auger" motors and vacuum feeder solenoids are also notoriously noisy especially when they are more than a few years old and your Fastfeed is supplied with suppressors to control this interference. These suppressors should be fitted across the motor/solenoid supply terminals or as close as practically possible. Fitting the suppressors inside the Fastfeed control box will not give adequate suppression of interference. The suppression devices supplied are diodes and should be connected so that the white band around one end is to the positive terminal of the motor.

4.6 Connection When Using Two Power Supplies

For auger type feeders, it is recommended that a separate power supply is used for the Fastfeed itself - see section 3.8. In this case, the negative terminals of the motors should be connected to the motor power unit as outlined above. The positive motor terminals should also be to connected to the relay card with fuses and suppressors as outlined above. In this case however, the connection from the positive terminal of the motor power supply should be connected to one of the terminals marked "Feeder Power Supply" on

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the relay card. The link between the two terminals must first be removed. On no account should the motor power unit positive be connected to the terminal immediately above the fuse holder since this connects to the fuse itself. The second power unit can now be connected to the terminals marked "+" and "-". No connection should be made to the terminals marked "E". The voltage requirements of this second power unit will depend on whether a 12 or a 24volt relay card is being used. The output must be D.C. and must not exceed 18 volts r.m.s. or a peak value of 24 volts as detailed in section 3.6.

4.7 Fitting The Lid

Before any attempt is made to fit the Fastfeed lid, or to switch on the power supply, the installing engineer should ensure that the polarity of the supply is correct and that the unit is being supplied from a D.C. source. In situations where existing control boxes are being replaced, and the existing power supply retained, then the installing engineer should ensure that a rectifier is fitted to the power supply where necessary. Some types of feed dispensers may have the rectifier built into the individual control box and in these cases the existing power unit may have an A.C. output. A suitable rectifier can be supplied upon request. Please note that the rectifier must be fitted to a large metal surface to give the necessary heat dissipation.

4.8 Checking For Correct Relay Panel

The installing engineer must also make sure that the unit he is fitting is suitable for the supply voltage from the power supply. The Fastfeed lid will operate at any voltage between 12 and 24 volts and it is therefore only necessary to ensure that the correct voltage output relay panel is being used. The part number for a 12 volt relay panel is 2840990A and the part number for a 24 volt output relay panel is 2840990B.

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9.0 PRODUCT SPECIFICATION

Product Name	Fastfeed v1.3					
Product Family	Feed Controllers					
Enclosure						
IP Rating	67					
Material	ABS					
Dimensions	W	230mm	L	298mm	D	110mm
Electrical						
Supply Voltage	12/24 volt D.C.					
Maximum Peak Voltage	28 volts D.C.					
Frequency	N/A					
Maximum Current Load	1.5 Amps					
Protection	3 Amp 20mm Fuse (Relay PCB)					
Environmental Conditions						
Temperature	0 to 45°C					
Humidity	5 to 95%					
Location	Indoor use only					
Approvals						
EMC Conformity to: EN 61000-6-1:2007, EN 61000-6-3:2007, EN 55022:2006						

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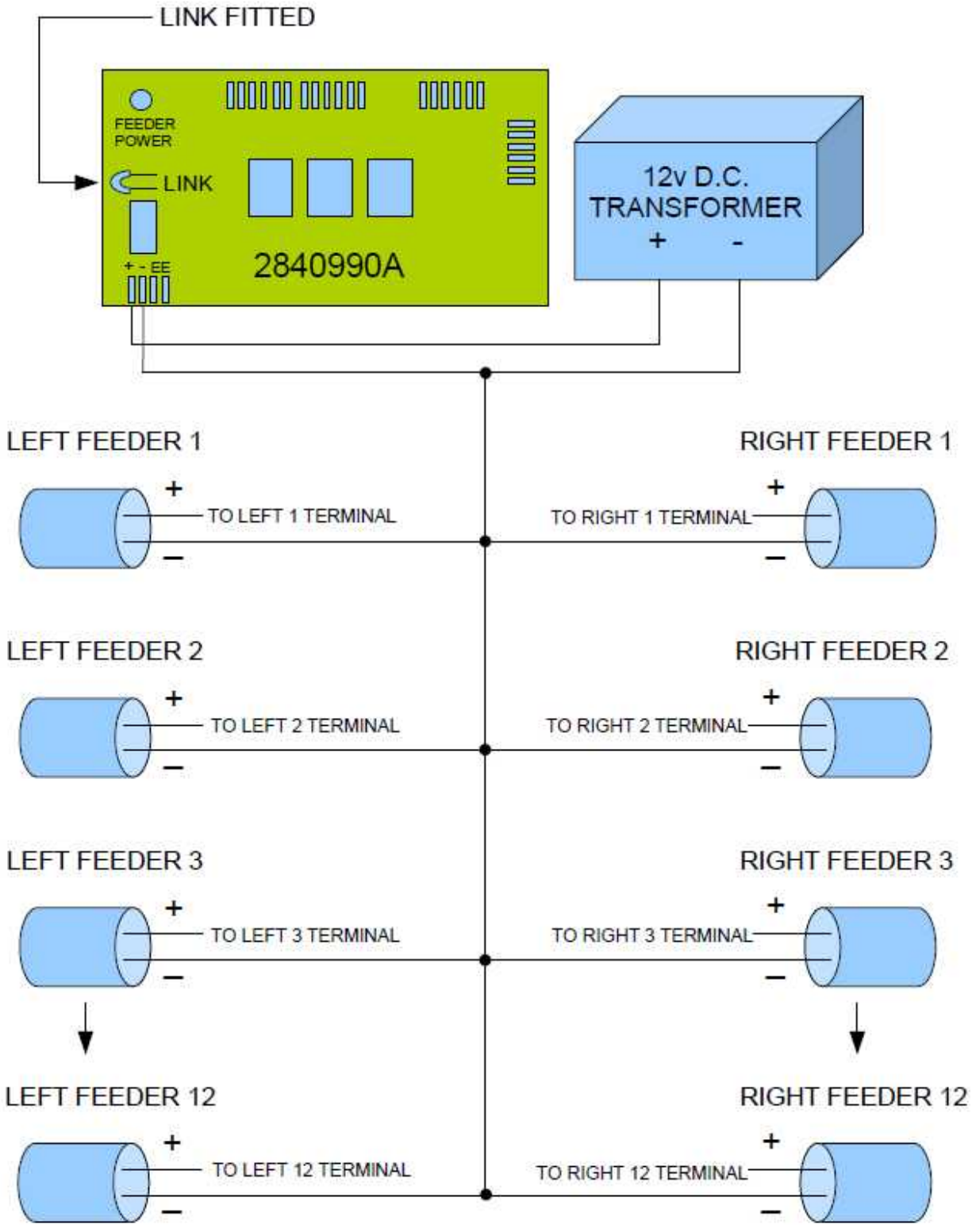
SINGLE TRANSFORMER WIRING



FIT SUPPRESSION DIODES TO EACH FEEDER

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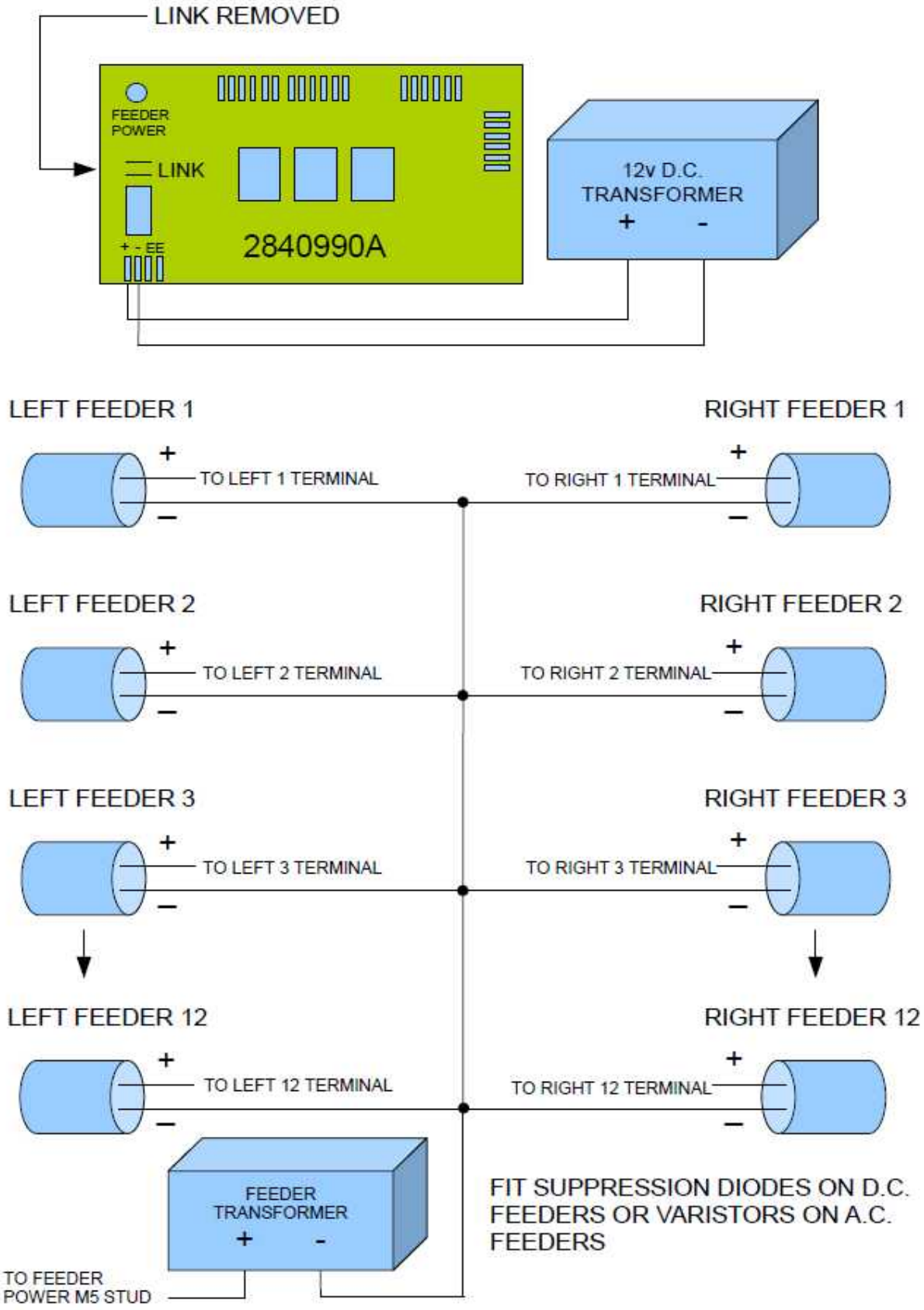
DUAL TRANSFORMER WIRING



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