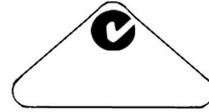


**C.S.L. MILKFLOW
INSTALLERS INSTRUCTIONS**



C-Tick

Systems Built to save

**MILKFLOWTM
FC - Model**

**INSTRUCTION
&
INSTALLER'S
MANUAL 2015**

*These instructions are to be used in conjunction with
the Danfoss operating instruction manual provided.*



Corkill Systems Ltd
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Health &
Safety
AS/NZS
4801

C.S.L. MILKFLOW

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Location of drive and operators station

Mount the CSL Controller in an upright position as close as possible above the pump that is being controlled. The enclosure is positively ventilated and is hose proof but will not stand direct pressure hosing from the underside at close quarters or water blasters from any angle.

Locate operators Control Station (if used) where easily accessible by the operator when milking and preferably within view of the receiving can window. This enclosure is hose proof and impact resistant to a reasonable degree.

Install the float in the receiving can by drilling a 20mm hole at a point in the can where the float will not be subjected to direct milk or wash incoming flows and where the float will not restrict outgoing flow to the pump. The height of the float is determined by setting the probe so that the float top stop is at two thirds height of the can diameter (see picture).

Please do not drop or knock the stem against hard surfaces, this stem contains fragile switching mechanisms that may be damaged.

Cabling and motor

This unit is designed to be permanently wired on a dedicated circuit with protection according to the controller Specification sheet current ratings. **Cables to the electric motor must be screened with both the earth conductor and the screen earthed at both ends**, minimum size 4 cores X 1.5mm, EMC type cable preferred.

This drive is C-Tick compliant and to comply with installation procedures **metal glands** must be used. Metal glands clamp the screen at maximum diameter to disperse stray voltage, therefore avoiding pig's tails on the screen.

Example of metal gland shown below.



Cable between the control station and drive to be of minimum 7/0.2mm twisted pair screened. This must not be run parallel with heavy current carrying cables, **earth the screen at both ends**. BELDEN type cable is recommended (the same as the float cable.)

The power supply cable to the drive can be non screened TPS or similar. We recommend all controllers be able to be electrically isolated near the unit. Normally the controller only requires turning off via the controls, this way the drive stays powered up and warm which discourages condensation. Three phase models all require as a minimum 10 amp circuits wired in 1.5mm cable. Single phase input units and larger three phase controllers require 20 Amp circuits (2.5mm) cable. Do not undersize earth conductors, the larger the earth conductor the better for removal of RF in the dairy.

A Mains and RF filter is factory fitted internally in all controllers, this has usually been adequate however we recognise there are certain areas where this filter will not be sufficient to suppress all radio interference, please contact your supplier for more information if this is the case.

In suspect poor power areas, should the incoming voltage drop below the unit tolerance levels, the unit will trip out, this tolerance level is below mandatory supply levels.

The client should talk to their electrician or network supplier if this condition persists as the Electrical Regulations state minimum mains supply voltage levels. This requirement is well above the controller Low Voltage tolerance level, please note that this low voltage condition will not damage the controller but could damage other electrical apparatus.

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The voltage tolerance level with three phase controllers is 325 volts, with single phase input controllers the tolerance is 200 volts.

Tip: To help avoid this condition with Single phase input units, select the phase with the highest phase to neutral voltage under washing conditions.

Connections

The motor MUST be connected in DELTA configuration for Single Phase Controllers and STAR configuration for Three Phase units.

Delta - 400V Three Phase.

Star - 230V Single or Three Phase.

Voltage Tolerance 380V – 460V Three Phase.

180V – 250V Single or Three Phase.

Power Connections;

Connect incoming supply to the supply plug at the base of the milkflow controller.

Connect the motor wires to the marked motor terminal plug, both connection plugs may be unplugged to terminate more conveniently. **DO NOT** put plugs into the brake socket – B+R ! This will cause huge damage to the controller.

Single Pump & Motor Combination

This system consists of one motor with one or more milk pumps attached.

1. Generally mount the Milkflow controller above the main milkpump.
2. Re-use the existing isolator normally at this point.
3. Remove power factor capacitor if connected (the Milkflow controller does this function).
4. Remove motor cable from the motor and re-terminate into the Milkflow controller supply terminals L1, L2 & L3. Connect the Earth to the screw/terminal provided.
5. Fit a new cable (EMC screened cable preferred) from the Milkflow controller terminals U,V,W to the motor, in some models this is a plug – be sure to put the plug back in carefully to the correct socket.
6. If the starter is at the switchboard and the farmer wishes to continue to start using the same method as previous to the Milkflow controller installation, an option is to remove the starter overload, connect the incoming phases at the starter directly to the outgoing motor wires to keep power to the Milkflow controller continuously and then use this starter to switch the remote start terminals #74 & #75 to start and stop the Milkflow controller. Any auxiliary equipment (pulsators/milk pump) connected to this starter will then still be switched using the original contactor terminals.
7. If the farmer is happy to start at the Milkflow controller, use the Milkflow controller relays to switch the original starter or the attached auxiliaries – not more than 5 amps through the Milkflow controller auxiliary terminals please !!!! If in doubt, use a driver relay.
8. If the starter is adjacent the pump, remove completely and switch any Auxiliary equipment via the relay outputs provided in the Milkflow controller (not more than 5 amps!)

– check the motor name plate for correct configuration!

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Tandem pump & motor combination

This system consist generally of two motors wired separately each with one or more milkpumps pumps attached.

In this configuration both milkpumps are started at the same time and same speed so both types of pumps have to be of the same configuration (ie both pumps must be centrifical)

These motors may be of different sizes, this does not matter !.

1. Generally mount the Milkflow controller above the main milkpump..
2. Re-use the existing isolators normally by the motors.
3. Remove power factor capacitors if connected (the Milkflow controller does this function).
4. Connect a new cable from a circuit-breaker or fuses sized to handle the combined milk pump motors full load current to the Milkflow controller.
5. Replace the motor cables with EMC screened re-route and connect the existing motor cables to the Motor Circuit-breakers in the Tandem Kit. Set the correct motor currents on the overloads in the Tandem Kit.
6. If the starters at the switchboard are used to control auxiliary equipment, connect these to the auxiliary start relay in the Milkflow controller, not more than 5 amps please !
7. If the starters are adjacent the pump, remove completely and connect to the isolators.
8. If the starter is at the switchboard and the farmer wishes to continue to start at this point, an option is to remove the overload and continue using this starter to switch the remote start terminals #74 & #75 to start the Milkflow controller. Wire the phases through the starter phase to phase. Continue to switch any auxiliary equipment (pulsators/etc) using the contactor terminals.
9. Connection of the tandem kit thermal relay start stop contacts can be done by removing the link for safe stop terminals #13 and #37 in most cases this is not needed as you can usually milk on one pump.

- check the motor name plate for correct configuration!

Slave pump & motor combination

This system consist generally of two motors wired separately each with one or more milkpumps pumps attached. In this configuration the second pump is brought in when needed to cope with the milk and wash liquids.

1. Generally mount the Milkflow controller above the main milkpump.
2. Re-use the existing isolators normally by the motors.
3. Remove power factor capacitors if connected (the Milkflow controller does this function).
4. Connect a new cable from a circuit-breaker or fuses sized to handle the combined milk pump motors full load current to the Milkflow controller.
5. Replace the motor cables with EMC screened re-route and connect the existing motor cables to the Motor Circuit-breakers in the Tandem Kit. Set the correct motor currents on the overloads in the Tandem Kit.
6. If the starters at the switchboard are used to control auxiliary equipment, connect these to the auxiliary start relay in the Milkflow controller, not more than 5 amps please !
7. If the starters are adjacent the pump, remove completely and connect to the isolators.
8. If the starter is at the switchboard and the farmer wishes to continue to start at this point, an option is to remove the overload and continue using this starter to switch the remote start terminals #74 & #75 to start the Milkflow controller. Wire the phases through the starter phase to phase. Continue to switch any auxiliary equipment (pulsators/etc) using the contactor terminals.

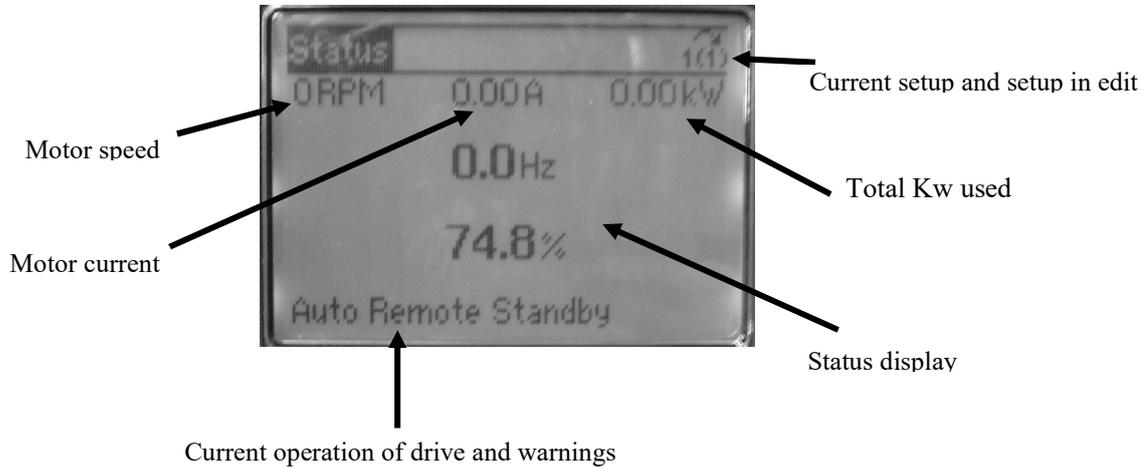
- check the motor name plate for correct configuration!

C.S.L. MILKFLOW

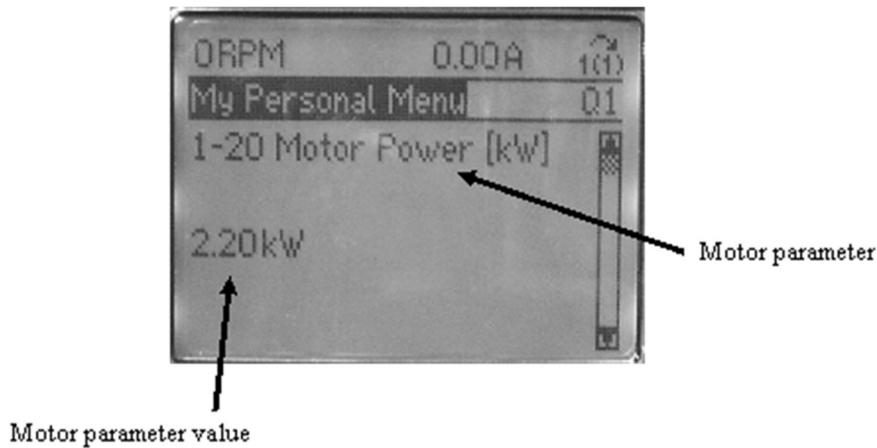
INSTALLERS INSTRUCTIONS

LCP Keypad Operation and Parameter Editing

Status Display To display the current operation of the drive and all status messages of the Milkflow controller press the “Display Status” button on the following screen display. If you keep on pressing the status display button it will scroll through the various states of the onboard PLC to check operation of unit for diagnostics.



My personal menu To display the current user modifiable parameters of the drive press the “Quick Menu” button on the front of the lcp followed by the “OK” key



My personal menu These are the user modifiable parameters that are used when setting up the Milkflow controller such things as motor power, automatic motor adaptation, motor ramp times, low and high speed limits etc...

Pressing the up and down button will scroll through the various settings of the Milkflow controller. These are the settings that are used when commissioning the Milkflow controller and all the relevant settings are in this menu to make it easy for anyone to install and set up a Milkflow controller unit. Pressing the “OK” button on any parameter will enable you to be able to change the value of the parameter in edit and press the “OK” button when you are finished editing it to store the value.

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INSTALLERS INSTRUCTIONS

Programming

To make program changes press “Quick menu” key on the front of the LCP followed by the “OK” key, press the “Display status” key to exit.

How to stop and start the drive using the LCP for programming to stop unintended starts the drive can be stopped by pressing the “Off” key on the front of the LCP pressing the “Auto on” key on the front of the LCP will return the unit to run mode

Explanation of setups in the drive unit The drive contains two setups milk (setup 1) wash(setup 2) each setup has its own parameters for the speeds and ramp times of the motor for a customised milk and wash system.

Forcing a setup to edit Firstly go into the personal menu and press the “Ok” key It will now not display the read only in the status message and warning display at the bottom of the display.

Scroll down to parameter 011 press “Ok” and store in the drive the value of the setup you wish to edit.

Also if the drive is in stop mode as explained in “how to stop and start the drive using the LCP for programming to stop unintended starts” you can switch setups using the control switch on the front of the drive but you can not change into the safety setups.

Explanation of parameters in the quick menu the parameters in the quick menu are dependant on witch setup the drive is in the setup is displayed in the top right corner as explained in the “LCP and keypad and parameter editing”.

The parameters can be edited in the same manor explained in “forcing a setup”

Some of the settings cannot be modified when the drive is in run mode as explained in “how to stop and start the drive using the LCP”

Extended Menu this menu is password protected, and is not necessary to be edited for the average setup, to access this menu please phone Corkill Systems Limited for assistance.

Parameters in the Quick Menu

Parameter no#	
010	Active setup (forced setup for drive to run in)
011	Edit setup (The current setup being edited)
120	Motor power in Kw (from name plate data)
122	Motor voltage (from name plate data)
123	Motor frequency (50 Hz international motor or 60 Hz American motor)
124	Motor current (from name plate data)
125	Motor nominal speed (from name plate data)
126	Motor continuous rated torque (from name plate data) or 100%
129	Auto motor adapt function (for automatic tuning of motor)
139	Motor poles 2 poles for 2800rpm 4 for 1450 rpm and 6 for 960 rpm motor
190	Thermal overload setting (used for setting up tandem models)
311	Jog speed in Hz (speed in pumpout mode)
351	Ramp up speed
352	Ramp down speed
412	Motor low speed limit in Hz
414	Motor high speed limit in Hz
451	Warning current high(will indicate warning limit)
540	Relay 1 / 2 function
418	Warning speed high (2 nd pump cut in speed)

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Motor Set Up

Press "Quick menu" key on the front of the LCP followed by the "OK" key

Turn the selector switch on drive to "Milk" and check and if necessary set the motor parameters #120 through to #139 as above, all other set ups will automatically update.

Turn back to "Milk" and turn on Parameter #129 "Auto Motor Adapt". Press "Auto On" And the drive will carry out the Auto Tuning function (not required if fitting a Tandem Kit), a message will be displayed when tuning is complete. Turn selector switch to "Off" before pressing "Reset". The milkflow controller should be ready to use.

Pump setup

The Danfoss drive has been pre programmed according to specifications as ordered, some refinements to the program may be necessary for individual situations. A full description of programming is contained in the danfoss Manual and this should be consulted if contemplating major changes.

The normal parameters that may require alteration are noted below with the normal preset values as dispatched. Program sheets for different types of pump/motor combinations can be provided if required, as all dairies are different, fine tuning may be required.

Milking Settings - set lid switch to "Milk"

Pump Minimum Speed
Pump Maximum Speed
Pump Ramp Up Time
Pump Ramp Down Time

Centrifugal Lobe/FIP

33Hz 20Hz
45Hz 45Hz
20 Sec's 20 Sec's
30 Sec's 30 Sec's

Wash settings - set lid switch to "Wash"

Pump Minimum Speed
Pump Maximum Speed
Pump Ramp Up Time
Pump Ramp Down Time

50Hz 45Hz
55Hz 50Hz
5 Sec's 5 Sec's
20 Sec's 20 Sec's

NOTE - when setting controller for diaphragm pump, speed parameters are preset at low levels. These will need adjustment depending on motor/pump pulley ratio's. Values can be fined tuned in either menu by selecting "Milk" or "Wash" on the switch. All other parameters will remain as programmed,

With diaphragm type pumps care needs to be taken not to exceed the capabilities of the pump damage to the pump may result if it is run at speeds over 48 strokes per minute.

Tandem motor overload set up

For tandem units the motor circuit breakers are to be wired to the thermal cut out input terminals on the drive terminals #13 and #37. If one of the circuit breakers trip, the drive will stop and "safe stop" message will be displayed.

For motors with an inbuilt thermal cut out switch this may also be put into these terminals.

Ofr motors with thermistor outputs wire the motor into terminals #50 and #54 and set parameter 190 to thermistor input to enable this must be enabled in each setup.

The drive will alarm thermal cut out on the display in the event of a motor cut out or over temperature and will not resume operation until the drive is reset and the circuit breaker is reset.

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Switching auxiliary equipment via the milkflow controller

For remote switching of auxiliary equipment use the provided Relay outputs on the din terminals of the controller labelled in the drive.

This is a four relay outputs with clean contacts to operate the pulsators cooler pumps, second pump and the flushing pulsator within the milkflow controller.

Warning – these relay will switch up to 400 volts do not load to more than 5 amps !!

No warranty will be recognised if these relays are melted !!

Connection of a flushing pulsator to the milkflow controller. Terminals #82-83 provide a means of connecting a flushing pulsator to the milkflow controller and operate whenever the drive is turned into wash mode.

Connection of pulsators to the milkflow controller. Terminals #84-85 provide a means of connecting the pulsators to the milkflow controller and operate whenever the drive is turned on.

Connection of a cooler pump or cooler solenoid to the milkflow controller. Terminals #80-81 provide a means of connecting a cooler pump cooler solenoid to the milkflow controller and operate whenever the drive is running in milk mode.
(note these terminals are programmable via the lcp to do a variation of outputs depending on the drive status and inputs.)

Connection of a slave pump to the milkflow controller. Terminals #78-79 provide a means of connecting a slave wash pump to the milkflow controller and operate whenever the drive is running depending on the speeds the milk pump is running at.
(note these terminals are programmable via the keypad to do a variation of outputs depending on the drive status and inputs.)

Switching the milkflow controller via auxiliary equipment

For remote switching of the milkflow controller via auxiliary equipment or a varivac clean contacts must be used the Danfoss control is incapable of accepting any foreign voltages and will result in severe damage to the control card and or power section of the drive and will not be covered by warranty you have been warned!!!!

Switching the Milkflow controller to Wash via remote For remote switching of the Milkflow controller to wash join the DIN rail terminals #74 & #77 together using the remote switch.

Switching the Milkflow controller to start via remote For remote starting of the milkflow controller join the DIN rail terminals #74 & #75 together using the remote switch or existing spare contact on plant start contactor.

Remote pumpout of the Milkflow controller to start via remote For remote pumpout of the milkflow controller join the DIN rail terminals #74 & #76 together using the remote switch.

Auxiliary wiring connections recommendations

When using the Milkflow controller to connect to auxiliary equipment or vice versa we recommend using screened cable like the Belden cable supplied with the Milkflow controller to avoid interference.

If possible use low voltage 24 volt control wiring, if interfacing with 230 or 400 volt controls, use slave relays and bring back switch signals to the Milkflow controller at low voltage using screened Belden or equivalent cable, remember to earth both ends of the cable screen. Make cables as short as possible inside the drive and strip off the minimum of sheathing on the cable to lessen interference being induced into the cable.

Back flush system (appropriate controllers only)

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This special controller has a special feature to turn the float stem off when switched in the off position when doing a back flush.

When cleaning with hot water after a back rinse turn the controller into wash and the pump will run at full speed to clean the pump and plant.

Warranty

All units are warranted twelve (12) months from the date of purchase by the dealer subject to the following conditions;

- * All electrical equipment to be installed and commissioned by qualified trade-persons.
- * Adequate measures to be taken against moisture and/or mechanical damage.
- * Recommended cabling procedures to be followed and circuit protection to be provided.
- * Unauthorised dismantling/repairs/modifications will void this warranty.
- * All faulty components must be returned prior.
- * The unit has been paid for in full.

In the event of a unit or component failure, all faulty parts will be repaired or replaced free of charge, consequential equipment damage and/or labour and/or travelling will not be subsidised.

Trouble Shooting

All faults will be displayed in number codes on the FC screen. The error message will flash on the display, a list of these messages is in the FC manual for further information.

RUNNING FIRST TIME FAULTS Drive won't start.

Start switch not wired properly on float stem, drive in local stop after performing "Automatic Motor Tune".

Cause/Remedy: After doing an "Automatic Motor Tune" the drive will need to be reset, it may show local stop on the display, press "STOP/RESET" and then "START" on the control panel on the Danfoss Drive.

RUNNING FIRST TIME FAULTS Drive won't switch setups or runs at wash or milk speeds all the time.

Drive is forced into a setup, or remote milk wash switch wired incorrectly.

Cause/Remedy: check that drive is switching setups by switching the milk wash switch while holding the pump out button in and note the speeds indicated on the display. If drive is not switching setups need to go into parameter 4 and select multi setup.

Common error messages

WARNING/ALARM 4 Phase fault (MAIN PHASE FAULT).

A phase is missing on the supply side or the mains voltage imbalance is too great. This message can also appear if there is a fault in the input rectifier on the frequency converter.

Cause/Remedy: Check to make sure all 3 Phases are OK to the milk pump controller, if these are OK check other 3 Phase equipment in the Dairy. Eg to make sure your power supply is OK to the Dairy. Turn off the milk pump controller completely for 40 sec then back on, "RESET" and then "START" may need to be pressed on the control panel on the Danfoss Drive.

WARNING 6 Voltage warning low (DC LINK VOLTAGE LOW).

The intermediate circuit voltage (DC) is below the under voltage limit of the control system.

Cause/Remedy: The incoming voltage to the milk pump controller is too low for it to operate. Example - there could be a fault with the power lines, transformer high tension fuse out. The voltage will need to be returned to normal for the milk pump controller to operate

WARNING/ALARM 9 Inverter Overload (INVERTER TIME).

The electronic, thermal inverter protection reports that the frequency converter is about to cut out because of an overload (too high current for too long). The counter for electronic, thermal inverter protection gives a warning at 98% and trips at 100%, while giving an alarm. The frequency converter cannot be reset until the counter is below 90%.

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The fault is that the frequency converter is overloaded by more than 100% for too long.

Cause/Remedy incorrect motor data has been put into the drive. Turn off the milk pump controller completely for 40 sec then back on, "RESET" and then "START" may need to be pressed on the control panel on the Danfoss Drive.

WARNING/ALARM 13 Over current (OVERCURRENT).

The inverter peak current limit (approx. 200% of the rated current) has been exceeded. The warning will last approx 1 – 2 seconds, following which the frequency converter will trip, while giving an alarm. Turn off the frequency converter and check whether the motor shaft can be turned and whether the motor size matches the frequency converter. If extended mechanical brake control is selected, trip can be reset externally.

Cause/Remedy: incorrect motor data has been put into the drive. Turn off the milk pump controller completely for 40 sec then back on, "RESET" and then "START" may need to be pressed on the control panel on the Danfoss Drive.

ALARM 14 Earth fault (EARTH FAULT).

There is a discharge from the output phases to earth, either in the cable between the frequency converter and the motor or in the motor itself. Make sure no power factor capacitor is fitted to the motor.

Cause/Remedy: Either the motor or the cable to the motor has a short to earth in it.

An Electrician will have to check this.

Turn off the Milkflow controller completely for 40 sec then back on, "RESET" and then "START" may need to be pressed on the control panel on the Danfoss Drive.

ALARM 16 Short-circuit (CURR.SHORT CIRCUIT):

There is a short circuit on the drive output, this could be in the cable, isolator or motor terminals or windings.

Cause/Remedy: Either the motor or the cable to the motor has a short to earth in it.

An Electrician will have to check this.

Disconnect the drive at the motor output terminals and turn the milk pump controller back on to prove the controller is OK.

Turn off the milk pump controller completely for 40 sec then back on, "RESET" and then "START" may need to be pressed on the control panel on the Danfoss Drive.

If problems are encountered that cannot be overcome, phone the following 24 hr number, and state that you have a C.S.L. MILKFLOW problem, we will be happy to assist.

Please record the fault number or message before phoning for assistance to help us help you. "Trip-lock" faults require the controller to be shut down for one minute and restarted to clear. The reset on the keyboard may also need to be pressed after repowering with some faults, followed by pressing 'START'.

(06) 761 7531

C.S.L. MILKFLOW

INSTALLERS INSTRUCTIONS

Corkill Systems Limited - TERMS AND CONDITIONS OF SALE

GENERAL

All quotations, orders and contracts for the sale or supply of goods or services by Corkill Systems Limited shall unless, otherwise agreed in writing, be subject to the following terms and conditions:

1. **ORDERS** All orders are made and accepted on the terms and conditions here stated. Order cancellations are subject to terms agreed as at time of cancellation.

2. **PRICES** Prices quoted remain firm for 30 days but beyond that time prices may be adjusted.

3. DELIVERY

Delivery dates given by Corkill Systems Limited are approximate and rely on prompt receipt of all necessary information regarding the order. Corkill Systems Limited will use their best effort to meet the estimated date but will not be held liable for any delay due to circumstances arising in the industry generally or within Corkill Systems Limited work due to delay in receipt of supplies from sub-contractor or any other circumstances beyond Corkill Systems Limited control. No liability will be taken for any late deliveries unless delivery date has been guaranteed by Corkill Systems Limited in writing. Otherwise Corkill Systems Limited will use its best endeavour to meet delivery dates.

4. DELIVERY CHARGES

Unless otherwise agreed in writing or at the discretion of Corkill Systems Limited, all freight will be charged to the Purchaser's account.

5. RETURN OF GOODS

No goods may be returned without prior written approval of Corkill Systems Limited and may be subject to a restocking fee. Approval will be contemplated by Corkill Systems Limited only in circumstances where:

- 5.1 Advice of any proposed return is given within 30 days following the date of the invoice.
- 5.2 Transportation and other costs for return are prepaid by the Purchaser
- 5.3 Goods to be accompanied by a copy of Corkill Systems Limited Packing Slip or Invoice
- 5.4 Goods to be accompanied by a written explanation of reasons for return.
- 5.5 Corkill Systems Limited may charge for handling, inspection, disassembly or reconditioning

stock items.

- 5.6 Units manufactured, modified or imported as special or unique units will only be accepted for

credit

Less the cost of converting the unit back to a standard saleable unit.

6. TERMS OF PAYMENT

All goods shall be paid for on the 20th day of the month following delivery. Corkill Systems Limited may at any time require full or part payment in advance of delivery and the purchaser shall not be entitled to any damages or compensation arising from such requirement. Goods on time payment shall be subject to the conditions on the Time Payment contract in addition to the terms contained within this document.

7. PRODUCT SAFETY

Corkill Systems Limited products are supplied and manufactured to high standards but no electrical equipment is failsafe within itself. When risk to person or property may be involved a fail-safe device should be an integral part of the equipment, the entire responsibility for which rests with the Purchaser.

8. OWNERSHIP OF GOODS

The goods shall remain the property of Corkill Systems Limited until they have been fully paid for. Risk shall pass to the purchaser on delivery. The purchaser will insure the goods. The purchaser acknowledges that it is in possession as agent and bailee for Corkill Systems Limited and owes a fiduciary duty to Corkill Systems Limited until such time as legal and equitable title shall transfer. The purchaser's right to possession of unpaid goods shall terminate on demand by Corkill Systems Limited, which may enter or authorise an agent to enter the purchaser's premises to recover the goods.

9. PRODUCT WARRANTY

Provided that the product has been subjected to normal and proper use only, all new products supplied by the company are warranted to be free from defects in materials and workmanship from the date of shipment to the Purchaser either for one year or the Manufacturers warranty term subject to the following conditions:

- 10.1 All electrical equipment to be installed and commissioned by qualified trade-persons.
- 10.2 Adequate measures to be taken against moisture and/or mechanical damage.
- 10.3 Recommended cabling procedures and/or circuitry protection must be provided.
- 10.4 Suitable overload protection be provided and installed where required.
- 10.5 All faulty components to be returned to Corkill Systems Limited before a credit can be made.

In the event of equipment failure, all faulty components will be repaired or replaced free of charge, consequential loss/equipment damage and/or labour and/or travelling will not be subsidised. Any unauthorised dismantling, repair or modification voids this warranty.

10. LIABILITY UNDER WARRANTY

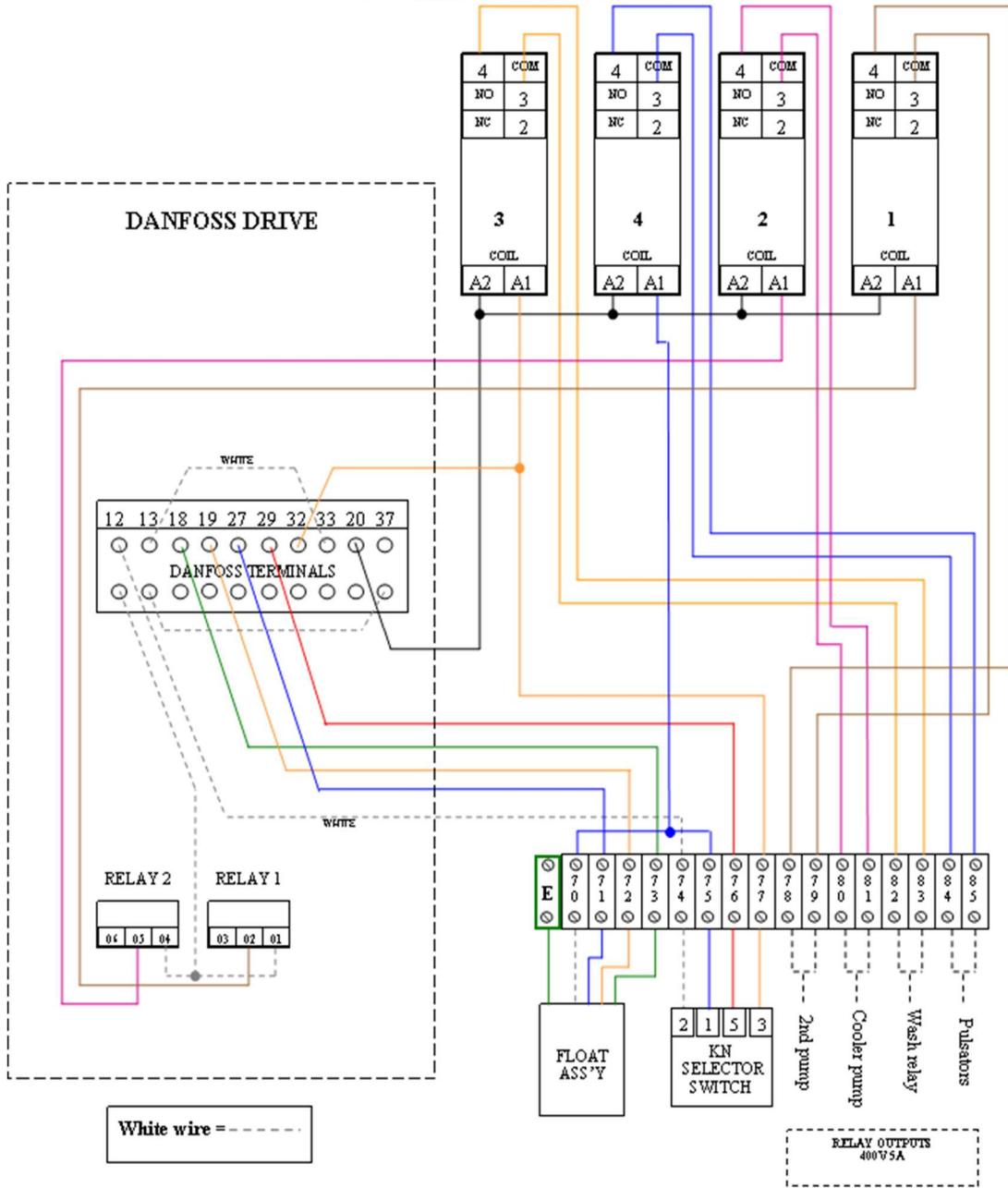
C.S.L. MILKFLOW

INSTALLERS INSTRUCTIONS

Corkill Systems Limited liability under this warranty or any other warranty whether express or implied in law or fact shall be limited to the repair or replacement of defective material and workmanship and in no event shall Corkill Systems Limited be liable for consequential or indirect damages.

11. GOVERNING LAW This agreement shall be construed according to the laws of New Zealand.

C.S.L. MILKFLOW INSTALLERS INSTRUCTIONS



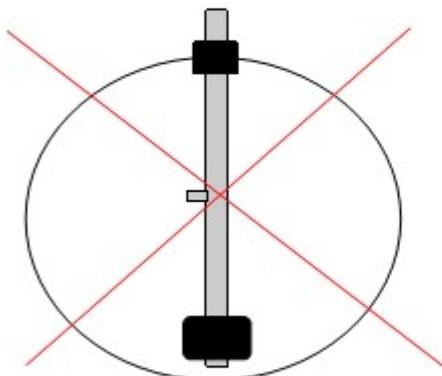
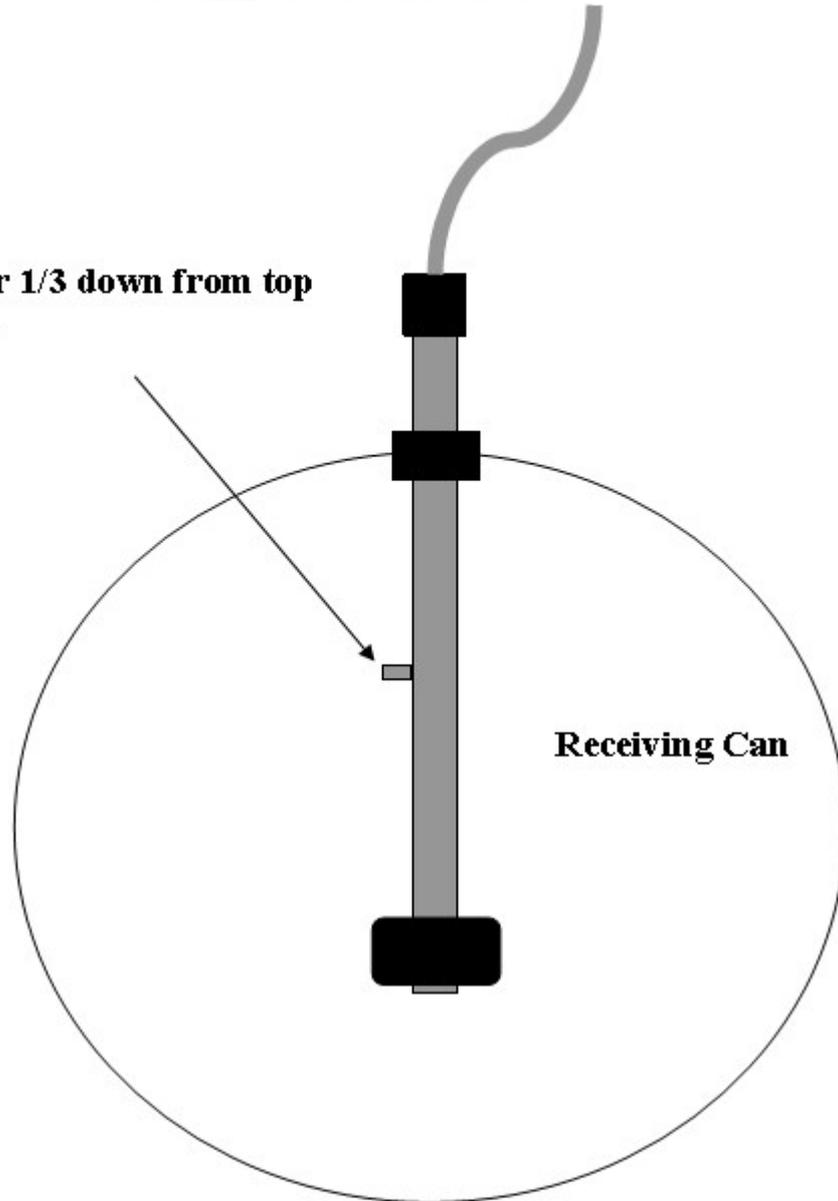
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CIRCUIT DIAGRAM FOR
FC SERIES
VARIABLE SPEED MILKFLOW
CONTROLLER

CSL-FC383X-WIRE.PDF COPYRIGHT 2013/01/15/01/000001.L 12 June 2013

C.S.L. MILKFLOW INSTALLERS INSTRUCTIONS

Stopper 1/3 down from top
Of can.

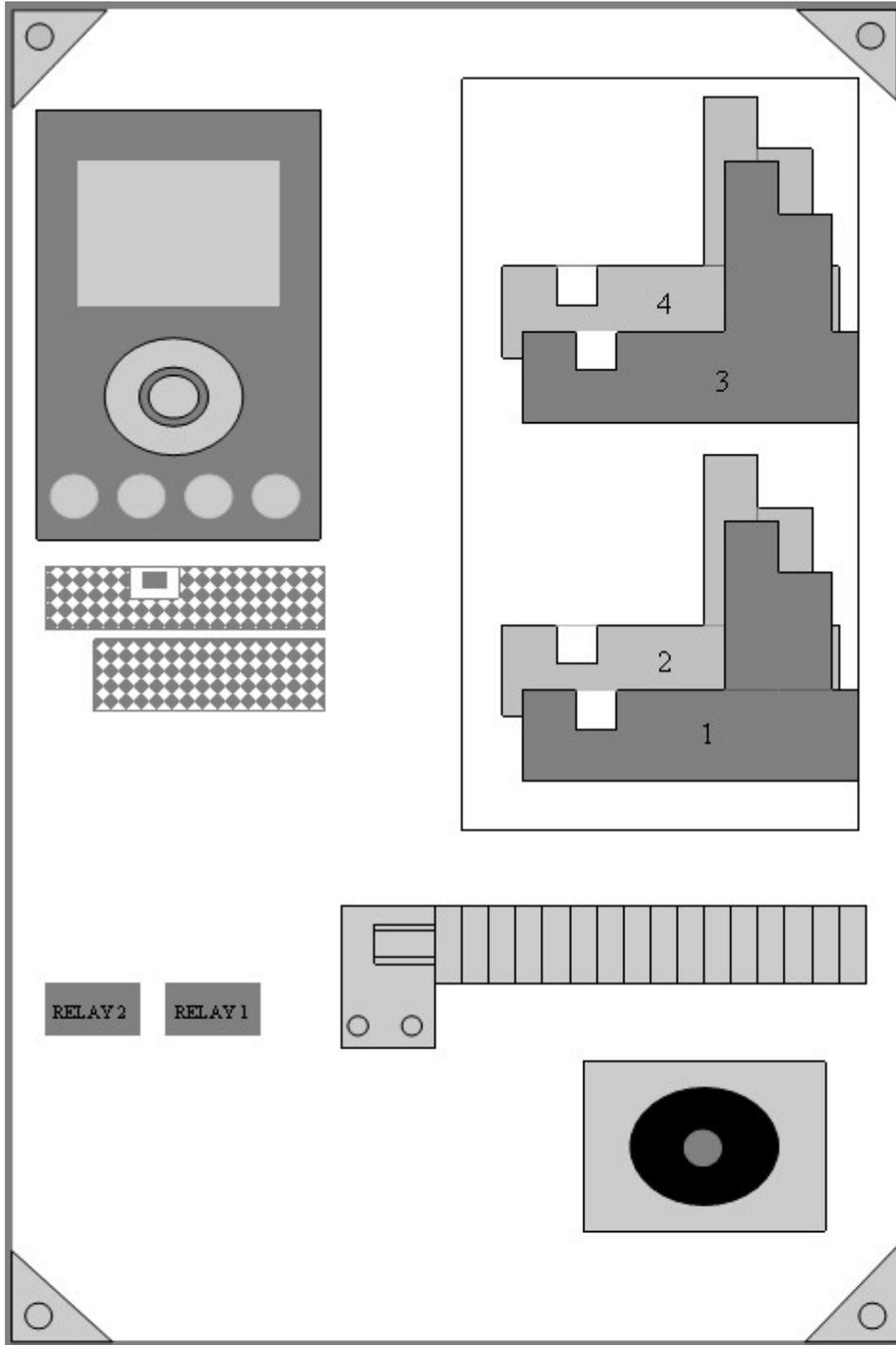


TOO LOW IN CAN

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C.S.L. FLOAT POSITION DIAGRAM

C.S.L. MILKFLOW INSTALLERS INSTRUCTIONS



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**LAYOUT FOR
FC SERIES MILKFLOW
CONTROLLER**

CSL-FC38SX-LAYOUTPUB 3/12/07