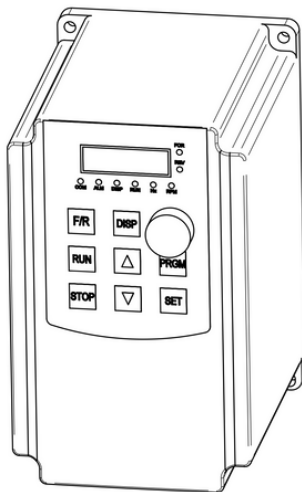


# VFD WITH SPEED CONTROL INSTALLATION



[www.farmhq.com](http://www.farmhq.com)

June 2024 • Version 3.1

# TC-4 INSTALLATION



**COMPATIBILITY** - ONLY THE TC-4 SUPPORTS VFD SPEED AND PRESSURE SET POINT CONTROL. CHECK THE DEVICE TYPE BY LOOKING FOR A TC-4 STICKER ON THE FRONT OF YOUR DEVICE.

**⚠ WARNING ⚠** -ALL ELECTRICAL WORK SHOULD BE PERFORMED BY A LICENSED ELECTRICIAN. IMPROPER INSTALL CAN CAUSE INJURY OR DEATH.

**⚠ WARNING ⚠** -DO NOT INSTALL WHILE YOUR EQUIPMENT IS RUNNING. FAILURE TO COMPLY MAY CAUSE INJURY OR DEATH.

## WHAT YOU WILL NEED

- DRILL
- VOLTMETER
- METRIC ALLEN WRENCHES
- CRESCENT WRENCH
- WIRE STRIPPERS
- TEFLON TAPE
- 1/4" PIPE ADAPTORS
- CONTROL SCREWDRIVER
- 12-48VDC POWER SUPPLY
- 12-48VDC RELAY

## CONTACT US AT

- SUPPORT@FARMHQ.COM
- +1 360-818-2632

## ADDITIONAL HARDWARE

- ADDITIONAL HARDWARE MAY BE REQUIRED DEPENDING ON YOUR PUMP. FIND HARDWARE RECOMMENDATIONS ON OUR WEBSITE UNDER **FarmHQ.com/support**

## FARMHQ APP

- AVAILABLE FOR BOTH IOS AND ANDROID. DOWNLOAD ON OUR WEBSITE **FarmHQ.com/support**

## SUPPORT

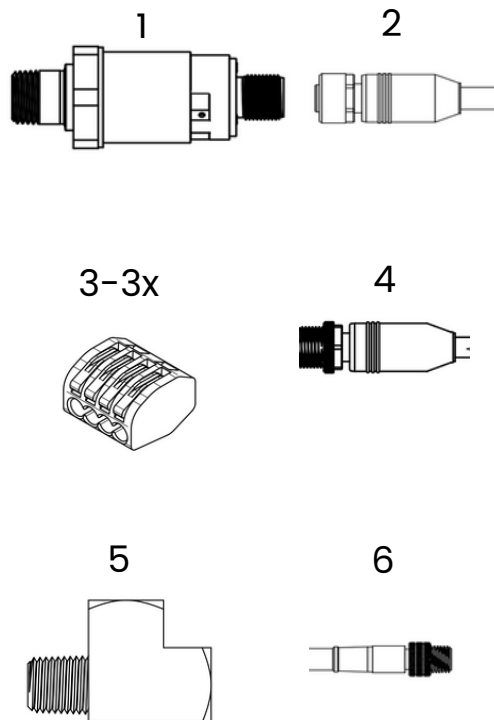
- IF YOU HAVE ANY TROUBLE DURING INSTALL REFERENCE THE USER MANUAL AT **FarmHQ.com/support**



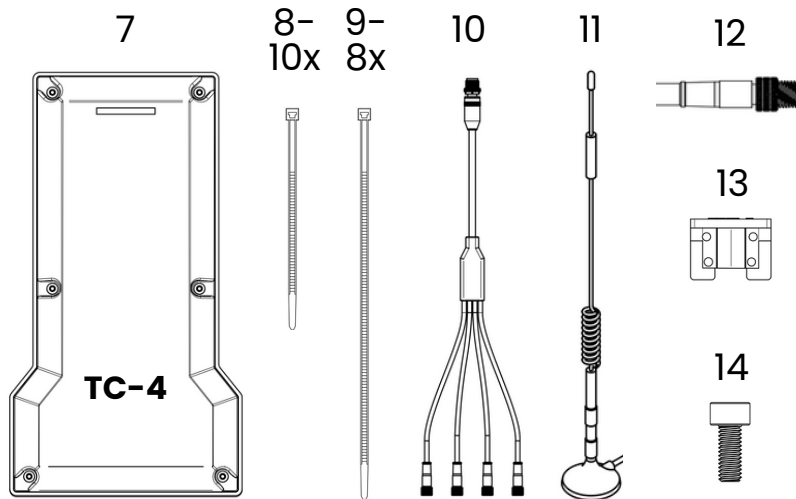
# INSTALLATION HARDWARE



## VFD PUMP KIT



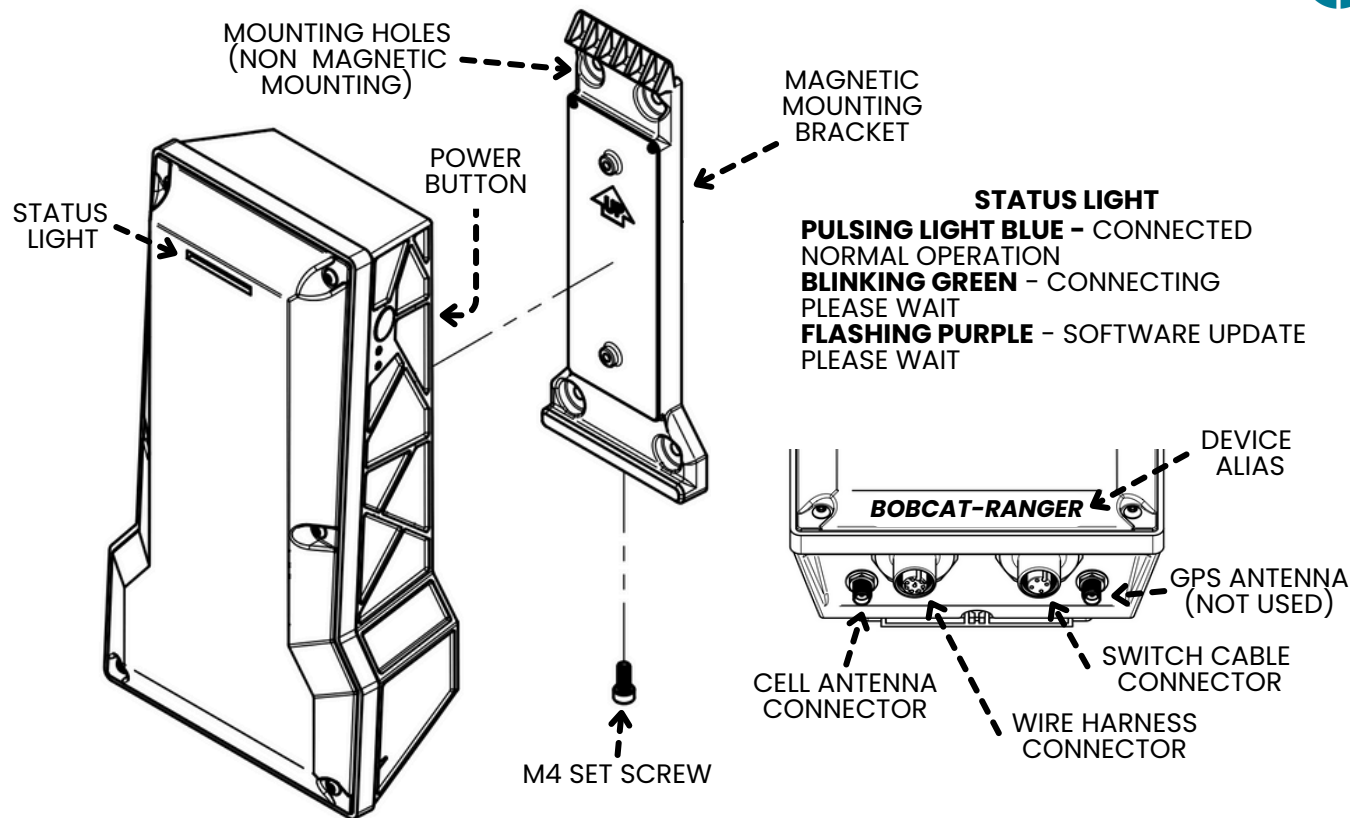
## DEVICE KIT



1. PRESSURE SENSOR
2. PRESSURE SENSOR CABLE
3. WAGO WIRE CONNECTORS
4. SWITCH CABLE
5. 1/4" NPT BRASS TEE M5
6. VFD M8 CABLE
7. TC-3

8. 6" CABLE TIES
9. 11" CABLE TIES
10. TC-4 WIRE HARNESS
11. ANTENNA
12. POWER CABLE
13. SPARE 5A BLADE FUSE
14. SPARE M4 SET SCREW

# DEVICE OVERVIEW



# INSTALLATION OVERVIEW

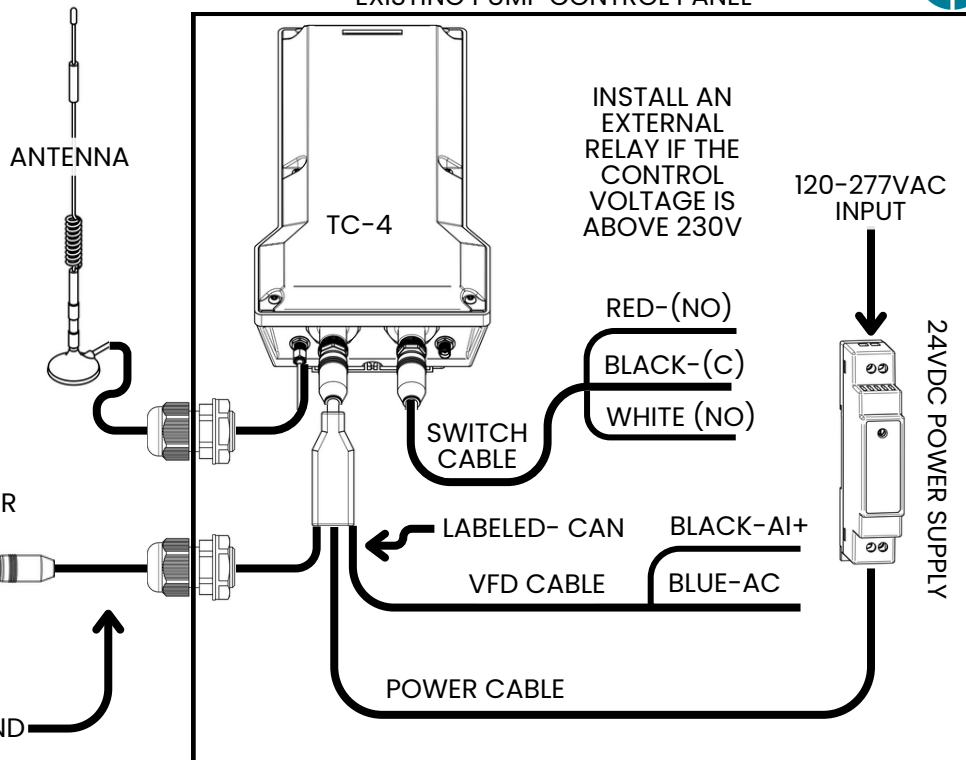


**SWITCH CABLE** - STARTS AND STOPS THE VFD

**VFD CABLE** - SENDS A 4-20ma SIGNAL TO CONTROL THE VFD SPEED.

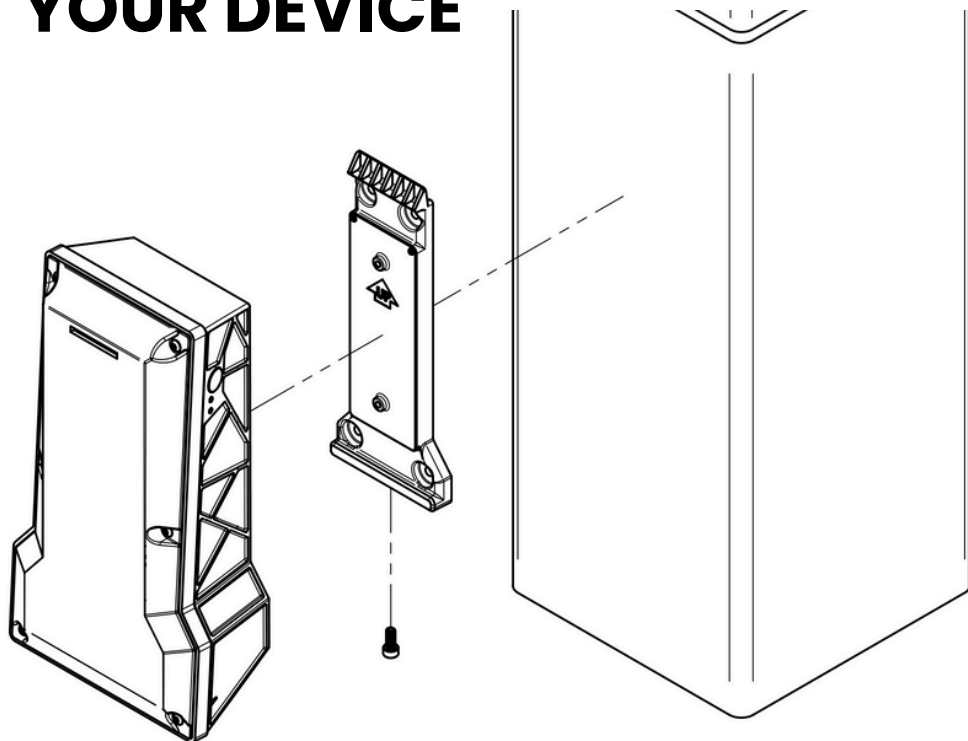
**POWER CABLE** - POWERS THE DEVICE.

**PRESSURE SENSOR** - REQUIRED FOR MAINTAIN PRESSURE FEATURE



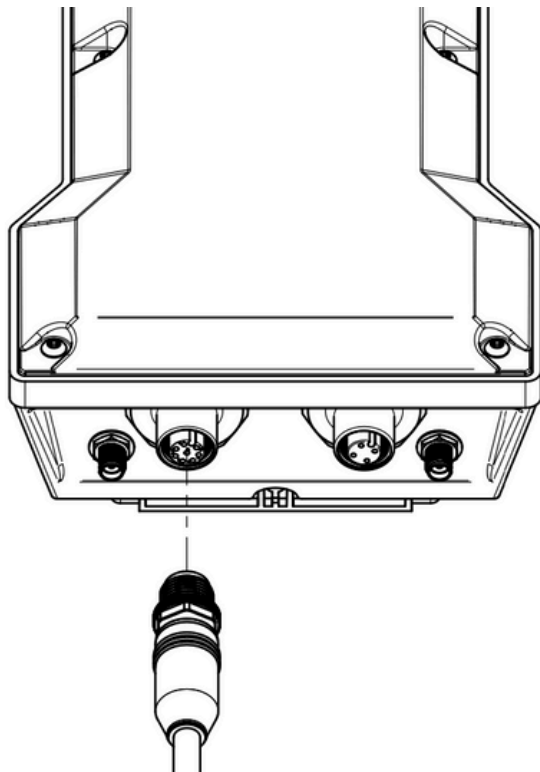
THE DEVICE CAN BE INSTALLED INSIDE OR OUTSIDE THE PANEL.

# 1. MOUNT YOUR DEVICE



**INSTALLATION LOCATION** – FEEL FREE TO MOUNT YOUR DEVICE INSIDE AN ELECTRICAL PANEL OR PUMP HOUSE. WHEN MOUNTING INSIDE OF AN ELECTRIC PANEL, MAKE SURE THE DEVICE, ANTENNA AND ANTENNA WIRE IS FAR AWAY FROM ANYTHING CARRYING HIGH CURRENT. THIS WILL DISRUPT THE CELLULAR CONNECTIVITY OF THE DEVICE. THE GPS LOCATION OF THE DEVICE MAY NEED TO BE ADDED AS THE ENCLOSURE OR ROOF CAN INTERFERE WITH THE GPS SIGNAL. THIS CAN BE SET ON THE DEVICE DETAIL PAGE.

## 2. CONNECT WIRE HARNESS



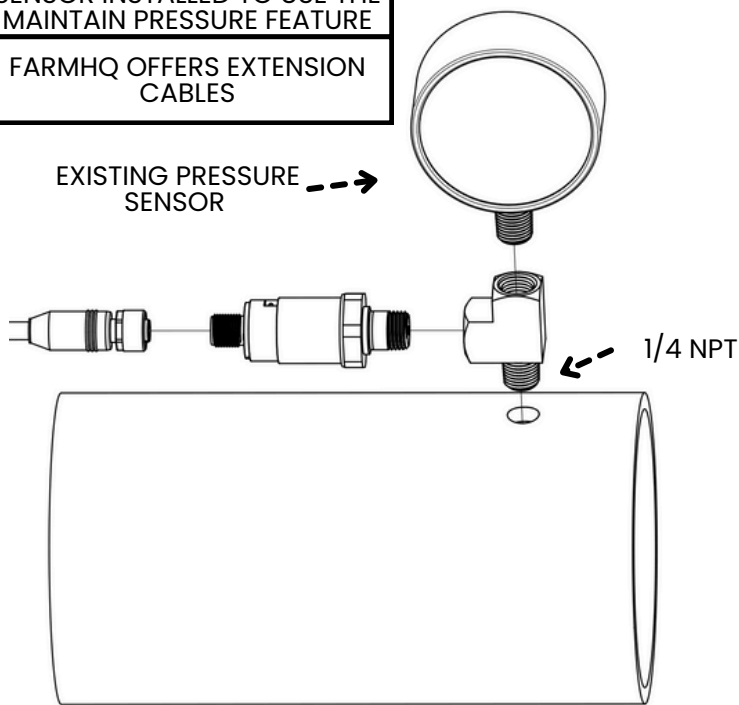
# 3. CONNECT PRESSURE SENSOR



YOU WILL NEED A PRESSURE  
SENSOR INSTALLED TO USE THE  
MAINTAIN PRESSURE FEATURE

FARMHQ OFFERS EXTENSION  
CABLES

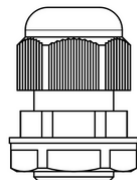
EXISTING PRESSURE  
SENSOR 



CONNECT TO  
SENSOR 2

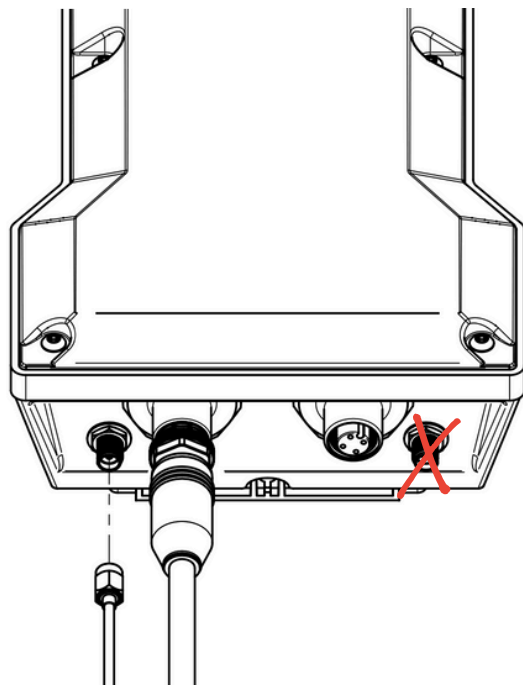
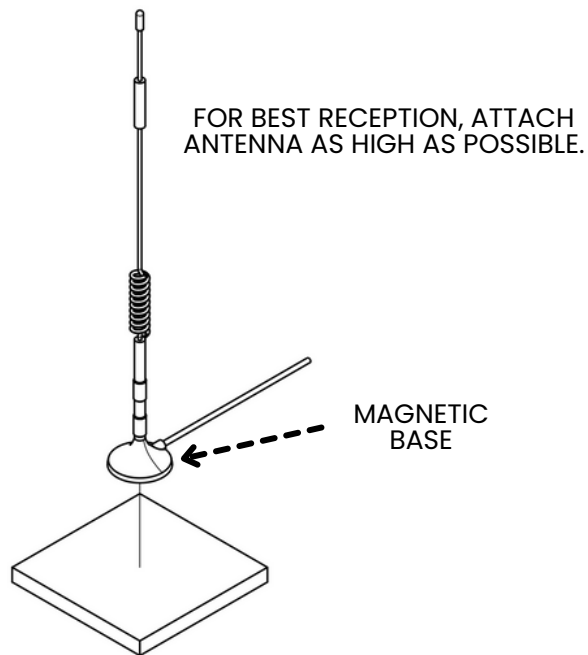


USE A CORD GRIP FOR  
EACH CABLE PENETRATION  
IN THE PANEL





## 4. CONNECT THE ANTENNA



**INSTALLING INSIDE AN ELECTRICAL PANEL - ROUTE THE ANTENNA OUTSIDE THE ENCLOSURE**

**INSTALLING INSIDE A PUMP HOUSE - ROUTE THE ANTENNA ONTO THE ROOF**

# 5. CONNECT TO POWER (8-48VDC)

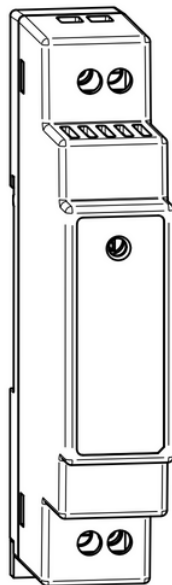


THE TC-3 ACCEPTS 8VDC-48VDC. MOST VFDS HAVE 24V AVAILABLE AND THAT CAN BE USER TO POWER THE DEVICE. IF THIS VOLTAGE IS NOT AVAILABLE, FarmHQ CAN PROVIDE 24V POWER SUPPLY

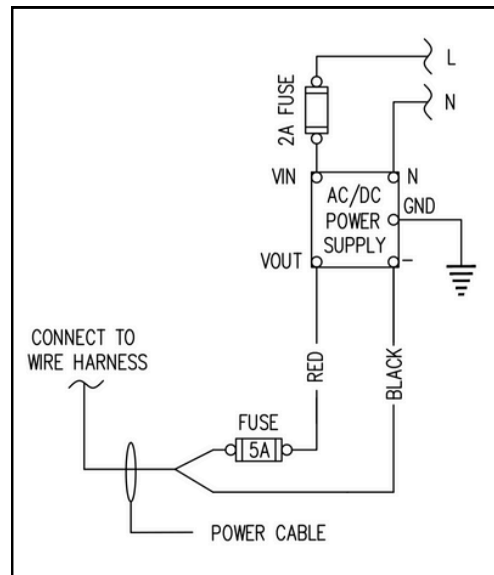
## POWER SUPPLY SPECS:

- 20W MIN
- 8-48VDC OUTPUT

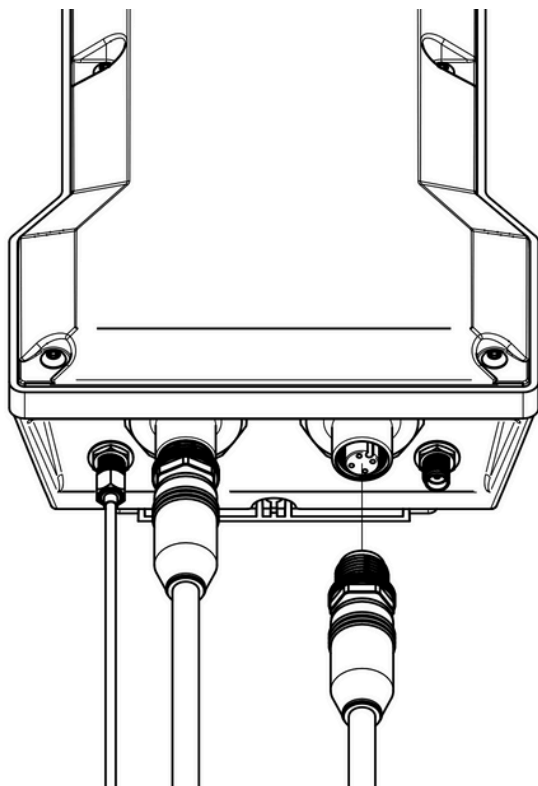
INSTALL A 12V OR 24V  
POWER SUPPLY. FARMHQ  
CAN ACCEPT 8-48V



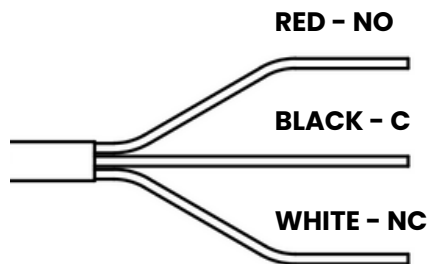
## AC/DC POWER SUPPLY WIRING DIAGRAM



## 6. CONNECT SWITCH CABLE



THE TC-3 HAS AN INTERNAL RELAY RATED FOR 4A, 250V FOR USE TO START/ENABLE YOUR VFD. THE SWITCH CABLE EXPOSES THE NO, NC, AND C CONTACTS OF THE RELAY. EACH PUMP IS DIFFERENT SO YOU WILL NEED TO DETERMINE HOW TO PROPERLY WIRE IN FarmHQ FOR PROPER PUMP SHUTDOWN.



**NO - NORMALLY OPEN**

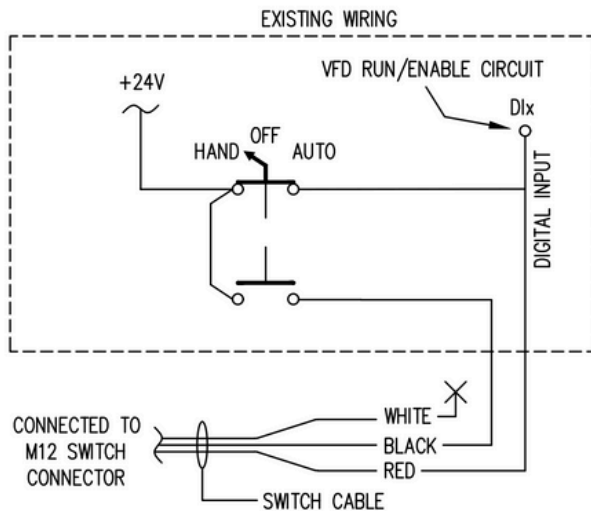
**C - COMMON**

**NC - NORMALLY CLOSED**

# 7. WIRE INTO RUN/ENABLE CIRCUIT



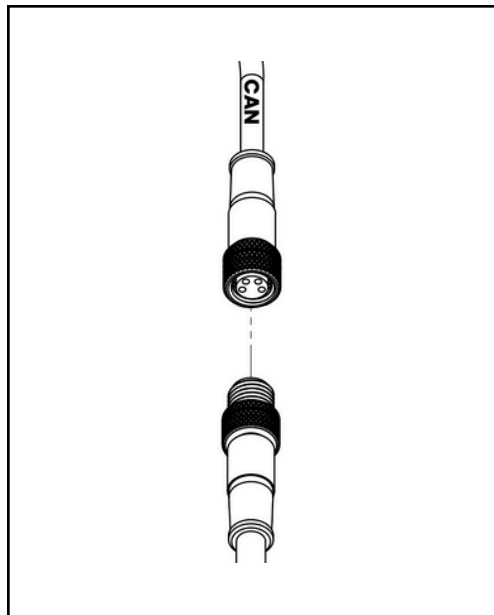
WIRE FARMHQ INTO THE RUN/ENABLE CIRCUIT, ALLOWING IT TO START/STOP YOUR VFD. IT IS RECOMMENDED TO CONNECT THROUGH THE HOA SWITCH ON THE PANEL. REFER TO THE SIMPLIFIED WIRING DIAGRAM, NOTING THAT YOUR PUMP'S WIRING MAY DIFFER. USE THE PROVIDED WAGO CLIPS TO CONNECT THE SWITCH CABLE TO THE EXISTING RUN/ENABLE CIRCUIT.



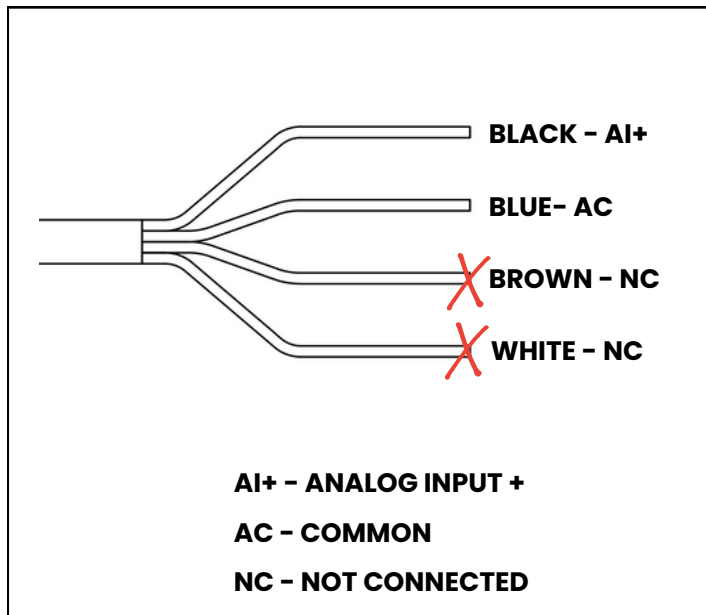
# 8. CONNECT VFD CABLE



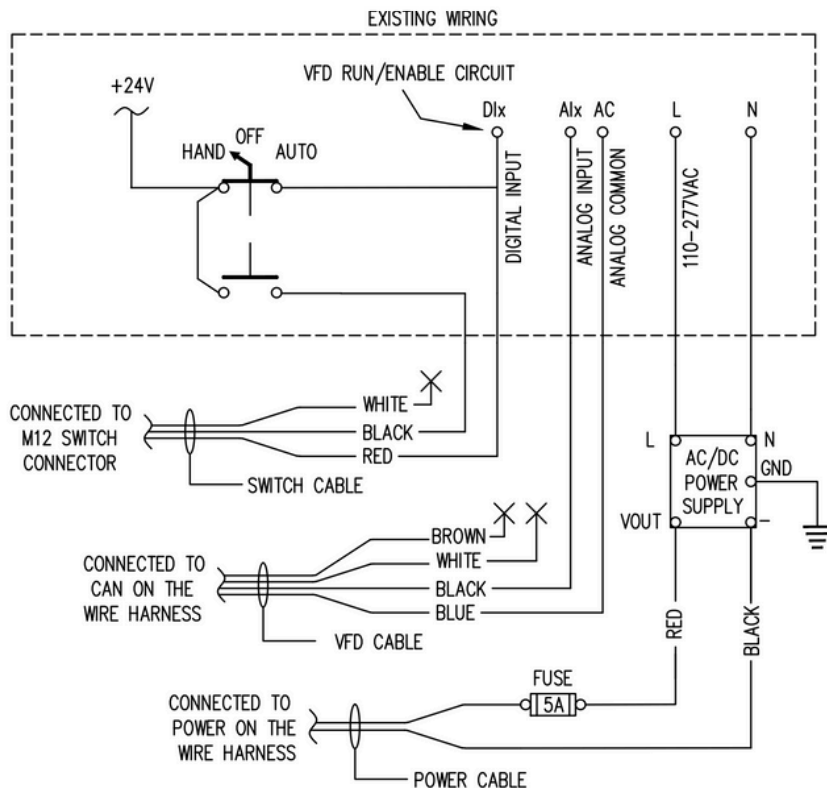
CONNECT THE VFD CABLE  
TO THE CAN CONNECTOR  
ON THE WIRE HARNESS.



CONNECT THE FLYING LEADS  
OF THE VFD CABLE TO THE  
ANALOG INPUT ON THE VFD



# VFD WIRING DIAGRAM



# 9. REPROGRAM YOUR VFD



**JUMPER/SWITCH** – VERIFY THE JUMPER/SWITCH SETTING ON THE VFD TO ENSURE THE PORT IS SET TO 4-20MA INPUT. CONSULT THE VFD MANUAL TO DETERMINE THE CORRECT POSITION. NOTE, NOT ALL VFDS HAVE JUMPERS OR SWITCHES.

**4-20MA INPUT** – SET THE VFD TO ALLOW SPEED CONTROL VIA THE 4-20MA ANALOG INPUT CONNECTED TO FARMHQ.

**MIN/MAX SPEED** – SET THE PUMP'S DESIRED MINIMUM AND MAXIMUM SPEEDS, TYPICALLY MIN = 30HZ, MAX = 60HZ. DO NOT SET OUTSIDE MANUFACTURER LIMITS.

**DIGITAL INPUT RUN/ENABLE** – THE DIGITAL INPUT FARMHQ IS CONNECTED TO NEEDS TO BE SET TO ALLOW THE VFD TO RUN WHEN ENERGIZED. THIS WAY THEN THE FARMHQ SWITCH CLOSSES IT WILL ALLOW THE VFD TO RUN. THIS IS LIKELY SET UP IF THE VFD IS ALREADY IN USE.

**HELP** – CONTACT THE VFD MANUFACTURER FOR PROGRAMMING ASSISTANCE.

# 10. GETTING STARTED WITH THE APP

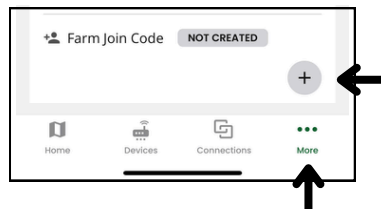


## A. DOWNLOAD THE FARMHQ APP



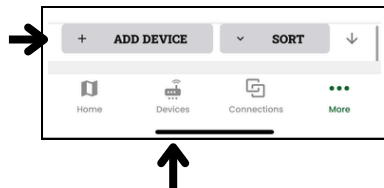
## B. SIGN UP, CREATE OR JOIN AN ACCOUNT

CREATE YOUR OWN USER ACCOUNT. EVERY USER NEEDS TO HAVE AN ACCOUNT. FOLLOW THE PROMPTS TO VERIFY YOUR EMAIL ADDRESS AND PHONE NUMBER. NEXT CREATE A NEW FARM ACCOUNT. IF A FARM ACCOUNT ALREADY EXISTS, USE A FARM JOIN CODE TO BE ADDED TO THE EXISTING FARM. SOMEONE WHO HAS ACCESS TO THE ACCOUNT CAN GENERATE ONE FOR YOU.



## C. ADD A DEVICE

FROM THE DEVICES TAB ADD A NEW DEVICE. INPUT THE DEVICE ALIAS PRINTED ON THE FRONT OF THE DEVICE. THE CONFIGURATION WORKFLOW GUIDES YOU STEP BY STEP. YOU CAN CHANGE CONFIGURATION DETAILS LATER IF YOU NEED TO.



**APP BASICS** - GO TO [www.farmHQ.com/support](http://www.farmHQ.com/support) FOR AN OVERVIEW OF HOW THE APP WORKS



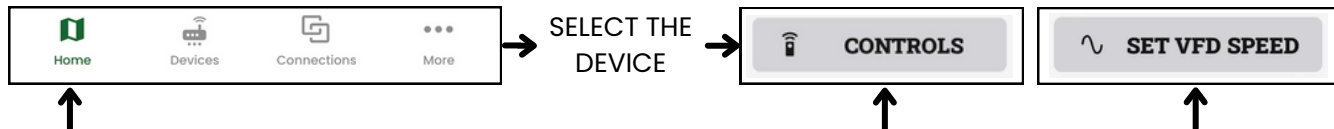
# 11. TEST VFD CONTROL



## TEST SPEED CONTROL

A. NAVIGATE TO DEVICE CONTROLS.

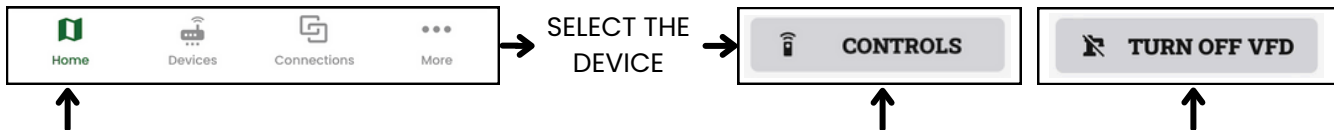
B. TURN ON THE VFD – HIT “**SET VFD SPEED**” AND INPUT 50%



C. VERIFY VFD SPEED – CHECK THE VFD AND MAKE SURE THE PUMP IS RUNNING AT THE DESIRED SPEED.

D. VERIFY PRESSURE – VERIFY THE APP IS REPORTING THE SAME PRESSURE AS THE GAUGE.

E. TURN OFF THE VFD



E. VERIFY THE VFD SHUTS DOWN

## TEST MAINTAIN PRESSURE

A. HIT “**MAINTAIN PRESSURE**” AND INPUT THE DESIRED PRESSURE SET POINT.

B. VERIFY IN THE APP THE VFD COMES UP TO THE DESIRED PRESSURE.

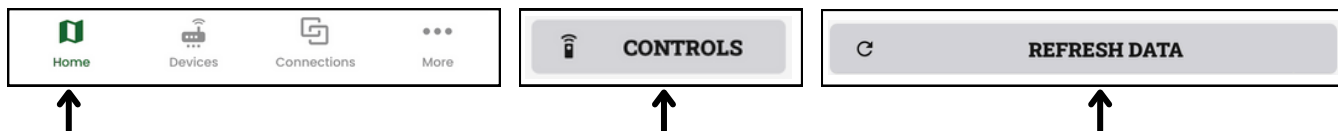
**NOTE** – FARMHQ WILL HAVE DIFFICULTY WITH MAINTAINING PRESSURE BELOW 10PSI.

**NOTE** – IF THE DATA IN THE APP LOOKS INCORRECT PRESS “**REFRESH DATA**”

# TROUBLESHOOTING – BASIC CHECKS

**A.** CHECK THAT THE TC-4 IS POWERED ON AND THE STATUS LIGHT IS PULSING LIGHT BLUE.

**B.** CLICK ON THE HOME TAB AND CLICK ON THE DESIRED DEVICE. CLICK “REFRESH DATA”

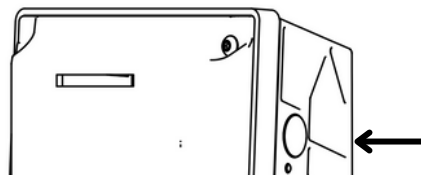


**C.** VERIFY THE PUMP CONFIGURATION. CHECK THE FOLLOWING.

1. MAKE SURE YOU SELECTED THE CORRECT PUMP TYPE – “PUMP VFD”
2. MAKE SURE THE SENSOR PORT MATCHES HOW IT IS CONNECTED TO THE WIRE HARNESS



**D.** RESTART THE DEVICE – REMOVE THE WIRE HARNESS THEN HOLD THE POWER BUTTON UNTIL THE LIGHT TURNS GREEN (3 SECONDS) THEN LET GO. PLUG THE WIRE HARNESS BACK IN AND WAIT FOR THE DEVICE TO BEGIN PULSING LIGHT BLUE.



# TROUBLESHOOTING

## **PROBLEM: INACCURATE SPEED CONTROL**

1. IMPROPER GROUNDING - HAVING MULTIPLE GROUNDS CAN CAUSE ISSUES WITH SENDING AN ACCURATE SPEED COMMAND TO THE VFD. ADJUST HOW FARMHQ IS POWERED AND USE THE DC POWER SUPPLIED BY THE VFD TO POWER THE FARMHQ DEVICE. MAKE SURE EVERYTHING IS PROPERLY GROUNDED TO THE PANEL.
2. ELECTRICAL NOISE -
  - A. MAKE SURE THE VFD CABLE, POWER CABLE AND PRESSURE CABLE ARE ALL AWAY FROM HIGH CURRENT LINES. THIS CAN INTRODUCE NOISE INTO THE SYSTEM.
  - B. INSTALL AN ADDITIONAL POWER SUPPLY TO ONLY POWER THE FARMHQ DEVICE. THIS WILL ISOLATE THE POWER TO THE FARMHQ REDUCING NOISE. MAKE SURE TO CONNECT THE GROUND OF THE POWER SUPPLY TO THE ANALOG COMMON ON THE VFD.

## **PROBLEMS: STARTING AND STOPPING THE VFD**

1. CHECK TO VFD CABLE WIRING. IF THE VFD CABLE IS NOT WIRED PROPERLY THE FARMHQ SWITCH WILL NOT TOGGLE.
2. VERIFY ENABLE/RUN CIRCUIT WIRING. IF THE VFD NO LONGER STARTS, YOU WILL LIKELY NEED TO CHANGE HOW THE SWITCH CABLE IS WIRED. CONSULT THE WIRING DIAGRAM OF THE VFD.