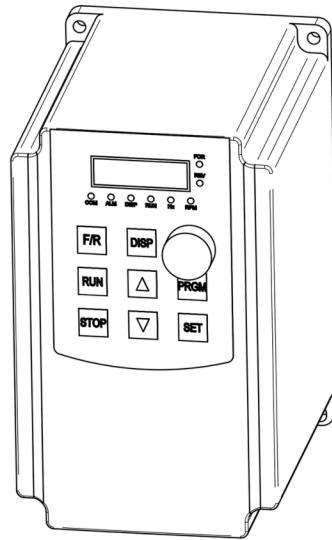


VFD WITH SPEED CONTROL INSTALLATION



www.farmhq.com

December 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

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

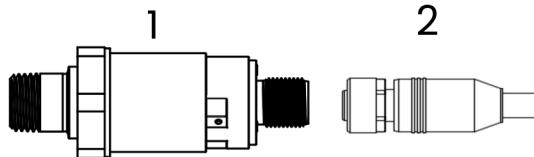
- IF YOU HAVE ANY TROUBLE DURING INSTALL REFERENCE THE USER MANUAL AT FarmHQ.com/support



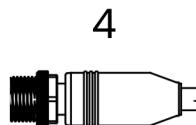
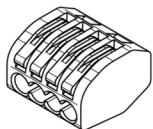
INSTALLATION HARDWARE



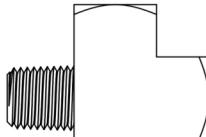
VFD PUMP KIT



3-3x



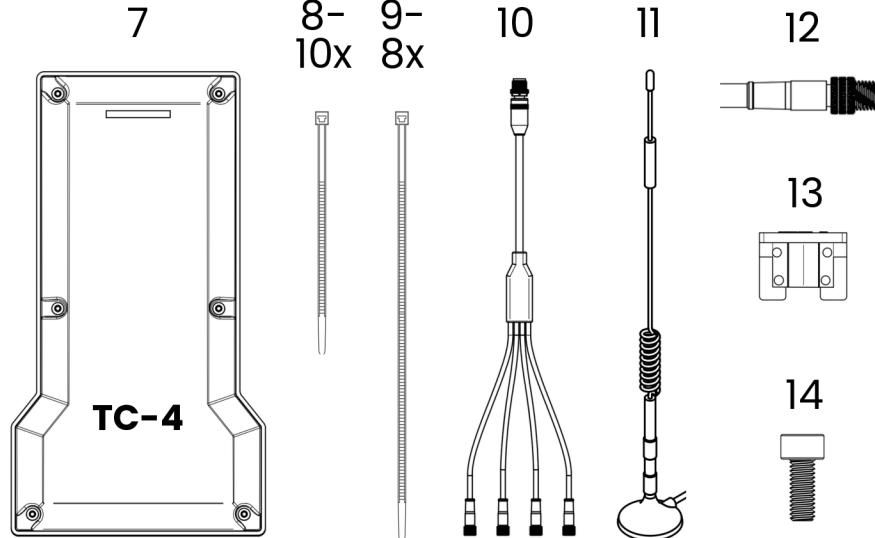
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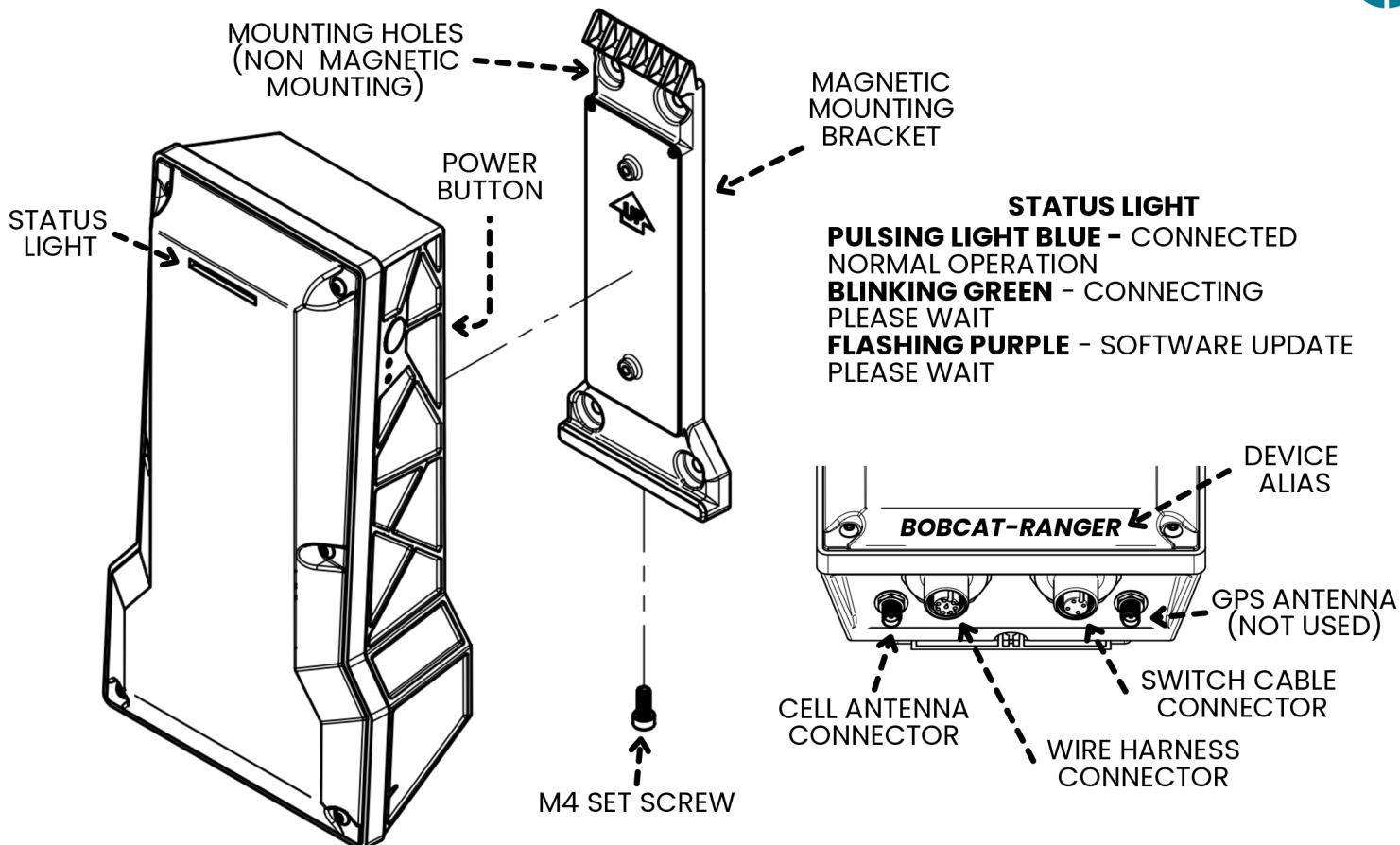


DEVICE KIT



- | | |
|--------------------------|-------------------------|
| 1. PRESSURE SENSOR | 8. 6" CABLE TIES |
| 2. PRESSURE SENSOR CABLE | 9. 11" CABLE TIES |
| 3. WAGO WIRE CONNECTORS | 10. TC-4 WIRE HARNESS |
| 4. SWITCH CABLE | 11. ANTENNA |
| 5. 1/4" NPT BRASS TEE M5 | 12. POWER CABLE |
| 6. VFD M8 CABLE | 13. SPARE 5A BLADE FUSE |
| 7. TC-4 | 14. SPARE M4 SET SCREW |

DEVICE OVERVIEW



INSTALLATION OVERVIEW



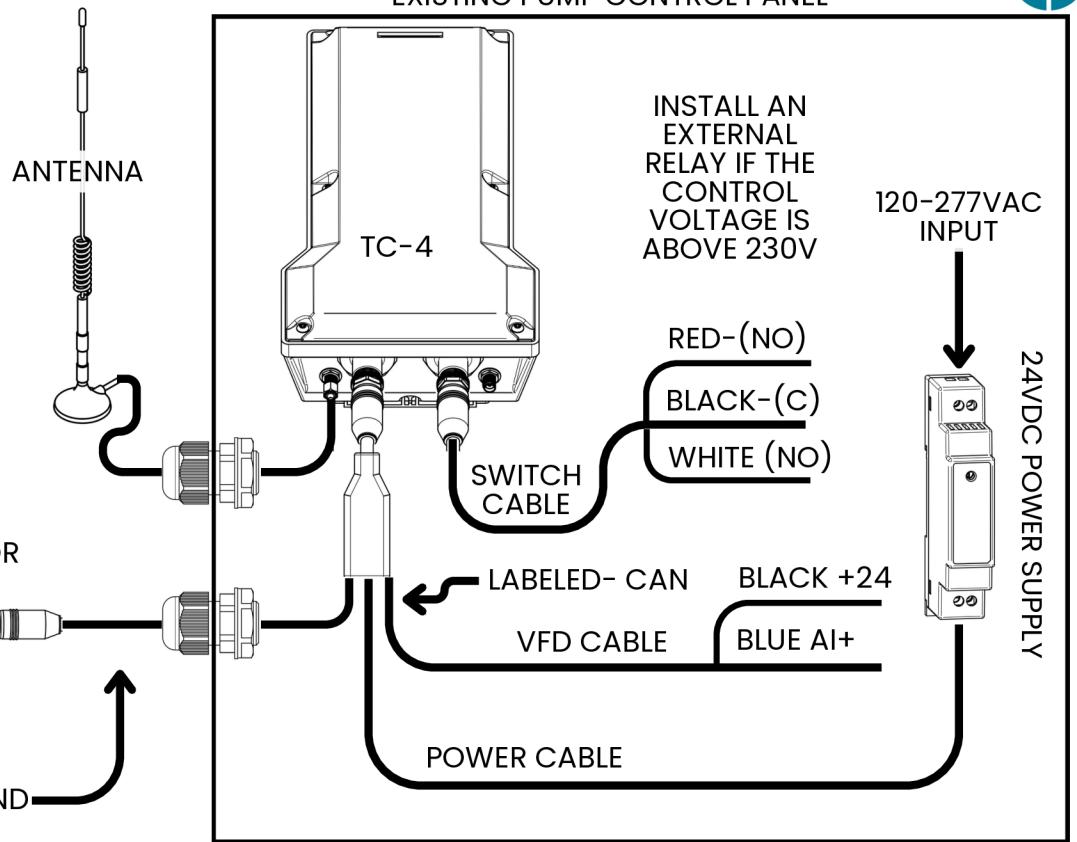
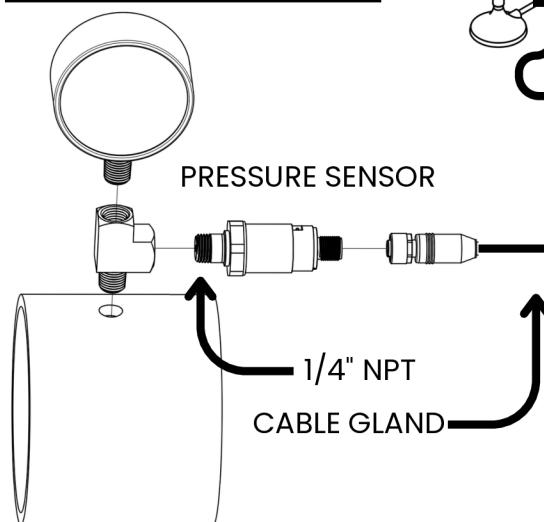
EXISTING PUMP CONTROL PANEL

SWITCH CABLE - STARTS AND STOPS THE VFD

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

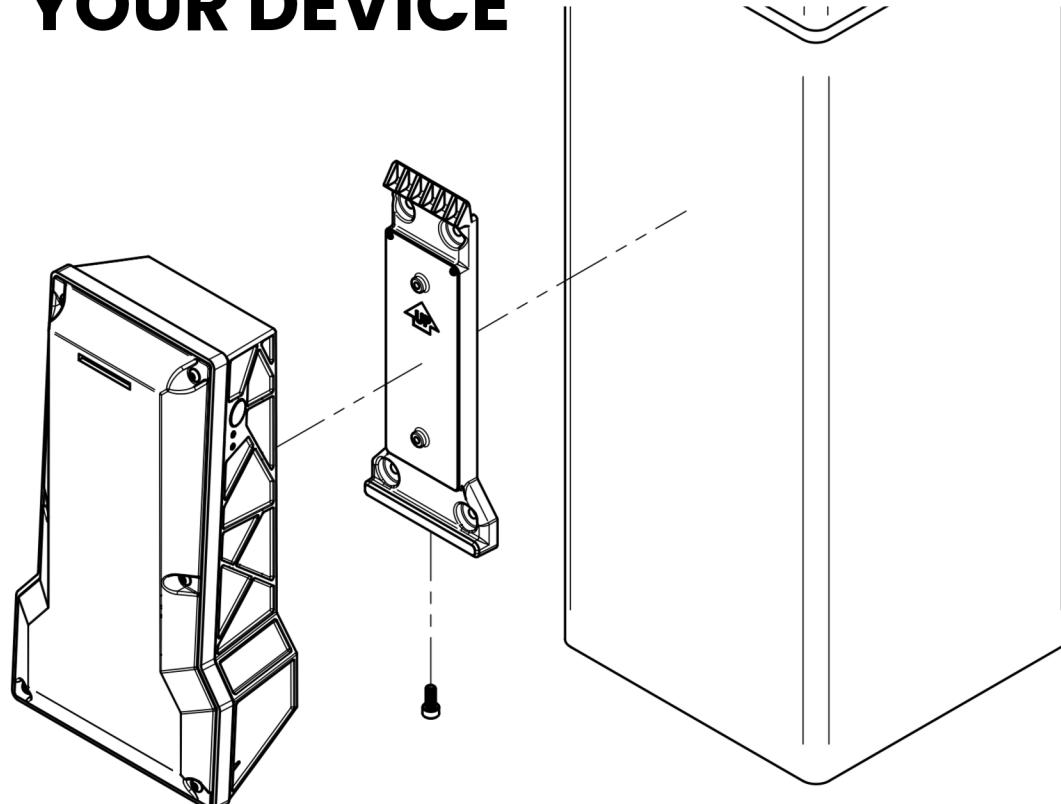
POWER CABLE - POWERS THE DEVICE.

PRESSURE SENSOR - REQUIRED FOR MAINTAIN PRESSURE FEATURE



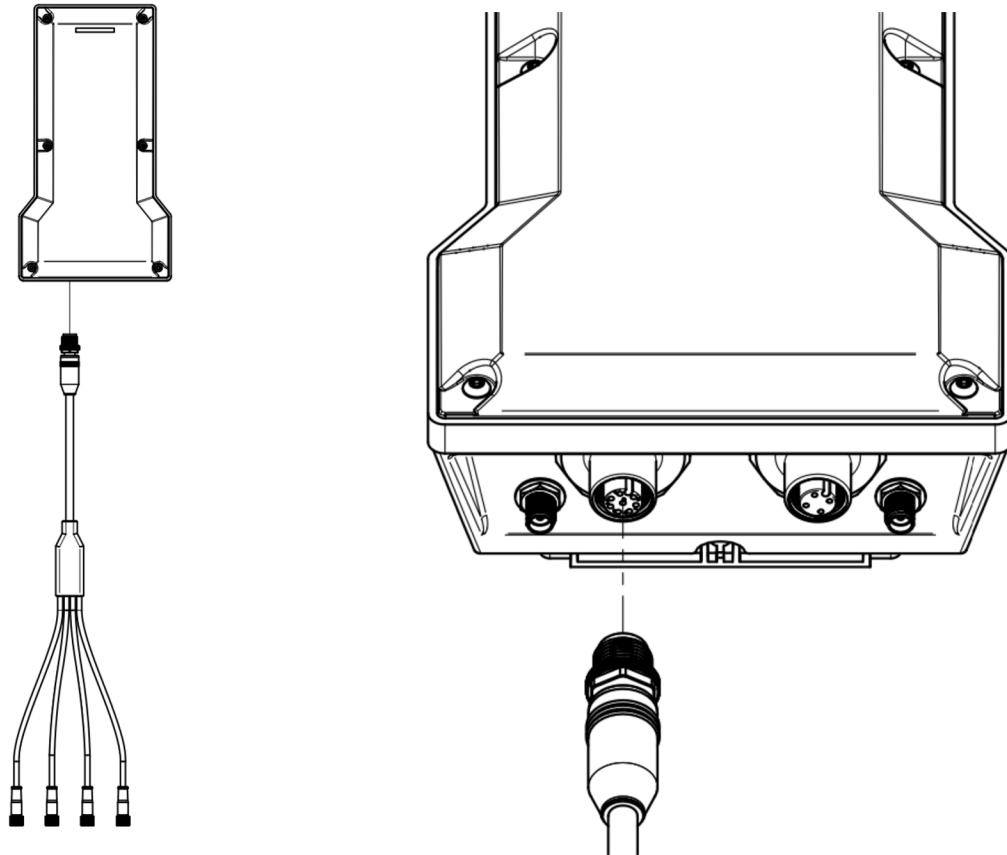
THE DEVICE CAN BE INSTALLED INSIDE OR OUTSIDE THE PANEL. 4

1. MOUNT YOUR DEVICE



INSTALLATION LOCATION -FOR STATIONARY PUMPS, DEVICES CAN BE MOUNTED INSIDE THE ELECTRICAL PANEL OR PUMP HOUSE. NOTE THAT HIGH CURRENT POWER CABLES CAN INTERFERE WITH PROPER FUNCTIONALITY. WHEN MOUNTING INSIDE OF AN ELECTRIC PANEL, MAKE SURE THE DEVICE, ANTENNA AND ANTENNA WIRE IS FAR AWAY FROM ANYTHING CARRYING HIGH CURRENT. FOR BEST GPS PRECISION, THE DEVICE SHOULD HAVE A CLEAR VIEW OF THE SKY. THE DEVICE GPS LOCATION CAN BE MANUALLY ADDED TO A SPECIFIC LOCATION WHERE IT'S NOT POSSIBLE TO GET GOOD GPS.

2. CONNECT WIRE HARNESS



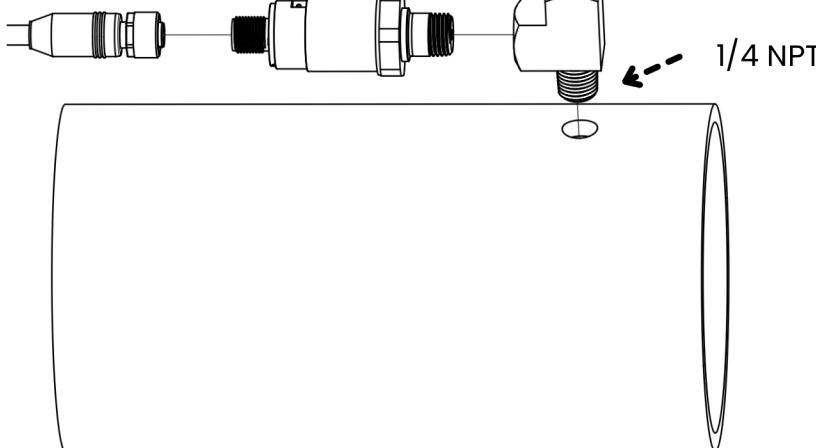


3. CONNECT PRESSURE SENSOR

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

FARMHQ OFFERS EXTENSION
CABLES

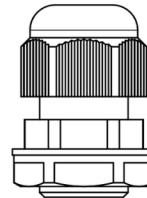
EXISTING PRESSURE 
SENSOR



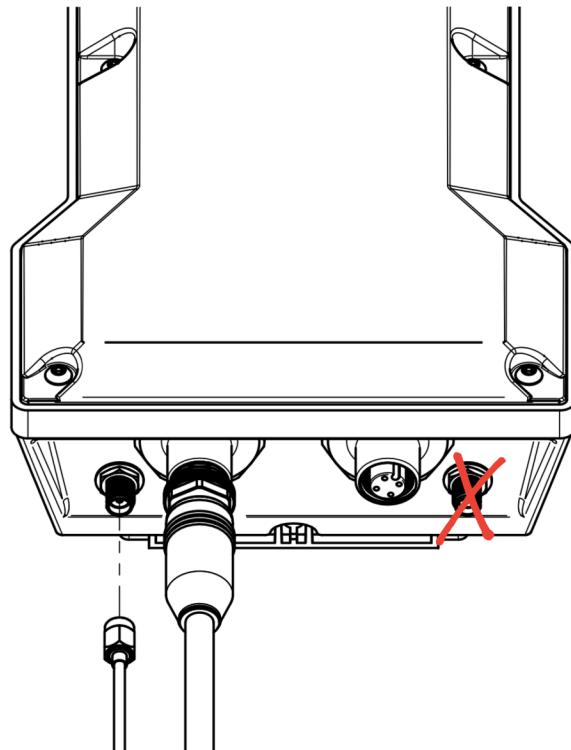
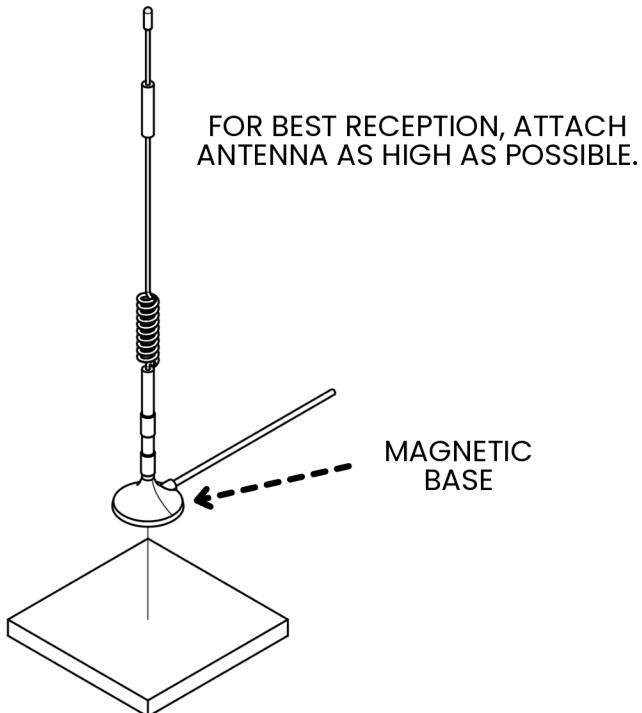
CONNECT TO
SENSOR 2



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)



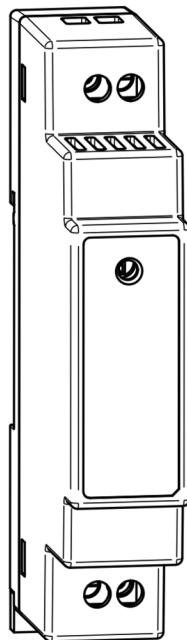
THE TC-3 ACCEPTS 8VDC-48VDC. MOST VFDS HAVE 24V AVAILABLE AND THAT CAN BE USED TO POWER THE DEVICE. IF THIS VOLTAGE IS NOT AVAILABLE, FarmHQ CAN PROVIDE 24V POWER SUPPLY

POWER SUPPLY SPECS:

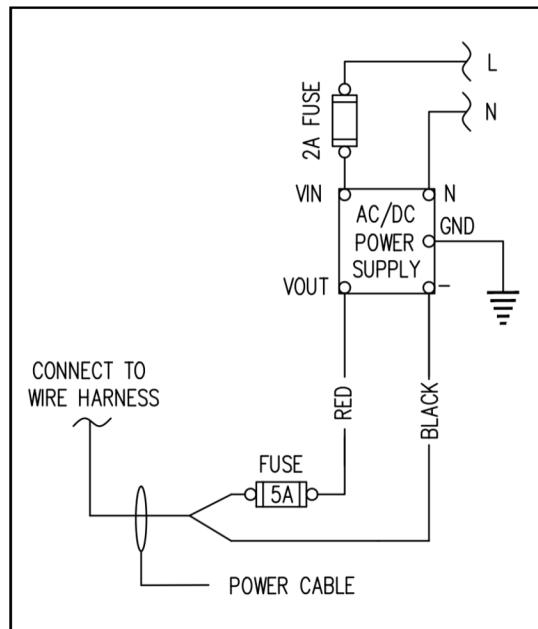
- 20W MIN
- 8-48VDC OUTPUT



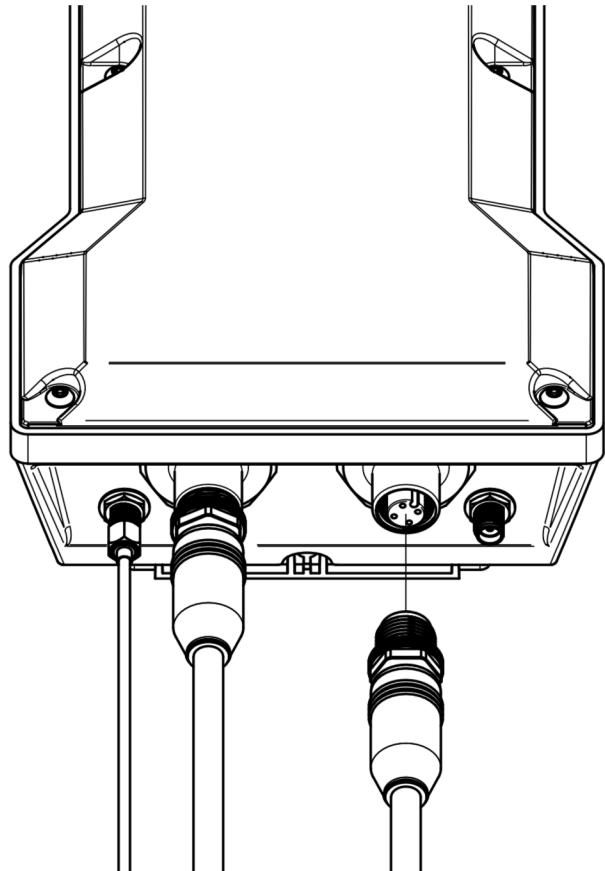
INSTALL A 12V OR 24V POWER SUPPLY. FARMHQ CAN ACCEPT 8-48VDC



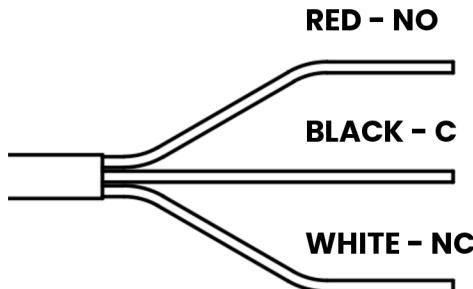
AC/DC POWER SUPPLY WIRING DIAGRAM



6. CONNECT SWITCH CABLE



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



NO - NORMALLY OPEN

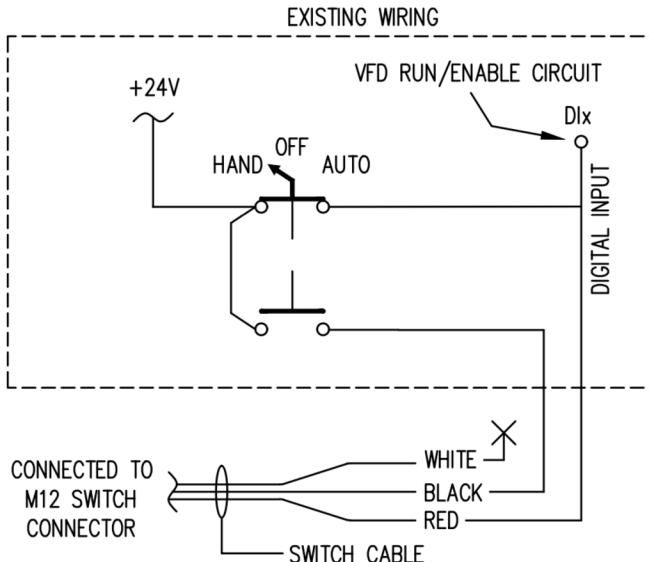
C - COMMON

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

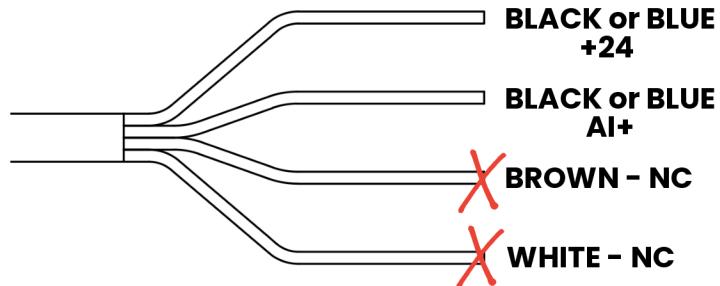


CONNECT THE VFD CABLE
TO THE **CAN** CONNECTOR
ON THE WIRE HARNESS.



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

**NOTE: BLACK AND BLUE WIRES
ARE INTERCHANGEABLE**

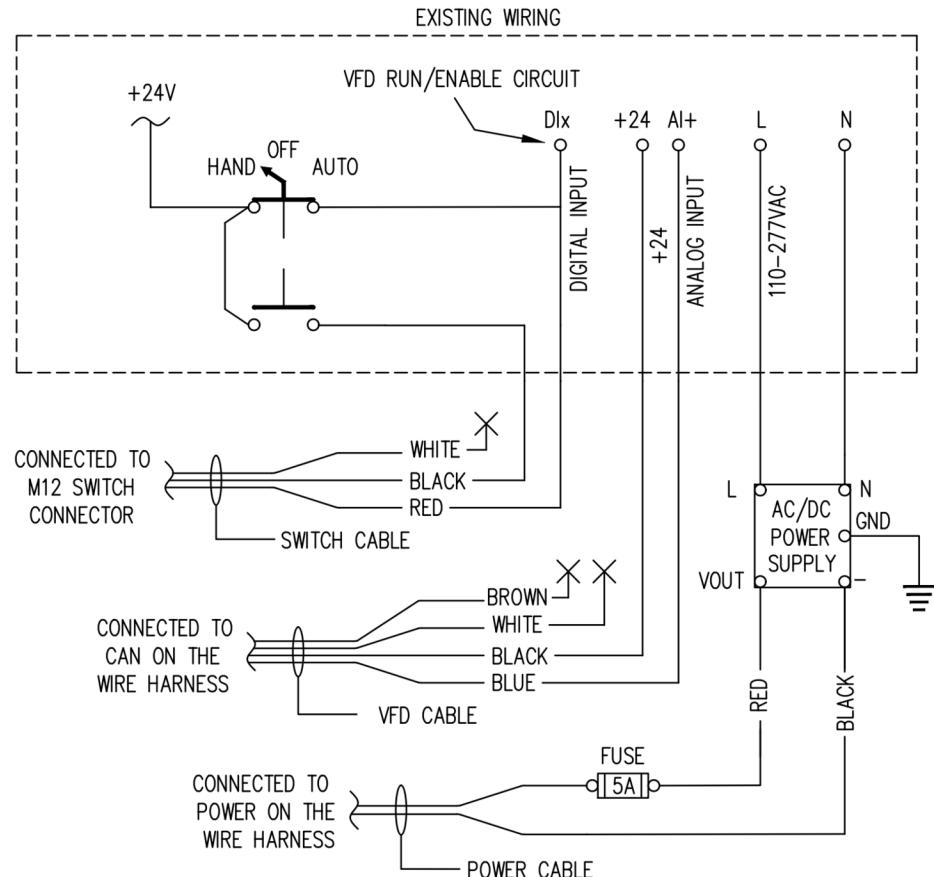


AI+ - ANALOG INPUT +

+24 - SUPPLIED ON VFD

NC - NOT CONNECTED

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.

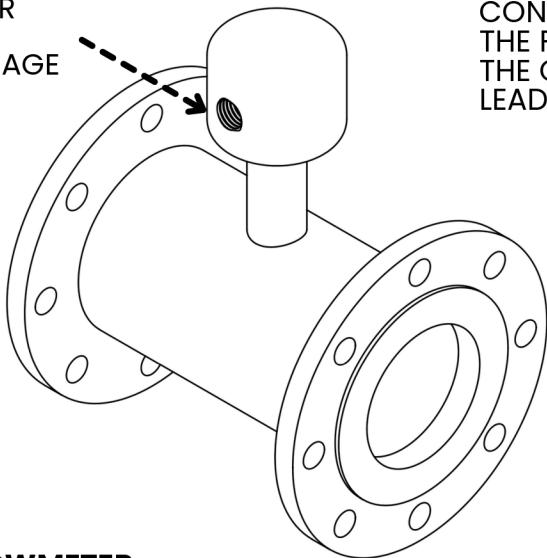
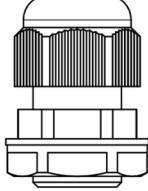
DIGITAL INPUT RUN/ENABLE - THE DIGITAL INPUT CONNECTED TO FARMHQ MUST BE CONFIGURED TO ENABLE THE VFD TO RUN WHEN ENERGIZED. ONCE THE FARMHQ SWITCH CLOSES, IT WILL ACTIVATE THE VFD. THIS CONFIGURATION IS LIKELY ALREADY IN PLACE IF THE VFD IS CURRENTLY OPERATIONAL.

HELP - CONTACT THE VFD MANUFACTURER FOR PROGRAMMING ASSISTANCE.

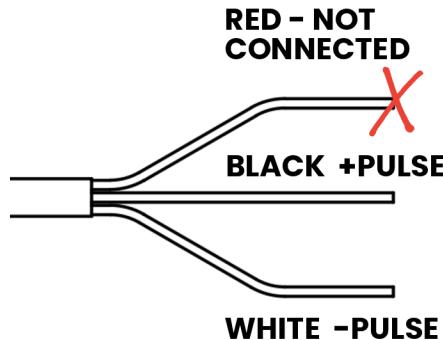
10. CONNECT TO FLOWMETER (OPTIONAL)



USE CORD GRIP OR
SEALING GLAND FOR
PENETRATIONS TO
AVOID WATER DAMAGE
TO FLOW METER



USE THE PROVIDED SENSOR CABLE TO
CONNECT TO THE PULSED OUTPUT OF
THE FLOW METER. CUT THE END OFF
THE CABLE TO EXPOSE THE WIRE
LEADS AND CONNECT AS SHOWN.



CONNECT
TO SENSOR 1



PROGRAM THE FLOWMETER

SOME FLOWMETERS REQUIRE THE PULSED
OUTPUT TO BE ENABLED AND THE K-VALUE OR
GALLONS-PER-PULSE SETTING TO BE
CONFIGURED. IN SOME CASES, THESE SETTINGS
COME PRE-CONFIGURED FROM THE FACTORY.
REFER TO THE FLOWMETER MANUAL TO
DETERMINE THE K-VALUE, AS THIS WILL BE
REQUIRED FOR PROPER CONFIGURATION.

**RED - CUT AND WRAP WITH
ELECTRICAL TAPE**

11. 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 FOR AN OVERVIEW OF HOW THE APP WORKS

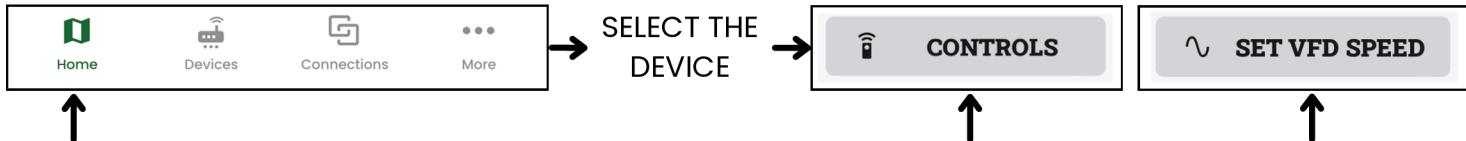


12. TEST VFD CONTROL

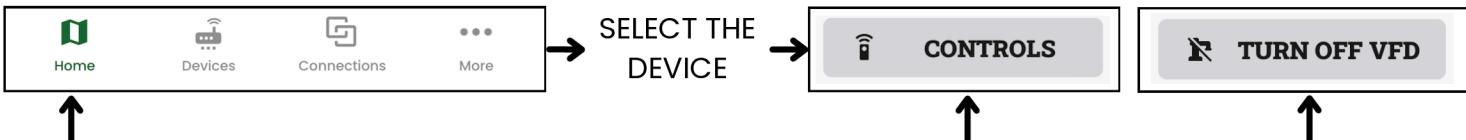


TEST SPEED CONTROL

- 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.

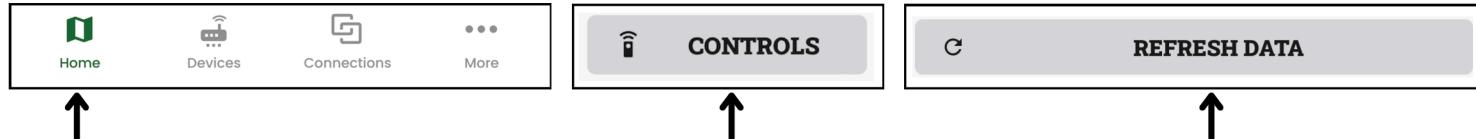
NOTE – FARMHQ WILL HAVE DIFFICULTY WITH MAINTAINING PRESSURE BELOW 10PSI.

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"

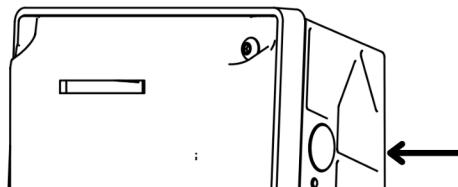


C. VERIFY THE PUMP CONFIGURATION. CHECK THE FOLLOWING.

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 THE 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.