



This RTU upgrade is set to be installed at this location:

Contact tech support if plans change and when RTU is ready to be put in production.



150/850 Upgrade Manual

Welcome,

Thank you for choosing Mission Communications for your monitoring and alarm needs.

This document is intended for installers experienced with the M110 and M800 series (Legacy series) remote terminal unit (RTU) installations and those upgrading M110 and M800 to MyDro RTUs. This manual highlights some of the differences between the Legacy series and MyDro series RTUs to aid in your next installation or upgrade.

At Mission, it is our goal to provide customers with the latest technology and designs while ensuring great value. A wide range of information is accessible through the web portal. You may also use your smartphone to scan the QR codes in this manual, which will take you to the corresponding document on our website.

We encourage you to take advantage of our quarterly newsletters, training videos, and weekly webinars. Visit 123mc.com to contact us or learn more about our training resources. Our technical support staff is available by calling (877) 993-1911, option 2.

Thank you,
The Mission Team



WARNING: This symbol indicates there is caution or warning to avoid damage to your property or product.



WARNING: Follow requirements for field wiring installation and grounding as described in NEC and your local/state electrical codes.



NOTE: This symbol indicates that there is something that requires your special attention.



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Chapter 1: Overview

This document describes the changes that may be required because of the differences between Legacy and MyDro series RTUs. We strongly encourage you to review this entire document and the standard installation manual before beginning the upgrade, as these notes are a supplement to those instructions. Technical support is available to assist you.

The MyDro RTU is designed to be an easy upgrade from an M110 or M800 series RTU regardless of enclosure. The upgrade kit should include all the parts needed to mount the components into the same form factor enclosure as was specified on the order. Few, if any, new holes will be required to complete the upgrade. Wire terminals are in the same general area as the previous boards so most wires will simply need to be reterminated, and the MyDro features removable terminals for convenience.

The MyDro may require slightly different wiring considerations than the M110 and M800 series RTUs due to enhanced electronics. The most notable are configurable auxiliary output voltages, isolated analog inputs, and the lack of direct support of the Wet Well Module (WWM). MyDro directly supports the pump run load sensors associated with the WWM, but not the module itself.

The Safe Module Plus is an available option that improves upon the Wet Well module and provides 4 pulse accumulators typical associated with rain tipping buckets and pulse based flow meters.



Future product enhancements will focus on the MyDro platform, including those related to communications and Modbus. The over-the-air firmware upgrade capability makes it easy for us to deliver these enhancements to you as they become available.

Included with RTU Upgrades

Common parts for all enclosures:

- Printed circuit board (PCB)
- Screwdriver
- LCD stylus
- Electronic key configured to allow configuration changes on the MyDro touchscreen
- New antenna (PN RF430)
- New battery (PN PW441)
- Key reader
- (4) #6–32 screws
- (2) Load sensors
- (6) Tie wraps

FlatPak:

- Metal lid with window
- (4) 1/4" standoffs
- Knockout plug

NEMA 1:

- Standoff mount
- (2) Knockout plugs
- Metal lid with window

NEMA 4

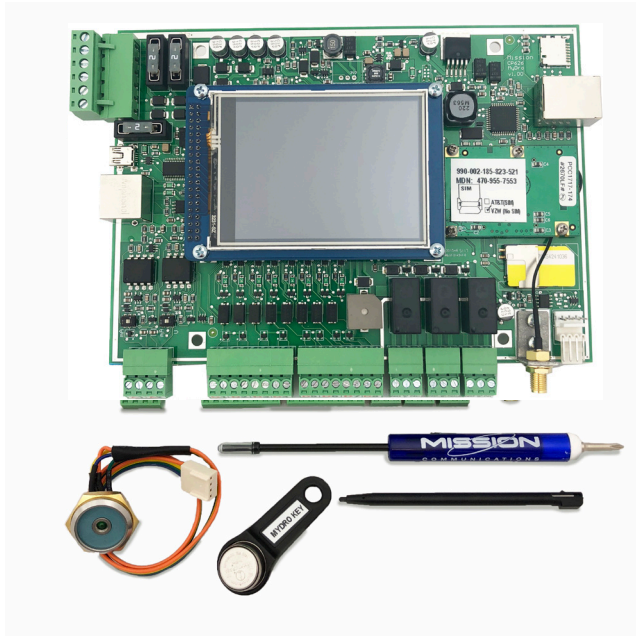
- Plastic lid for MyDro
- (4) 1/2" standoffs
- (1) Additional key reader

NEMA 4X Solar Enclosure:

- Plastic lid for MyDro
- (8) 1/2" standoffs
- (1) Additional key reader

Plan Your Strategy

In many cases, you will simply mount the new printed circuit board (PCB) and rewire the conductors as they were before. This is a good time to address aspects of installation that could be done better. Consider the best practices listed on the following page before installation.



Before you decommission your existing RTU, exercise each sensor to confirm they are working properly. This will allow your final tests of the MyDro to be conclusive.

To minimize down time, confirm that the MyDro RTU is ready for installation. Temporarily connect an antenna and power up the uninstalled MyDro RTU with battery power to ensure the radio is active and the carrier is appropriate for your location.

Chapter 2: Before Disassembly

Familiarize yourself with what you have by looking at the I/O descriptions and configuration of your web portal. Confirm those details by evaluating existing local wiring and then correct or update your local labeling. Review the MyDro 150/850 Installation Manual prior to upgrading an existing RTU.

Use the camera in your smartphone to capture the wiring of your existing RTU. Individually label non-obvious conductors.

Power In

The top two terminals on the left are generally where power from the 120 volts to 12 VAC transformer enters (in some cases solar power). The new wiring will be the same unless this is a solar-powered RTU. Power supplied by a solar panel is polarity sensitive. An independent solar charge regulator is recommended.

Battery Power

The battery terminals are controlled by a smart charging circuit that reduces current as the battery voltage approaches 13 volts. Even with solar panels, where 20 VDC is not uncommon, the voltage will be regulated to not overcharge the battery.

Auxiliary Power

The voltage provided by the auxiliary (aux) power terminals is software selectable as 0, 12, or 24 VDC. The aux terminals of the Legacy RTU supplied 12–16 VDC. The 24 VDC option is the preferred voltage for most 4–20 mA transducers. Any components powered by aux must complement your aux voltage setting.

Antenna Best Practices

Do	Don't
Mount the antenna outside and high as possible, preferably above the roof or other objects.	Mount the antenna underground, in a dry well, or inside a canned lift station.
Mount the antenna above all metal surfaces close to the installation.	Mount the antenna horizontally or bend the antenna whip.
Coil excess coax in circles of 5 to 7 inches in diameter. Pinching or tight bends in the coax can restrict the high frequency/low power radio signal path in much the same way water flow is restricted through a tight bend in a hose.	Mount the antenna inside a metal control cabinet. Even fiberglass cabinets degrade the signal.
Ensure that the weight of the cable does not damage the antenna base. There should be enough slack in the cable so it does not rest or touch the top surface of the mounting bracket.	Mount the antenna on the side of a metal cabinet or adjacent to a tank. Metal surfaces will reflect the radio signal, preventing it from traveling in all directions.
Incorporate a drip loop when installing the cable to prevent water from penetrating into the building or enclosure.	Cut, lengthen, or shorten the coaxial cable. Mission can supply antenna extension cables and connectors up to 50 feet. For lengths above this limit, another RTU mounting location should be considered.

Wiring Best Practices



Note: Mount the supplied transformer outside the Mission enclosure.

- Signal cables should not run parallel with high voltage AC wires (load conductors).
- Where signal wires and load conductors must cross, do so at right angles.
- High voltage should not enter the Mission RTU.
- Lay wires in wire trays with the excess near terminations. Replace wire race covers (follow NEC and your local/state electrical codes requirements).
- Cables used for digital and analog inputs should be 18–22 gauge, shielded, twisted pair wire with the shield connected to ground at the RTU and not on the other end of the cable (to prevent ground loop current).
- MOVs can be installed across AC contactor coil terminals to shunt voltage spikes away from the RTU inputs and other electronics in the panel. Voltage spikes can be caused by coils de-energizing. The included MOVs are rated for 120 volt circuits and will suppress excess voltage above 150 volts. These parts are application dependent. They have a finite lifespan and will need to be replaced over time.

Digital Inputs

The MyDro digital inputs feature software selectable wire fault supervision. That means the end-of-line (EOL) resistors are optional. When the no-fault (NF) setting is chosen at the LCD digital input “Config.” screen, no EOL resistors should be installed.

Multiple sensors connected to the MyDro digital input can be wired to (share) a common (chassis) ground. The Legacy series required 1,800 ohm resistors wired in series as described in Appendix C of the M110/ M800 Installation Manual.



See I/O Expansion section for expanded digital information.



Note: For EOL resistors to be effective they must be installed parallel to the sensor switch, not on the terminals of the RTU.

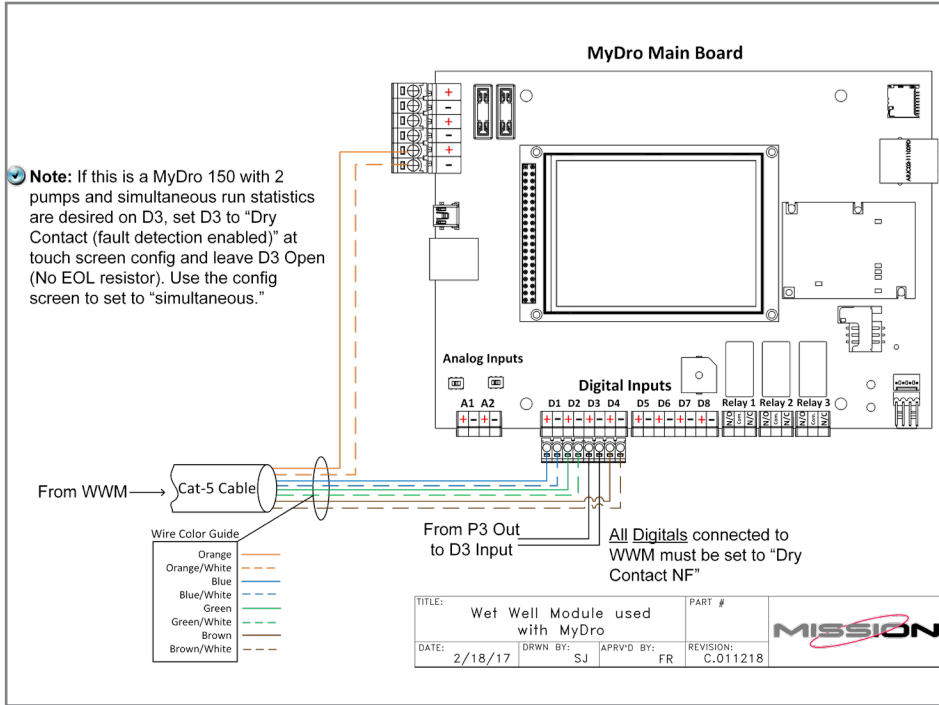
Wet Well Module

Legacy series RTUs support the Wet Well Module (WWM) by way of the RJ45 interface on the left side of the printed circuit board. There were two versions of the WWM (green, older and red, newer). **The MyDro does not directly support either version of the WWM, but does support the optional Safe Module Plus via the RJ45 (RS485/Modbus port).**

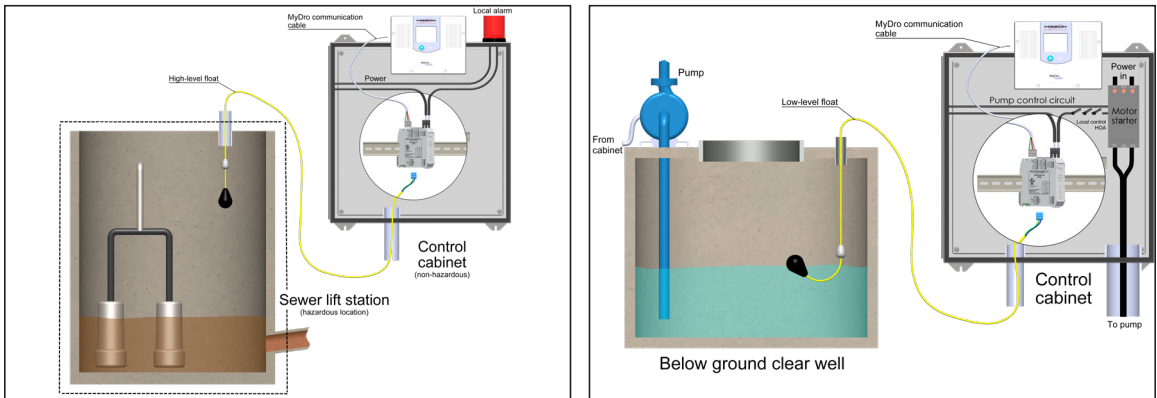
The WWM provided two primary functions—that of pump run indication and that of sharing the signal of the high-level float to both the Mission RTU and the local panel (local siren). While the MyDro does not support the WWM the cable from either version can be cut and terminated directly to the MyDro terminals. If you currently utilize local alarming and want to continue doing so, you may consult Figure 1 to reuse the WWM.

Furthermore, the newer, red version relies on the load sensors that are now directly supported on the MyDro. In other words, you could chose to directly wire the load sensors to the MyDro as indicated in the standard MyDro installation manual and continue to use the float functionality of the WWM.

**Figure 1:
Using Wet Well Module with MyDro**



**Figure 1b:
Using Safe Module Plus with MyDro**



Analog Inputs

The two onboard analog inputs of the MyDro are isolated—they were not on the Legacy board. If the power for the instrument is sourced from the MyDro aux terminals an additional conductor (highlighted in Figure 2) from the negative terminal of the analog input to aux is required for the loop to be complete. The aux voltage is software selectable as 0, 12, or 24 VDC. Most analog instruments are rated for a broad range of voltages (typically 10–30 VDC). Selecting the 24 volt option makes voltage starvation situations much less likely when multiple devices are present on the current loop.

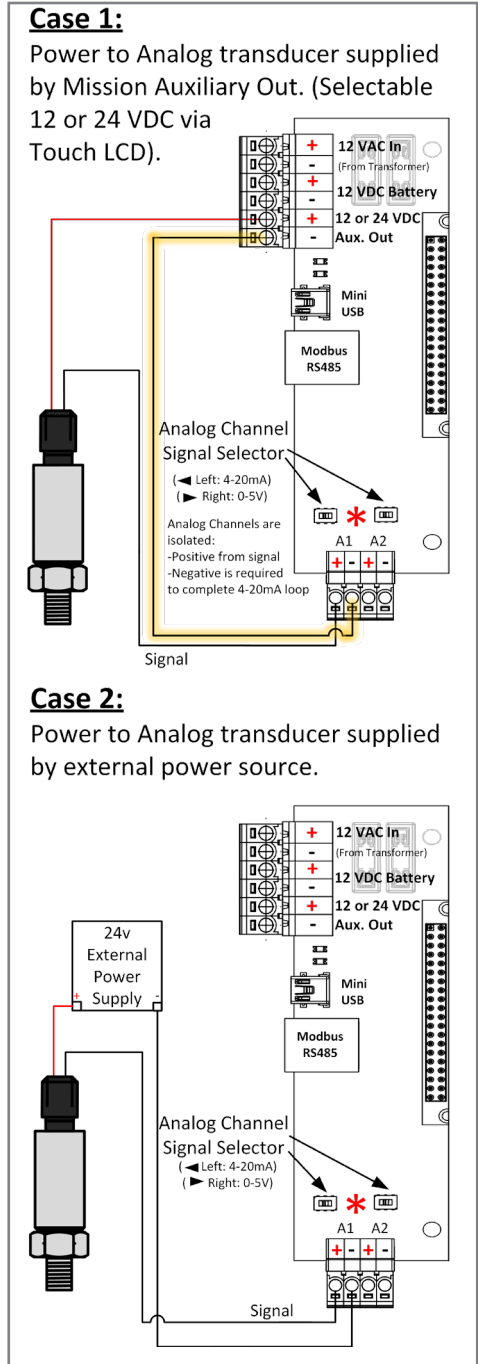
Take note of the analog jumper position on the Legacy RTU and identify it as 0–5 volts or 4–20 mA. By default, it is set as 4–20.

See I/O Expansion section for expanded analogs.



Note: Other components supported by the aux-out must be rated appropriately. For example, the ELK relay that Mission offers has a resistor that can be clipped for 24 VDC power.

Figure 2:
Analog Input Wiring

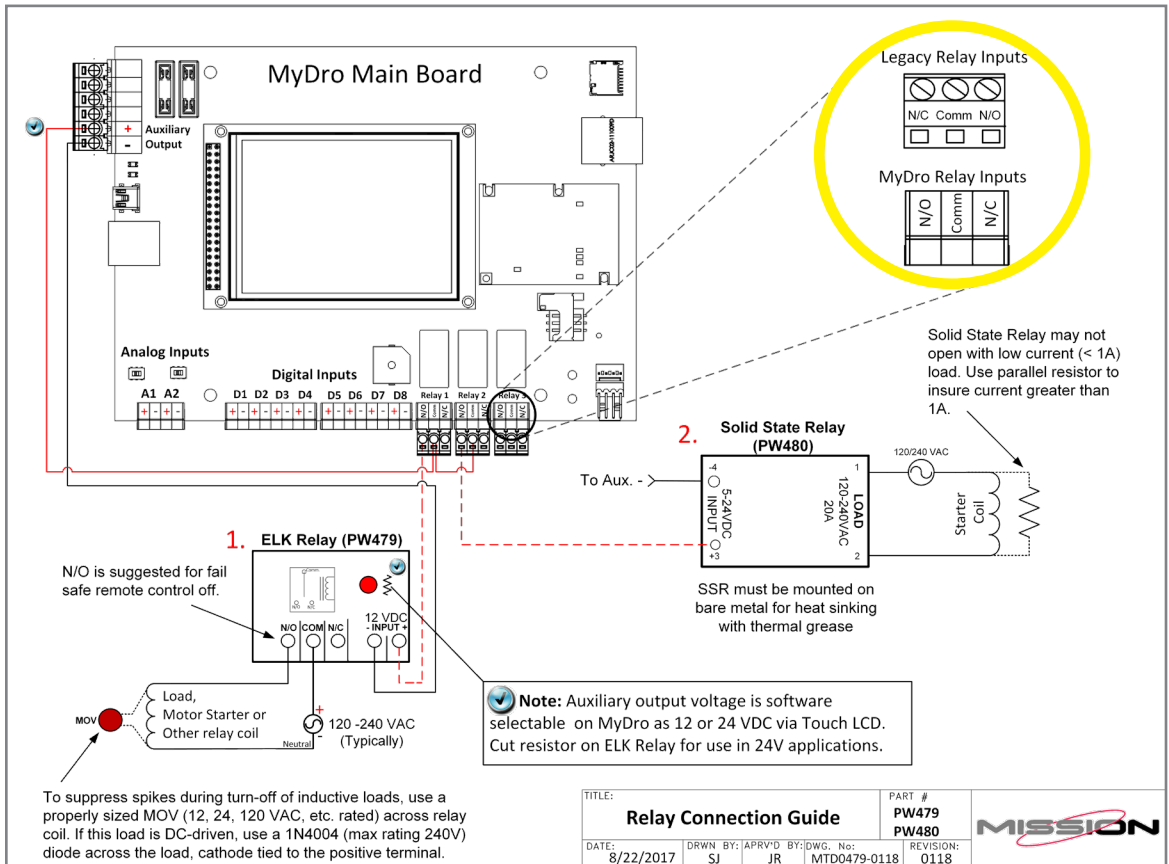


Output Relays

MyDro output relays have higher ratings than the Legacy RTUs (maximum AC voltage is 120 volts, maximum DC is 30 volts, maximum current is 5 amps). We discourage high voltage AC inside of the Mission enclosure for safety and induced voltage reasons (see Figure 3).

Warning: The MyDro relay normally open (N/O) and normally closed (N/C) terminals are opposite to that of Legacy units (highlighted in figure 3).

Figure 3:
Relay Connection Guide



I/O Expansion

The MyDro relies on a different expansion module interface than the Legacy RTUs, and Legacy expansion boards are not compatible with the MyDro. See the MyDro Expansion Manual document (LI # MEM) for full details.



The MyDro expansion communication cable (8') is based on RS485 and capable of long distances. If I/O expansion is present at this location consider the benefits of moving the MyDro expansion module outside of the enclosure (in the case of the FlatPak enclosure, this is not optional).

The MyDro expansion modules support the same or better I/O characteristics than the Legacy modules.

**Table 1:
Expansion Module Difference Chart**

	Legacy Expansion	MyDro Expansion
Total Supported	One	One of each type
Physical Connection	Proprietary	Modbus RS485 with power Mission PN CP500
Pulse Input	Dry, open collector Up to 5 VDC	Dry Up to 30 VDC
Digital Input	Individual ground	Common ground
Analog Input	0–5 V, 4–20 mA	Same, requires change of internal jumper and LCD configuration
Analog Output	4–20 mA Max current load 300 ohms	4–20 mA, 0.5 ohm output impedance, max current load resistance 500 ohms

Chapter 3: Rewiring and Enclosure Installation

Rewiring

The MyDro features removable terminals. Your strategy may involve removing one wire at a time from the Legacy RTU and immediately terminating it onto the corresponding removable terminal. Nevertheless, it is a good idea to photograph the existing installation and label wires before decommissioning the Legacy RTU.

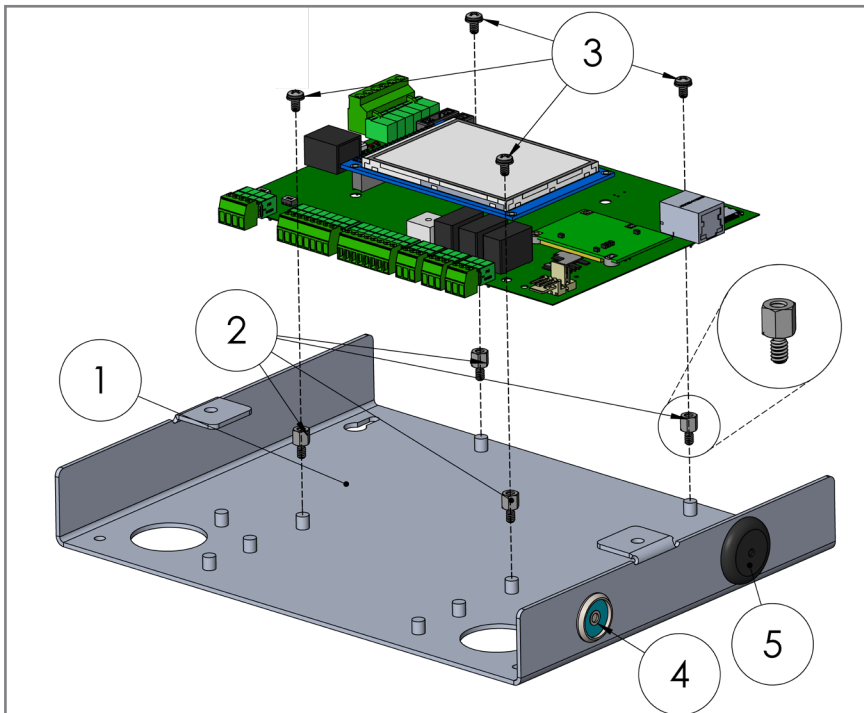
1. Turn AC power off to the Legacy RTU, remove the leads and either terminate them to the corresponding terminal or temporarily insulate them. Repeat for battery leads.
2. Unscrew the SMA connector from the antenna connector.
3. Remove the four screws holding the PCB down. These screws will be reused.
4. Refer to the appropriate section for reassembly information based on your enclosure.
5. Reterminate remaining conductors into their respective removable terminals. You may choose to power up the RTU and insert one bank of removable terminals at a time so that any wiring problems can be more easily identified. The removable terminals have been labeled to assist you with this step.



FlatPak Retrofit (see Figure 4)

1. Remove Legacy PCB hardware from existing FlatPak enclosure.
2. Extend standoffs by installing the four included standoffs (1/4" x #6-32) on top of the existing standoffs on the enclosure back plane.
3. Secure the MyDro PCB into the enclosure by placing it on top of the extended standoffs, use existing #6-32 screws.
4. Remove existing key reader and replace it with the one supplied. Terminate the new key reader at the bottom right side of the PCB.
5. Remove the old noisemaker and fill the hole with the supplied knock-out plug. The PCB includes an onboard noisemaker.
6. Replace lid with new one supplied when installation and testing is complete.

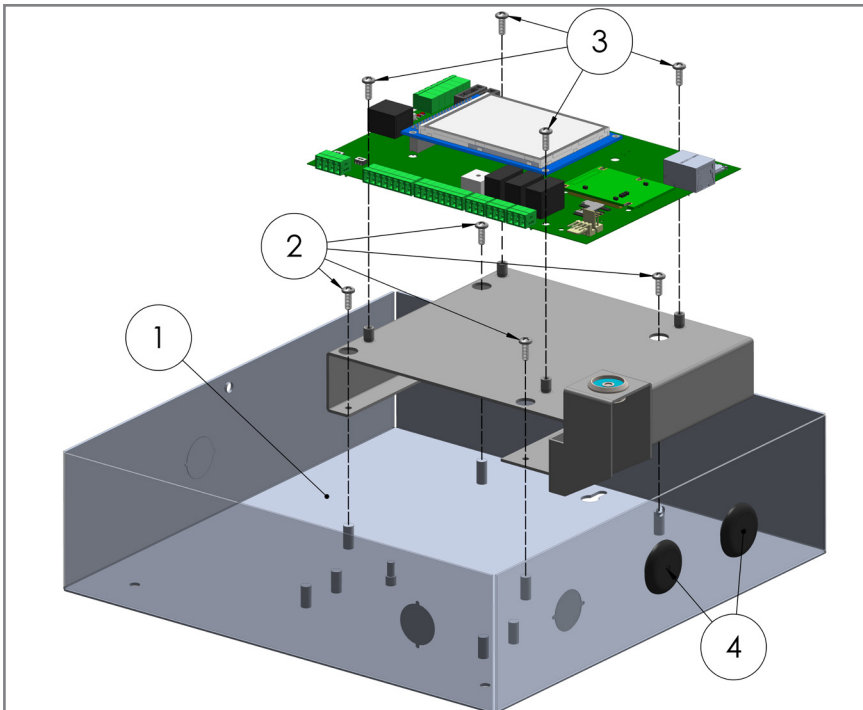
Figure 4:
FlatPak Retrofit



NEMA 1 Retrofit (see Figure 5)

1. Remove Legacy PCB hardware from existing NEMA 1 enclosure.
2. Install adapter bracket onto existing standoffs with the four #6–32 screws supplied. Use the holes for screwdriver access.
3. Install MyDro mainboard on adapter bracket. Secure with existing #6–32 screws.
4. Remove existing key reader and noisemaker and replace with knockout plugs. Terminate the new key reader at the bottom right side of the PCB.
5. Replace lid with new one supplied when installation and testing is complete.

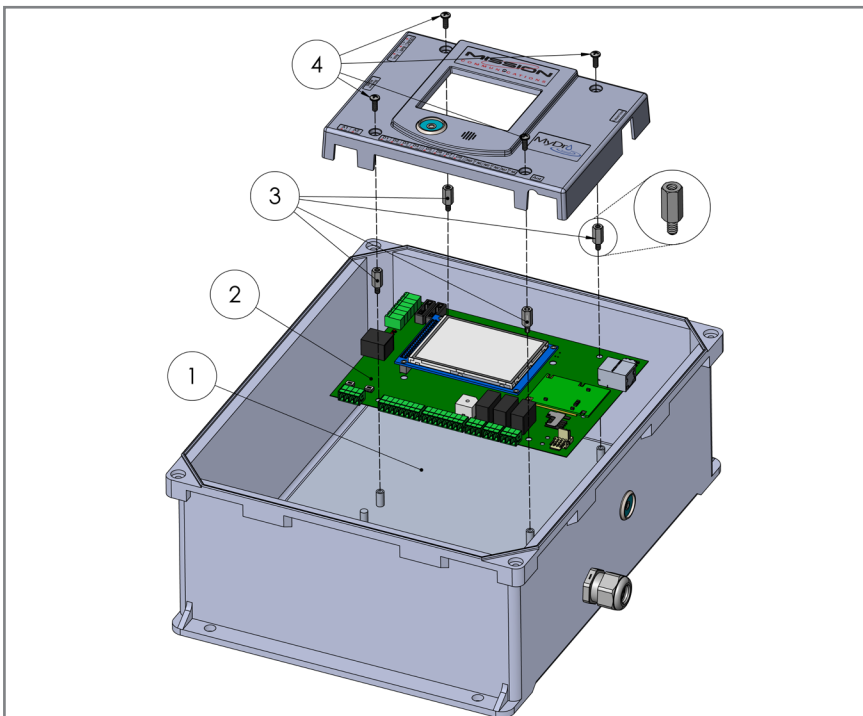
Figure 5:
NEMA 1 Retrofit



NEMA 4 Retrofit (see Figure 6)

1. Remove Legacy PCB hardware from existing NEMA 4 enclosure.
2. Install MyDro mainboard on existing standoffs in enclosure.
3. Use the included standoffs (1/2" x #6–32) to secure the PCB to enclosure backplate.
4. Place the MyDro cover over the PCB, and use the four #6–32 screws to secure cover.
5. Replace lid with new one supplied when installation and testing is complete. Put silicone on the thread of the new key reader.

Figure 6:
NEMA 4 Retrofit



Note: If you are upgrading a solar RTU, place the (4) additional standoffs before installing the mainboard.

Configuration Adjustments

It is possible that the Legacy RTU had special settings. Certain settings will need to be paged to the RTU from the web portal or by tech support, while others may not be necessary with the enhanced electronics of the MyDro.

Configurable Settings Shown on the LCD

The following settings may be configured locally on the LCD screen with an electric key programmed to access the “Config.” screens.

Digital Input Setup:

- Channel: alternate between digital input channels
- Mode:
 - Dry Contact: no voltage on switched circuit, requires 1000 ohm EOL resistor parallel to switch
 - Dry contact NF: no voltage on switched circuit, no EOL resistor
 - Load sensor: strap on current sensor, no EOL resistor, broken wire, or failed sensor will show as wire fault
 - Load Sensor NF: strap on current sensor, no EOL resistor, no wire supervision
 - Runtime: for items like pumps where statistics (runtimes, starts, etc.) are desired. MyDro 150 allows runtime configuration on D1, D2, D3. MyDro 850 allows runtime on all 8 onboard digital inputs. See main manual for simultaneous runtime options on input 3 (M150) or input 8 (M850).
 - Alarm: used for items like floats, where change of state should be sent in real-time
 - MyDro 150 configures simultaneous runtimes
- Disabled: No data is sent
- Debounce: Noise suppression feature for 10–90 seconds

Analog Input:

- Channel: alternate between analog input channels
- Mode: 0–5 V, or 4–20 mA
- Filter: consider high filter setting for volatile analog instruments like flow meters. Filtering is implemented on firmware versions 14.2 and greater.

Analog Scaling Setup

- Channel: alternate between analog input channels
- Offset: allows you to enter value if sensor is not at the bottom or top of measured item
- Range: of sensor as described on the instrument name plate, or converted value appropriate to engineering units. For example, 2.31 feet per PSI results in a 0–23.1' range on a 0–10 PSI pressure transducer.
- Units: engineering units as desired

Auxiliary Output Voltage:

- 0, 12, 24 VDC
- Make certain all items powered by auxiliary are compatible to this selection

Relay Communication Failure:

- De-energize: generally appropriate if pumping into a pressure tank
- No change: generally appropriate if tank can spill
- See Best Practices for Remote Control Applications document



Battery Test:

- Runs a routine that puts battery under load and returns final voltage. This test is performed daily and recorded on web portal.
- A good battery should result in a V-battery test reading of 12.1–12.4 volts, assuming it as been installed and properly charged.

Server Connection:

Tech support will advise if it should be changed from default.

Miscellaneous

- Language
- Temperature (C or F)
- Audio
- Screen Saver

Configurable Settings NOT Shown on the LCD

Alarm threshold settings must be paged to the RTU.

Chapter 4: Test the MyDro After Installation and Commissioning

1. Check input voltages with a multi-meter.
2. Exercise all inputs and confirm that the LCD and web portal are displaying the values correctly. Page relays and analog output (if in use) from the web portal and confirm proper operation. As a reminder, the N/O and N/C terminals on the output relays are opposite that of the Legacy RTU.
3. Confirm all automated remote control functions are working properly.
4. Confirm all fail-safe operations are working as desired. One way to do this is to disconnect the antenna so that the RTU goes offline.
5. Contact Mission Technical Support so that we can associate the new radio identifier (IMEI) with the data from the previous RTU.

Installation Notes



Web
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(877) 993-1911 option 2
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Sales
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MUM-2104