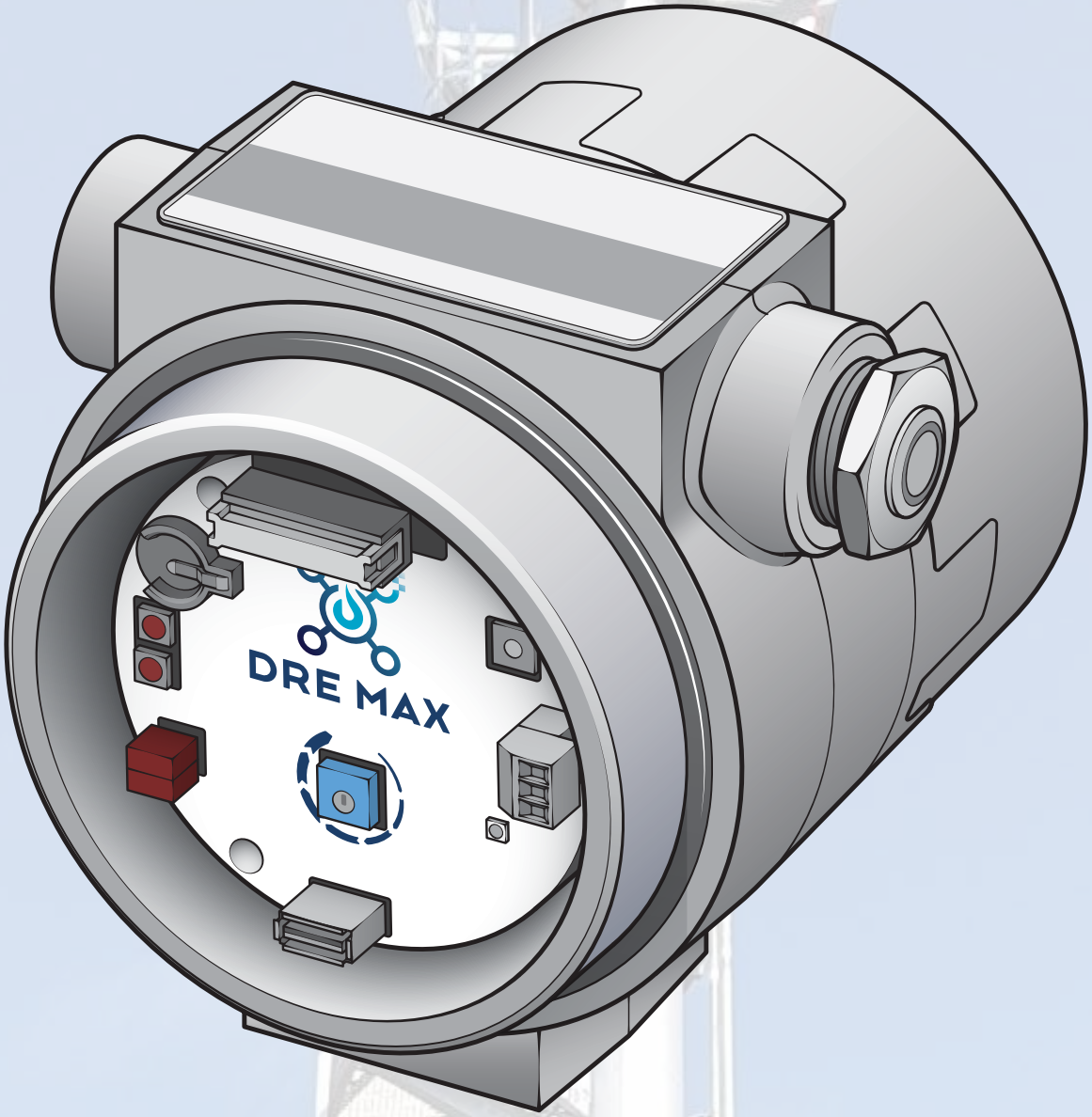
DRE MAX Smart Controller

USER MANUAL



https://cimarron.com/dre-max

Revision: 04/2025

Table of Contents

1 DRE MAX System Overview

The DRE-MAX system manages air demand for flare combustion efficiency by processing up to three transducer inputs: High Pressure (HP), Low Pressure (LP), and Medium Pressure (MP) streams. Based on real-time input data and user-defined parameters, it computes the necessary air demand for the flare blower. The system then adjusts a 4-20mA output signal to control the blower's Variable Frequency Drive (VFD). Depending on the flare type, certain streams may not be present. For example:

- Conventional flare types use only HP and LP streams
- DreamDuo and DreamTrio flares rely on LP and MP streams, with HP not requiring assist air
- In DreamDuo flares, MP is set to zero since there are only HP and LP streams

The system also monitors Net Heating Value Dilution (NHVD) for regulatory compliance and includes a gas assist control feature for reducing smoke in LP flaring.

1.1 Variable Frequency Drive (VFD) Control

The system calculates air demand based on HP, LP, and MP flare gas flow rates (measured in MSCFD) to optimize combustion efficiency. The VFD regulates blower speed to match this demand.

User-Configured Inputs:

- Blower Max Flow Rate (SCFM)
- Blower Max and Min Frequency (Hz)
- Blower Upper and Lower Frequency Threshold (Hz) to constrain output levels

Physical Inputs:

- HP Flow Rate (4-20mA)
- LP Flow Rate (4-20mA)
- MP Flow Rate (4-20mA, if present)

Physical Outputs:

- VFD Output Signal (4-20mA) to control blower speed

The system converts the computed air demand into a percentage of the VFD output signal, ensuring the blower delivers the correct airflow for efficient combustion.

1.2 Net Heating Value Dilution (NHVD) Monitoring

NHVD is a key parameter for compliance with flare emission regulations.

User-Configured Inputs:

- EGAS ON Threshold (Btu/ft²/hr)
- EGAS OFF Threshold (Btu/ft²/hr)
- NHV of each stream present (BTU/SCF)
- Flare Diameter (inches)
- Blower Max Flow Rate (SCFM)
- Flare Base Elevation Above Sea Level (ft)

Physical Inputs:

HP Flow Rate (4-20mA)

LP Flow Rate (4-20mA)

MP Flow Rate (4-20mA, if present)

Physical Outputs:

- NHVD Output Signal (4-20mA) representing computed NHVD value
- EGAS Output Signal (4-20mA) for relay driven valve control

The computed NHVD value is outputted on the NHVD output as a 4-20mA current signal. If NHVD falls below 22 Btu/ft²/hr, the system activates the EGAS output where a relay can open a solenoid valve, injecting enrichment gas to restore compliance. To prevent rapid cycling, the valve remains open until NHVdil exceeds a user-set threshold (e.g., 44 Btu/ft²/hr).

1.3 Gas Assist Control

The gas assist feature optimizes HP gas injection for suppressing smoke from LP flaring. LP gas, often from tank vapors, has low pressure (0.2 to 0.5 psig) and tends to produce smoke without sufficient assist air, gas, or steam.

User-Configured Inputs:

- HP Target Coefficient (0.1 to 1)
- Max Flow Rate (MSCFD)
- Min Flow Rate (MSCFD)
- Other standard PID parameters

Physical Inputs:

- HP Flow Rate (4-20mA)
- LP Flow Rate (4-20mA)

Physical Outputs:

- ASST Output Signal (4-20mA) to control gas assist valve

The system HP Target Coefficient is chosen using the following formula:

HP Target Coefficient = Measured LP Flow Rate / HP Target Flow Rate

The computed assist gas value is outputted on the ASST output as a 4-20mA current signal. If the measured HP flow rate is below the HP target flow rate, the ASST output increases its output signal. If the measured HP flow rate is above the HP target flow rate, the ASST output decreases its output signal (see Table 3.2.1 for default settings).

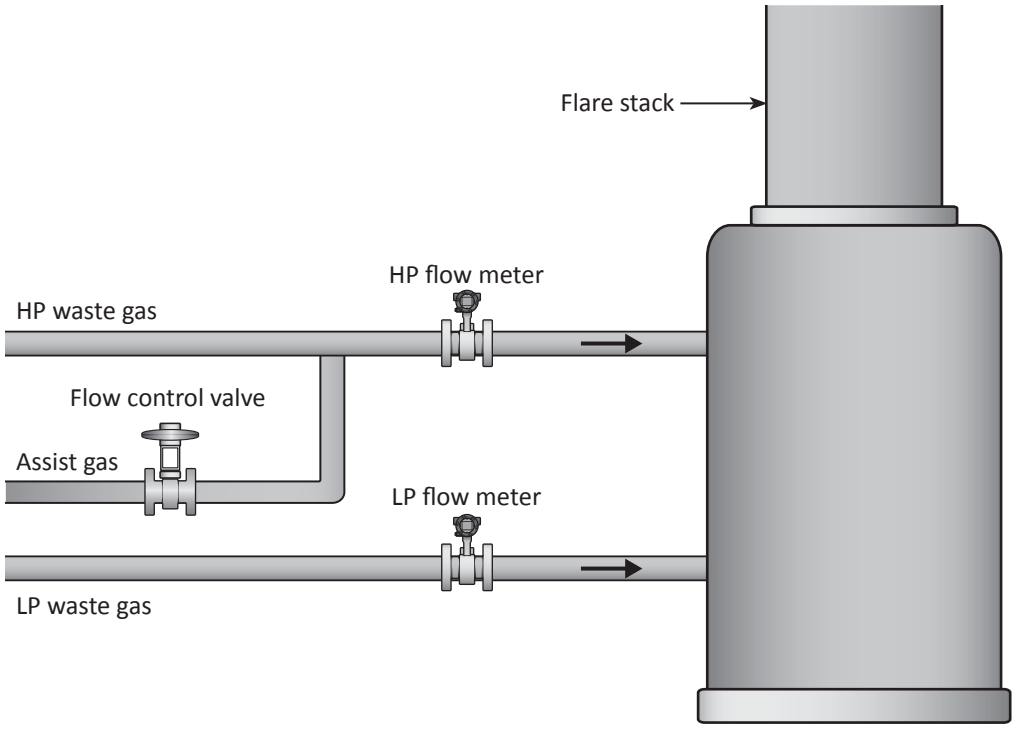


Image 1.3.1 · Gas assist control scheme

2 Installation

NOTICE

The DRE MAX™ must be installed according to the directions provided in this guide and in compliance with local electrical codes and the specifications of the operating company.

The following section will provide you with information regarding the following:

- Mounting and wiring guidelines and recommendations
- Basic wiring configurations
- Terminal descriptions
- Setup using the DRE MAX configurator software

2.1 Mounting

NOTICE

The DRE MAX™ must be wired according to the directions provided in this guide, and in compliance with the specifications of the operating company, as well as local codes, state and federal laws and regulations. The DRE MAX is not designed to be installed in hazardous locations hence it **must** be installed in an unclassified area.

The device is intended to be mounted in line with the wiring conduit. Mounting specifics are left to the user given the wide ranging of configurations of end equipment.

2.2 Wiring

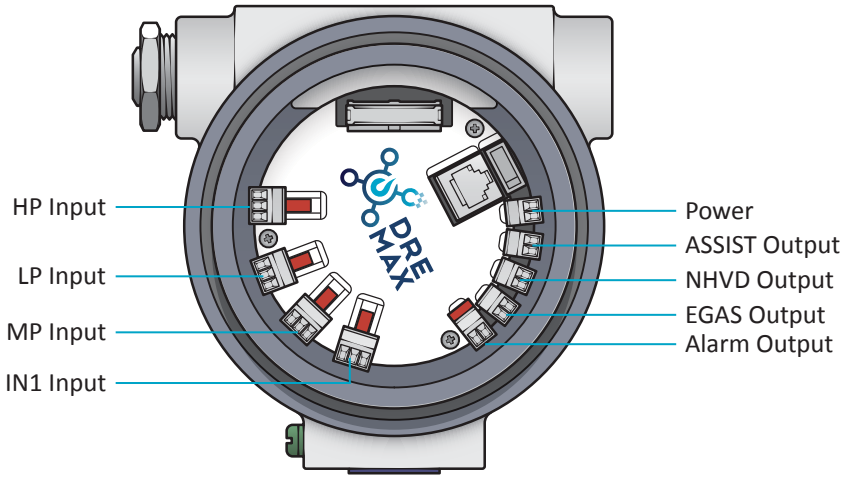
Guidelines

- Do not route wiring from other systems through the device enclosure
- Do not used solid core wires/cables
- Do not used wires larger diameter than 16AWG for the device terminal plugs

Recommendations

- Twisted pair cabling is strongly recommended
- It is strongly recommended to route 4-20mA signals together and away from power
- It is strongly recommended to route power cabling together and away from signal lines
- Ferrule terminations is strongly recommended for stranded wires/cables

2.2.1 Terminal Descriptions



PORT	TERMINAL	DESCRIPTION
POWER	**IN+**	Input power positive terminal, nominally 12V or 24V
	GND	Input power negative (ground) terminal
PWR/LED SWITCH	**RJ45**	Connection to power switch and external LED
IN1	**RET**	4-20mA input signal return
	IN	4-20mA input signal sink
	PWR	Power for loop power transducer
LP	**RET**	Low Pressure transducer 4-20mA input signal return
	IN	Low Pressure transducer 4-20mA input signal sink
	PWR	Power for loop power transducer
HP	**RET**	High Pressure transducer 4-20mA input signal return
	IN	High Pressure transducer 4-20mA input signal sink
	PWR	Power for loop power transducer
MP	**RET**	Medium Pressure transducer 4-20mA input signal return
	IN	Medium Pressure transducer 4-20mA input signal sink
	PWR	Power for loop power transducer
ASSIST	**OUT**	4-20mA output signal source to variable frequency drive or gas assist valve
	RET	4-20mA output signal return from variable frequency drive or gas assist valve
	PWR	Power for loop power transducer
NHVD	**OUT**	4-20mA output signal source for NHVdil
	RET	4-20mA output signal return for NHVdil
EGAS	**OUT**	4-20mA output signal source for enrichment gas valve driving relay
	RET	4-20mA output signal return for enrichment gas valve driving relay
ALARM	**OUT**	Isolated Alarm Input sink
	RET	Isolated Alarm Input return
RS485 IN	**B**	RS485 B Signal
	A	RS485 A Signal

Table 2.2.1 · Terminal descriptions

2.2.2 Basic Wiring Diagram for Self-powered Transmitters

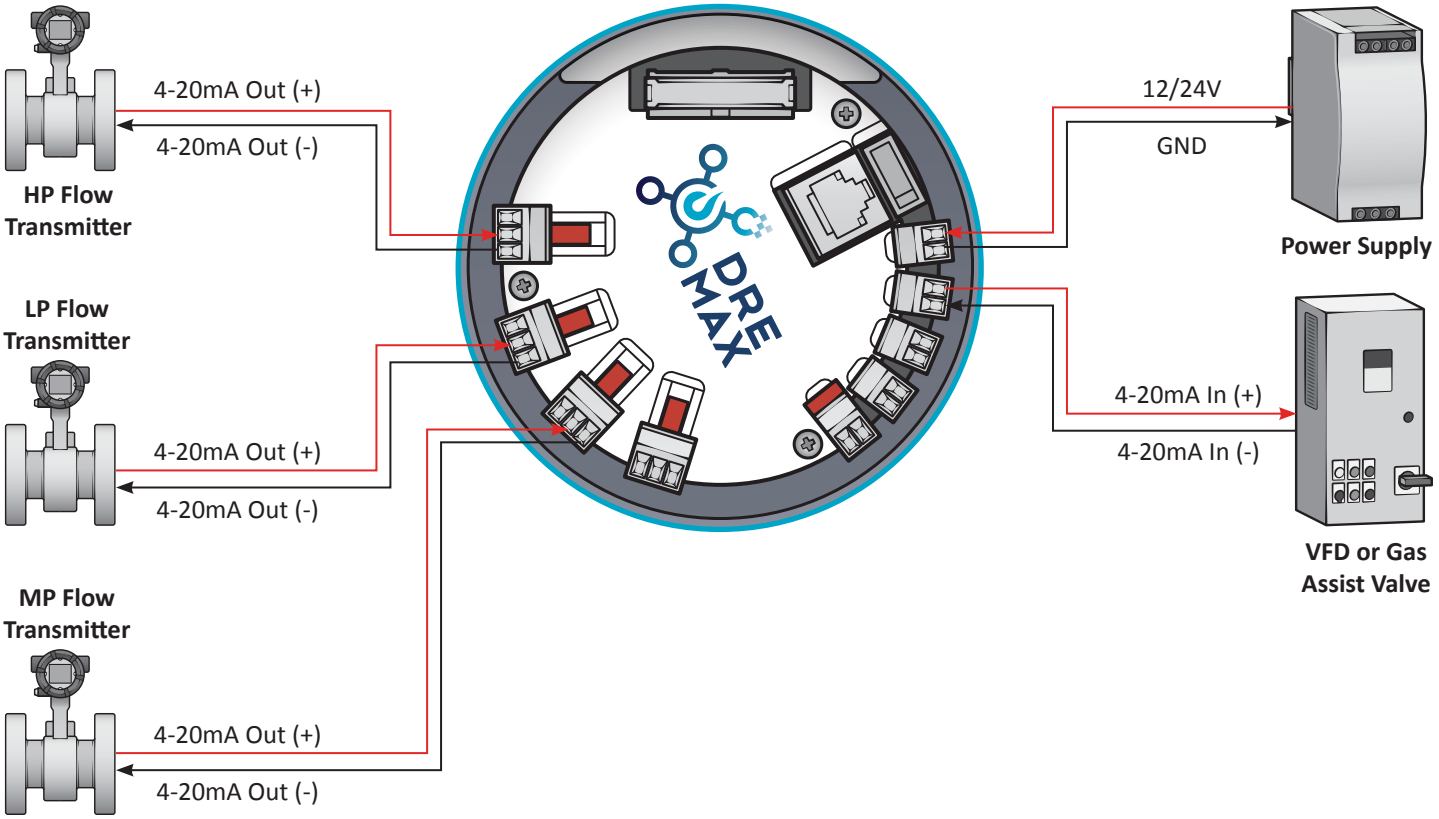


Image 2.2.1 · Wiring diagram: self-powered transmitters

2.2.3 Basic Wiring Diagram for Loop-powered Transmitters

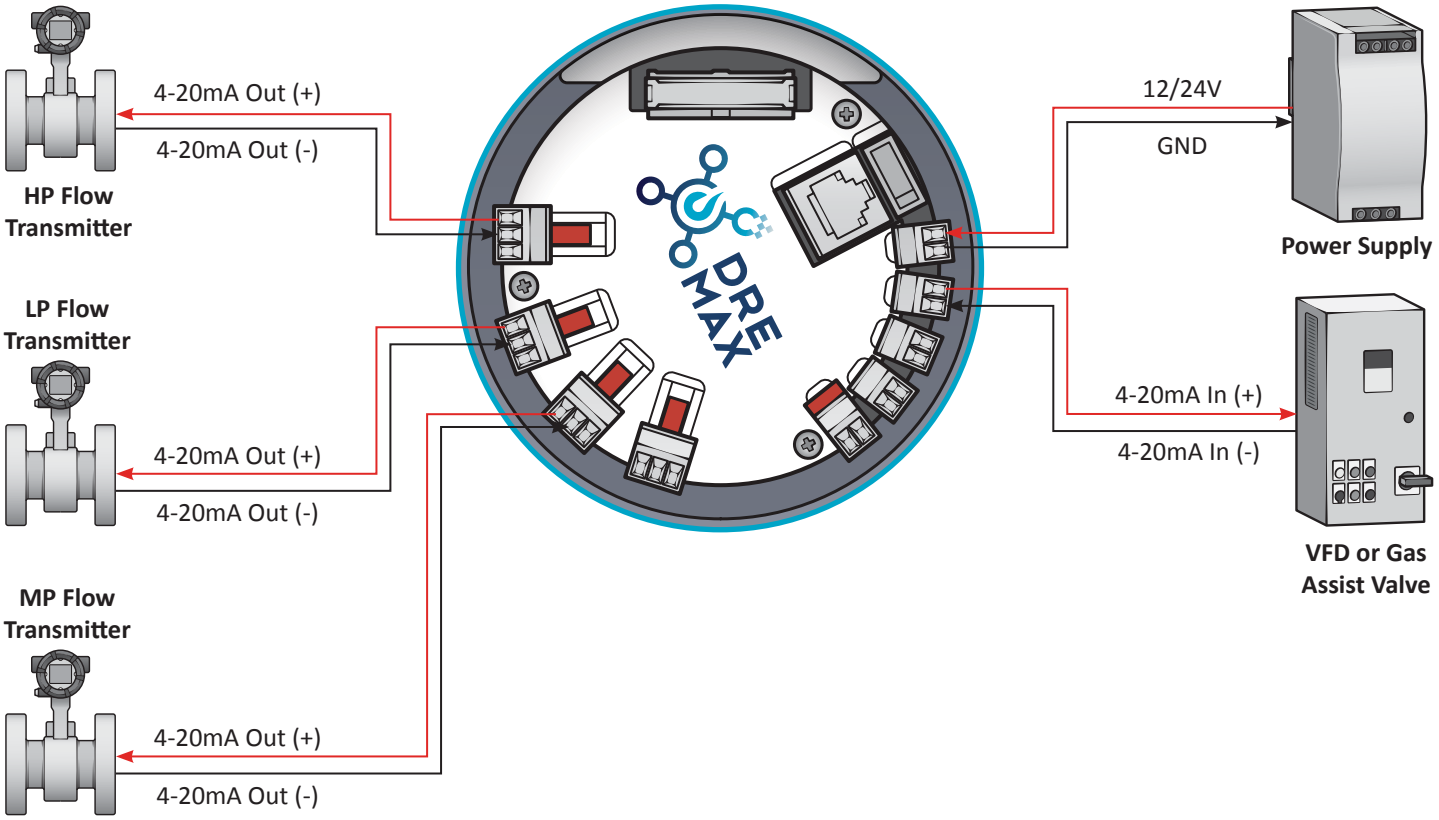


Image 2.3.1 · Wiring diagram: loop-powered transmitters

3 Settings and Configuration Software

3.1 Configurator Software

NOTICE

- Follow the manufacturer instruction for installing any required software and drivers for the USB to RS485 converter being used prior to running the DRE MAX configurator software
- Make sure DRE MAX is powered on prior to running the DRE MAX software
- The device uses a RS485 bus to provide half-duplex communications to manage the device settings using a configurator software

3.1.1 Setup

The diagram below depicts the connection required to use the configurator software. Note that the device must be powered ON (not depicted in figure for simplicity).

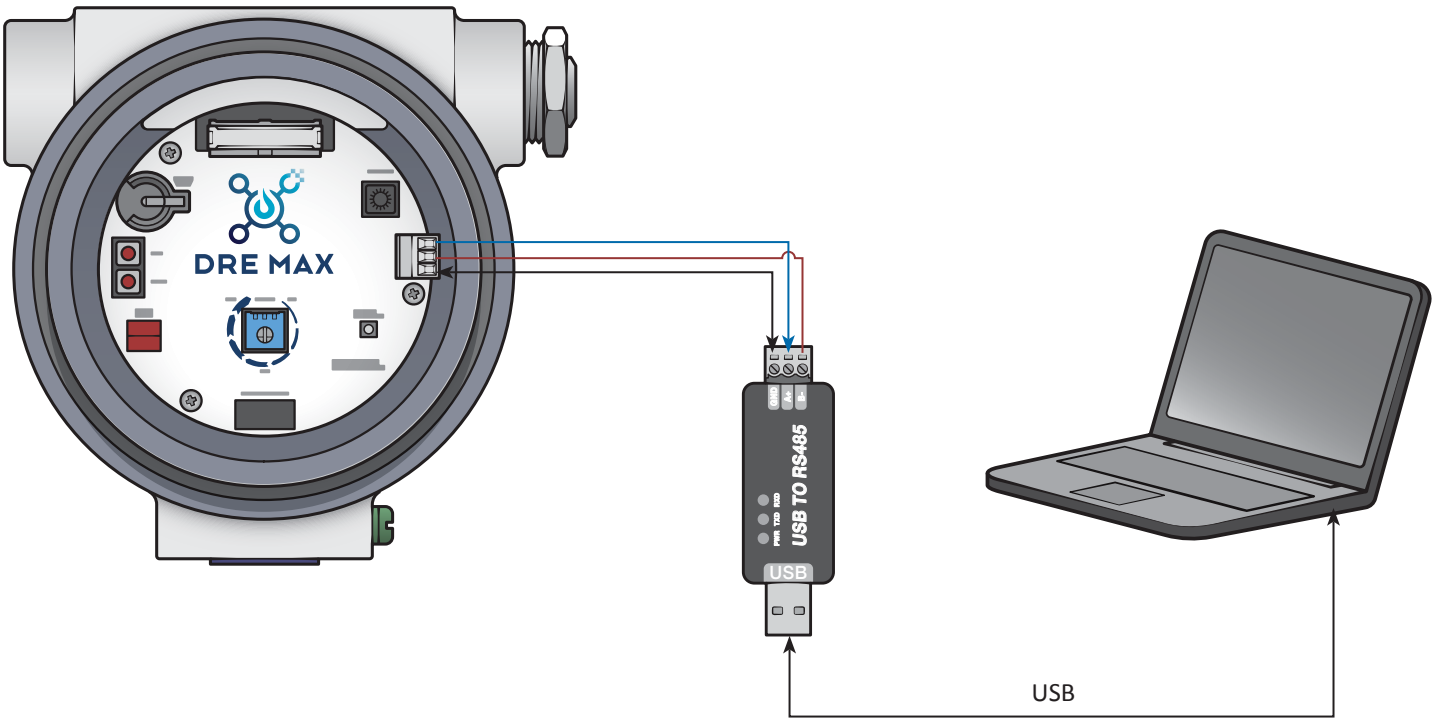


Image 3.1.1 · Connecting devices for software installation

3.1.2 Installation

1. Run the DRE MAX Configurator installation program.
2. Follow the screen prompt using the default settings.
3. Finish Installations.
4. You should see a shortcut to the DRE MAX Configurator software on your desktop.

3.1.3 Configurator Usage

1. After installing the configurator:

   a. Open the software.

   b. If the popup shown below appears, make sure the USB to RS485 converter is connected to your PC and the DRE MAX is connected to your PC and drivers are installed (windows 10 should have this driver included).

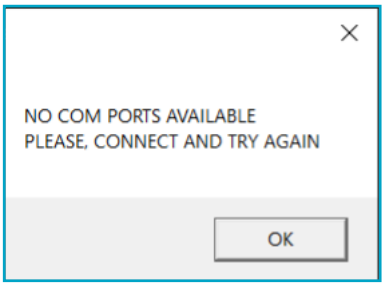


Image 3.1.2 · No com ports available

2. The screen below should appear:

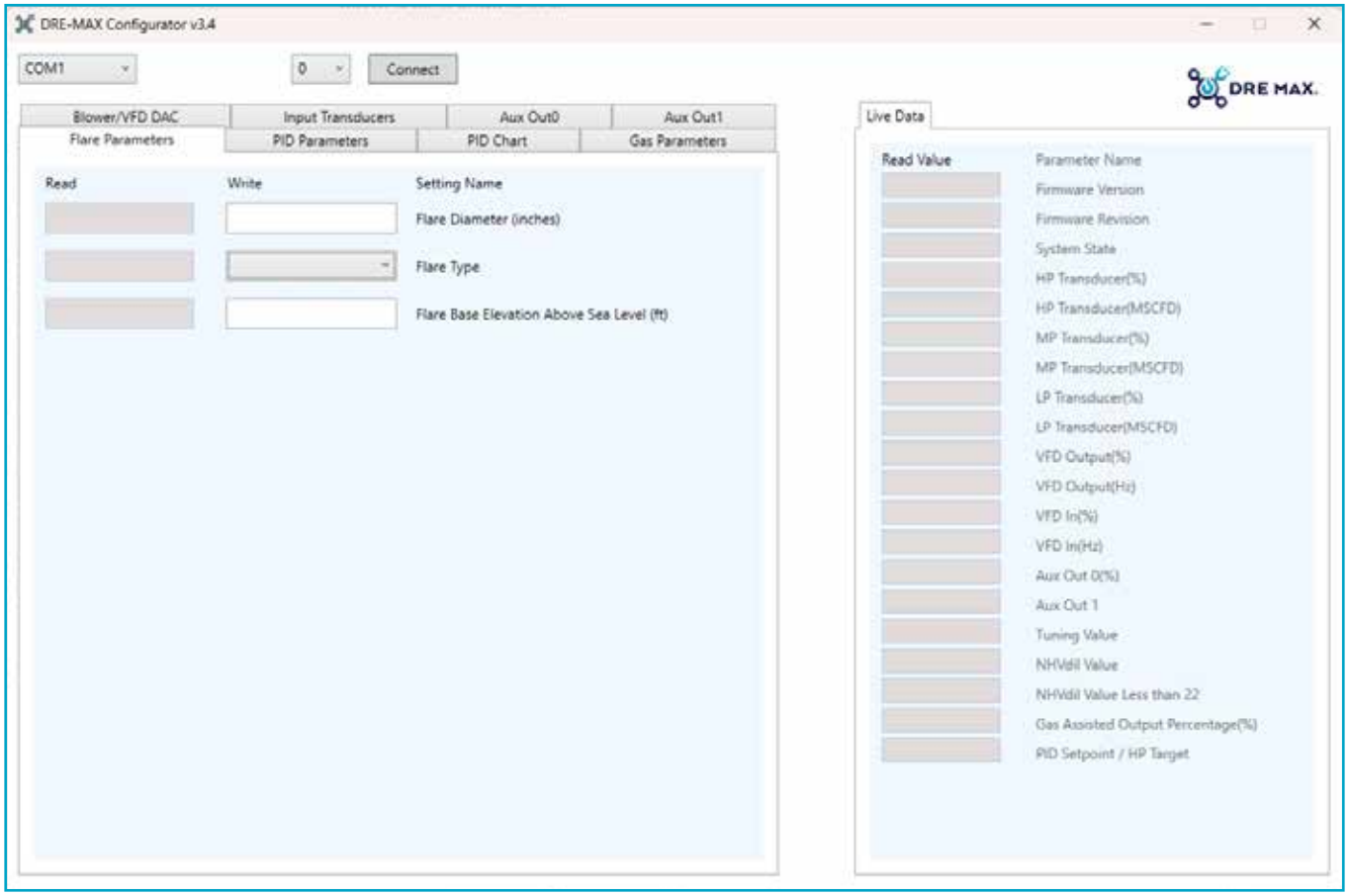


Image 3.1.3 · Configurator screen

3. Select the COM port linked to the USB-to-RS485 converter being used from the left drop down. Furthermore, select the correct address matching the one from the DRE MAX device configuration from the right drop down.

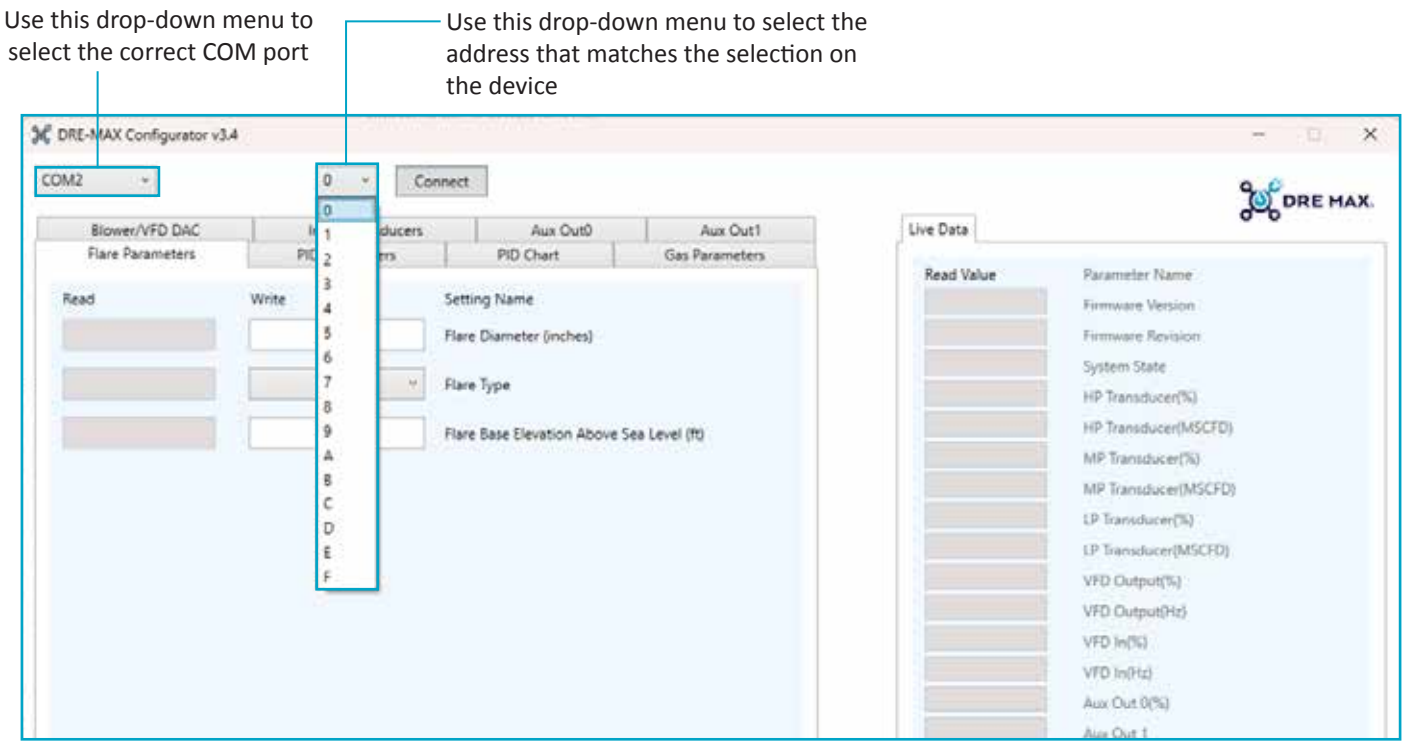


Image 3.1.4 · Select the COM port and address

4. Click the **Connect** button. If successful, the **Read Values** column should populate with the current settings readouts.

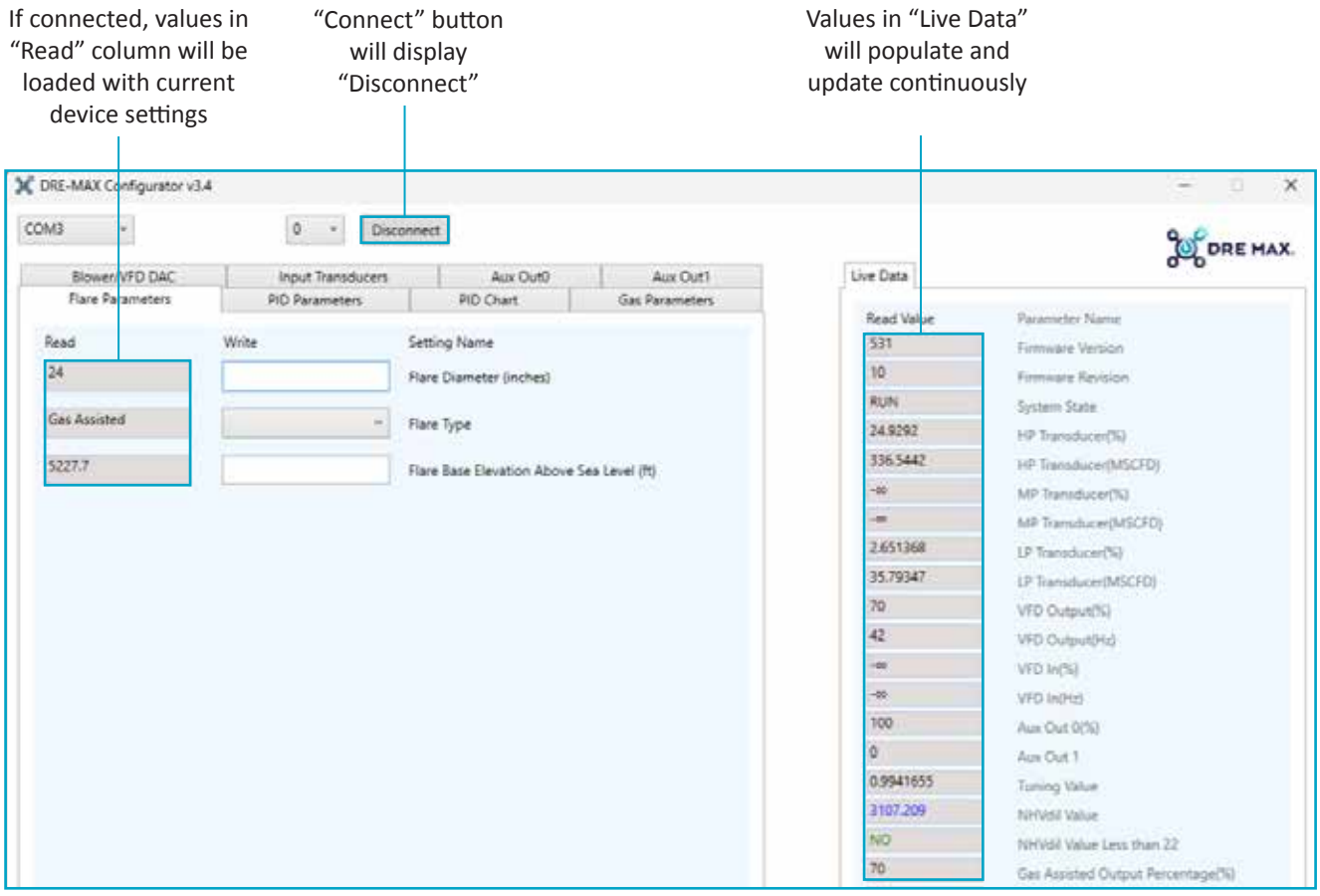


Image 3.1.5 · Current settings populated

5. Under each tab, enter the new desired values for each setting under the **Write** column. If the field is left blank, it will not be updated upon pressing **Commit**. Only fields with entered values will be updated.

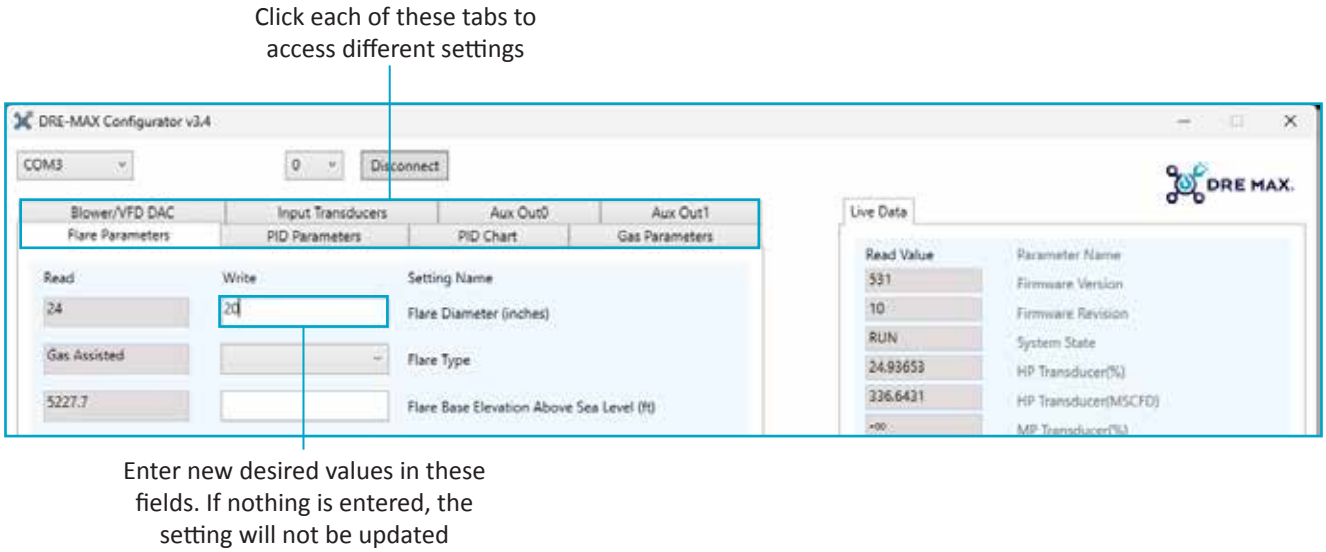


Image 3.1.6 · Settings tab new values

6. Under the **Flare Parameters** tab, use the dropdown menu for **Flare Type** to toggle between the Conventional, DreamDuo/Trio, Gas Assisted flare types.

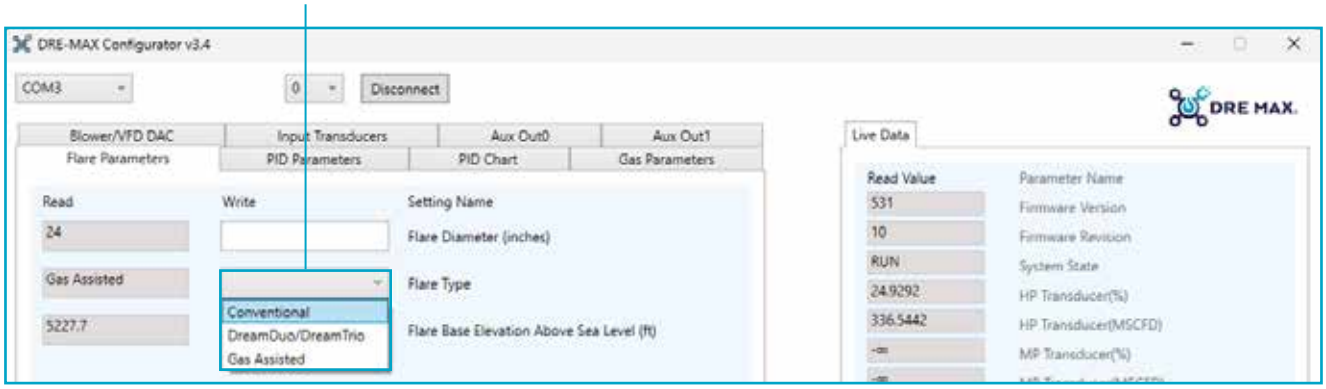


Image 3.1.7 · Select flare type

7. Press **Commit**. If the setting is updated successfully, the **Read** column will match the **Write** column. If any error messages pop up, look through the entered values and check for invalid entries.

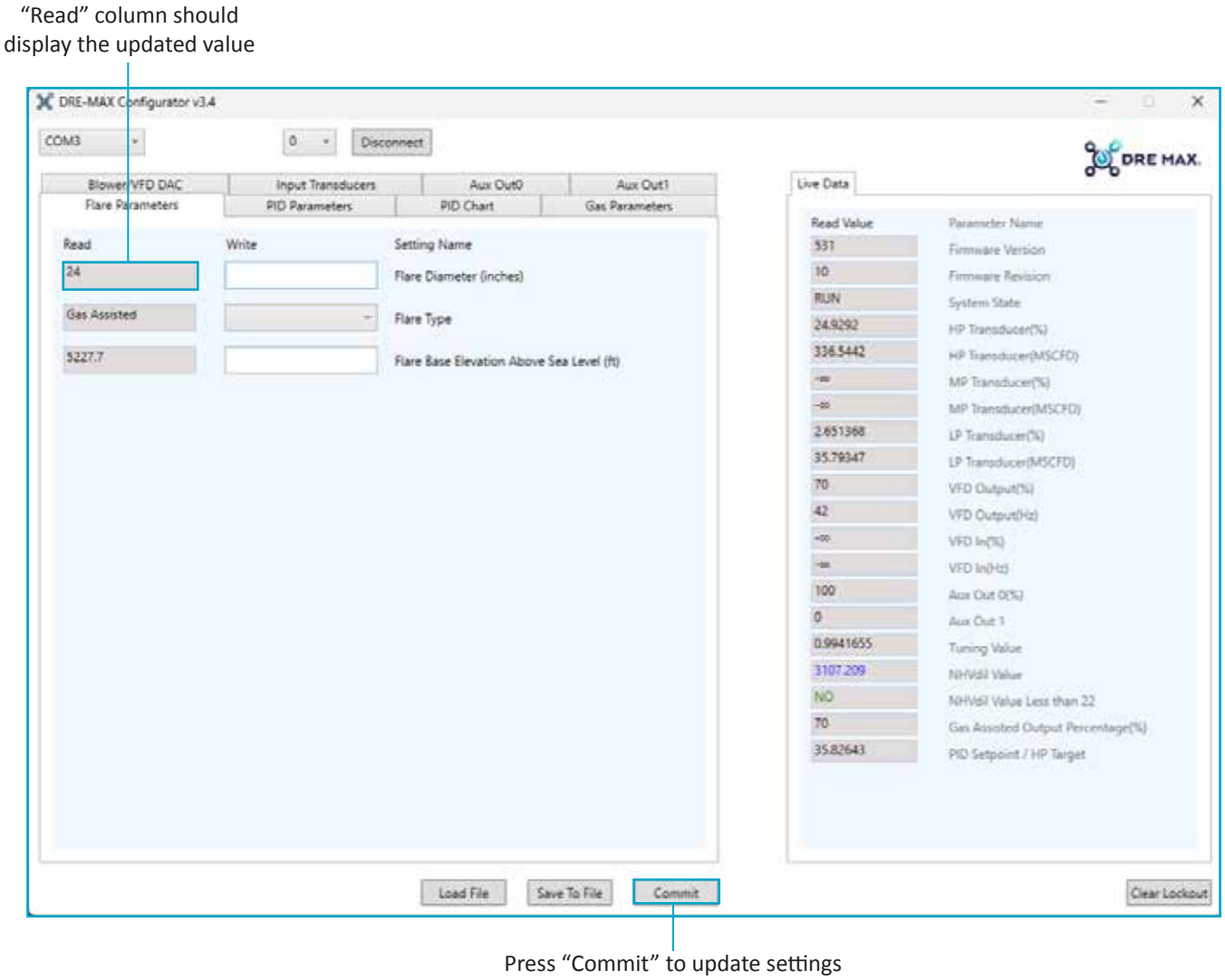


Image 3.1.8 · Press commit button to update

8. If the system is in a **Fault State**, it can be cleared by clicking **Clear Lockout**. If not, click on **Save to File** and choose the location you would like the file to be saved to. Saving the file will save the current configuration (i.e. Read values) from the device into a file.
9. You can click **Load File** to load the saved configuration file. The data will populate in the **Write** column.

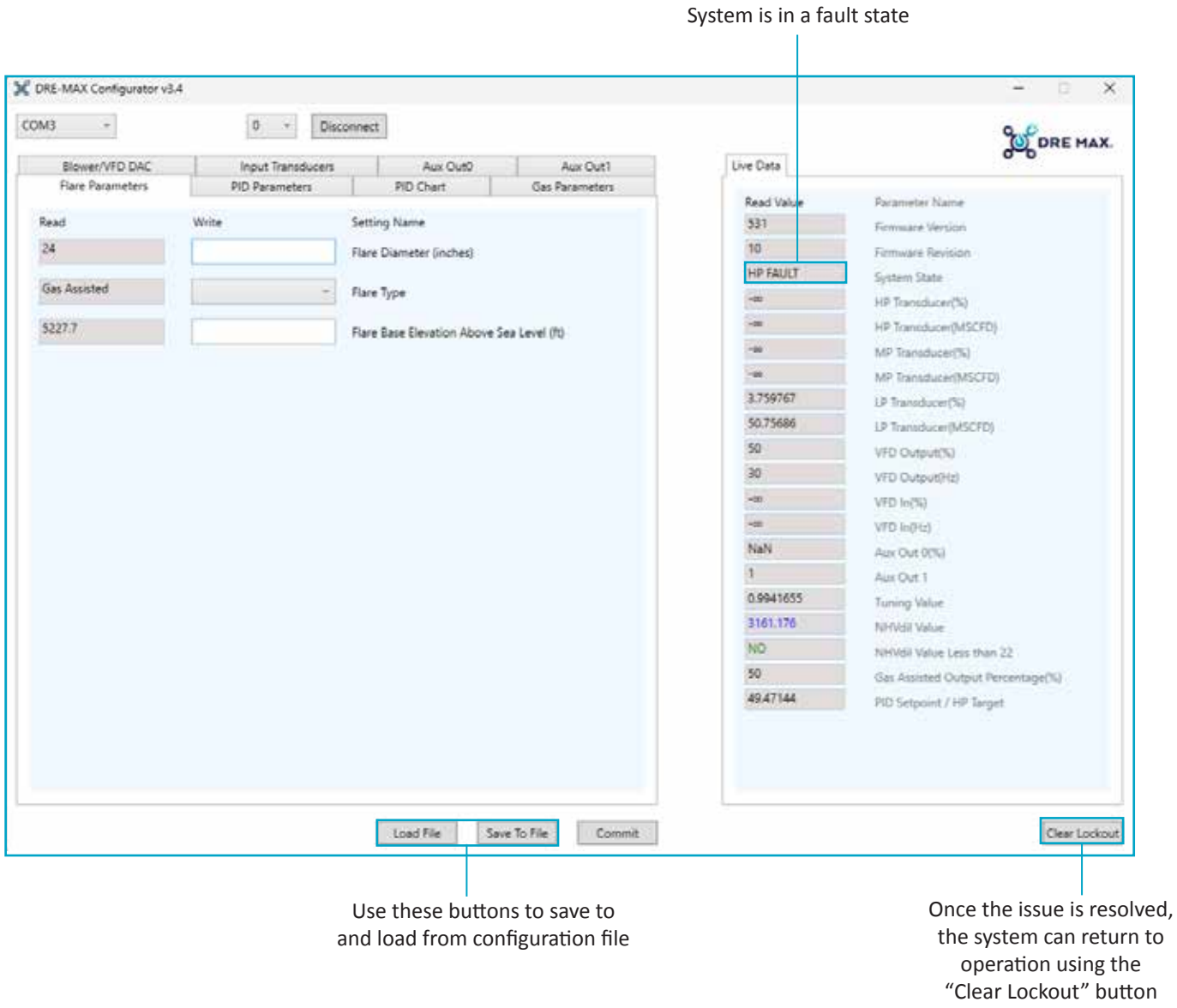


Image 3.1.9 · Clear fault state

3.2 Setting and Defaults

SETTING GROUP	SETTING	DESCRIPTION	DEFAULT	UNITS
GAS PARAMETERS	**HP NET HEATING VALUE**	Net heating value for the high-pressure stream. Value cannot be equal to 0.	1472.53	BTU/SCF
	MP NET HEATING VALUE	Net heating value for the medium-pressure stream. Value cannot be equal to 0.	1200	BTU/SCF
	LP NET HEATING VALUE	Net heating value for the low-pressure stream. Value cannot be equal to 0.	2315.9	BTU/SCF
	HP IDEALITY CONSTANT	Used for fine tuning DRE MAX HP reading	1	Const.
	LP IDEALITY CONSTANT	Used for fine tuning DRE MAX LP reading	1	Const.
	MP IDEALITY CONSTANT	Used for fine tuning DRE MAX MP reading	1	Const.
	STOICH AIR FRACTION	Value must be between 0.1 and 0.5	0.3	
BLOWER/VFD DAC	**BLOWER MAXIMUM FLOW RATE**	Maximum achievable air flow rate for blower. Value cannot be equal to 0.	13000	SCFM
	BLOWER MAXIMUM FREQUENCY	VFD maximum frequency – Hz @ 20mA. Value cannot be equal to 0. **Blower Maximum Frequency** ≥ (Blower Minimum Frequency + 1)	60	Hz
	BLOWER MINIMUM FREQUENCY	VFD minimum frequency – Hz @ 4mA. **Blower Minimum Frequency Blower** ≤ (Blower Maximum Frequency + 1)	0	Hz
	BLOWER UPPER THRESHOLD FREQUENCY	Maximum frequency value DRE MAX will send to VFD. Blower Maximum Frequency ≥ **Blower Upper Threshold Frequency** ≥ (Blower Lower Threshold Frequency + 1) ≥ Blower Minimum Frequency	60	Hz
	BLOWER LOWER THRESHOLD FREQUENCY	Minimum frequency value DRE MAX will send to VFD. Blower Maximum Frequency ≥ (Blower Upper Threshold Frequency – 1) ≥ **Blower Lower Threshold Frequency** ≥ Blower Minimum Frequency	10	Hz

Table 3.2.1 · Default settings

SETTING GROUP	SETTING	DESCRIPTION	DEFAULT	UNITS
INPUT TRANSDUCER	**HP TRANSDUCER SPAN**	High Pressure Side Transducer Span	5000	MSCFD
	HP TRANSDUCER ZERO	High Pressure Side Transducer Zero	0	MSCFD
	MP TRANSDUCER SPAN	Medium Pressure Side Transducer Span	5000	MSCFD
	MP TRANSDUCER ZERO	Medium Pressure Side Transducer Zero	0	MSCFD
	LP TRANSDUCER SPAN	Low Pressure Side Transducer Span	2000	MSCFD
	LP TRANSDUCER ZERO	Low Pressure Side Transducer Span	0	MSCFD
	IN1 TRANSDUCER SPAN	Experimental, unused	1000	MSCFD
	IN1 TRANSDUCER ZERO	Experimental, unused	0	MSCFD
FLARE PARAMETERS	**FLARE DIAMETER**	Diameter of the flare	24	in
	FLARE TYPE	Three types: Conventional or DreamDuo/ Trio/Gas Assisted	Conv	
	ELEVATION	Elevation at which flare operates	5227.7	ft
NHVD OUT	**ZERO**	OUT0 transducer zero	0	MSCFD
	SPAN	OUT0 transducer span	2400	MSCFD
EGAS OUT1	**ON THRESHOLD**	NHV_{dil} ON Threshold	22	Btu/ft^3
	OFF THRESHOLD	NHV_{dil} OFF Threshold	44	Btu/ft^3
PID PARAMETERS	**PROPORTIONAL**	Proportional gain factor	0.1	
	INTEGRAL	Time over which the integral accumulates	60	Seconds
	DIFFERENTIAL	Differential gain factor	0	
	HP TARGET COEFFICIENT	Coefficient for high-pressure target (0.1 to 1)	1	
	MAX FLOWRATE	Maximum flow rate limit	2000	MSCFD
	MIN FLOWRATE	Minimum flow rate limit	0	MSCFD
	TUNING MODE	Automatic (PID) or Manual (forced) output	Manual	
	MANUAL OUTPUT %	Manual output percentage of the controller (0 to 100)	0	%

Table 3.2.1 · Default settings (continued)

3.3 Live Data

VALUE NAME	DESCRIPTION	
FIRMWARE VERSION	Firmware Version identification number	
FIRMWARE REVISION	Firmware Number	
SYSTEM STATE	**CURRENT STATE OF SYSTEM**	
	STATE	**DESCRIPTION**
	RUN	See Section 1.3.1
	LP FAULT	See Section 1.3.3
	HP FAULT	See Section 1.3.4
	MP FAULT	See Section 1.3.5
	VFD OUT FAULT	See Section 1.3.2
	TRIMMER FAULT	See Section 1.3.6
LP TRANSDUCER	Normalized current readout in LP input, in percent and MSCFD	
HP TRANSDUCER	Normalized current readout in HP input, in percent and MSCFD	
MP TRANSDUCER	Normalized current readout in MP input, in percent and MSCFD	
ASSIST OUT	Normalized current output value in VFD Output, in percent and frequency (Hz)	
IN1 In	Normalized current readout in IN1 input, in percent and frequency	
NHVD OUT	Normalized current output value for NHVdil value in percent	
ENRICHMENT GAS OUT	Normalized current output value for enrichment gas in percent	
TUNING VALUE	Value currently being used for tuning parameter	
NHVdil VALUE	Value of NHVdil in BTU/ft^3	
ENRICHMENT GAS DEMAND	Whether ON Threshold <= NHVdil <=OFF Threshold. Displays YES or NO	

Table 3.3.1 · Live data

4 Application Information

4.1 Power Switch and LED

The unit has an external power switch with a built-in ring LED indicator around the switch actuator. The switch actuator being flushed indicates the device is OFF while the switch being depressed indicates the device is ON.

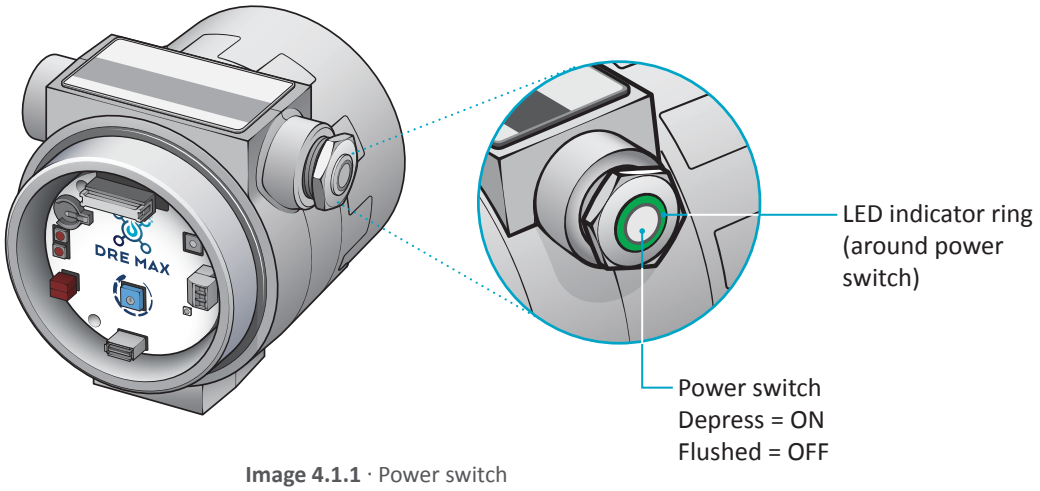


Image 4.1.1 · Power switch

4.1.1 LED Indicators

COLOR	BEHAVIOR	DESCRIPTION
GREEN	Pulsing once every 2 seconds	Normal operation
CYAN	Pulsing once every 2 seconds	Trimmer fault. System operates as normal but ignores the fine-tuning value.
YELLOW	Pulse once every 2 seconds	Fault detected on ASSIST 4-20mA loop
	Solid On	System power up sequence
RED	Pulse once every 2 seconds	Fault detected on the High-Pressure Side 4-20mA input
	Pulse twice every 2 seconds	Fault detected on the Low-Pressure Side 4-20mA input
	Solid On	Fatal system fault
PINK	Pulse once every 2 seconds	Fault detected on the Medium-Pressure Side 4-20mA input

Table 4.1.1 · LED indicators

4.2 PWR/LED Switch

Connection to the DRE MAX power switch and status LED device

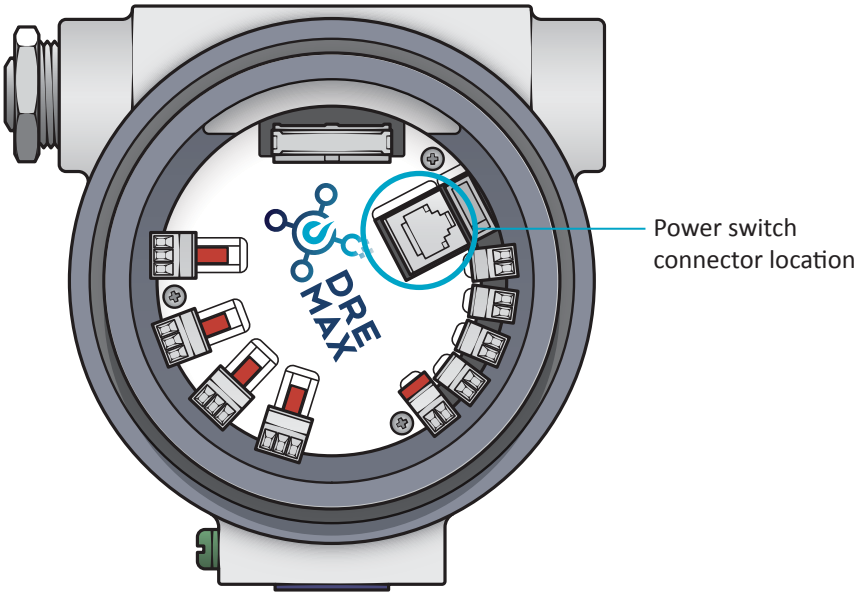


Image 4.2.1 · PWR/LED switch

4.3 On-board LED Indicator

The on-board LED provides indication for when the unit is in bootloader mode and in normal mode.

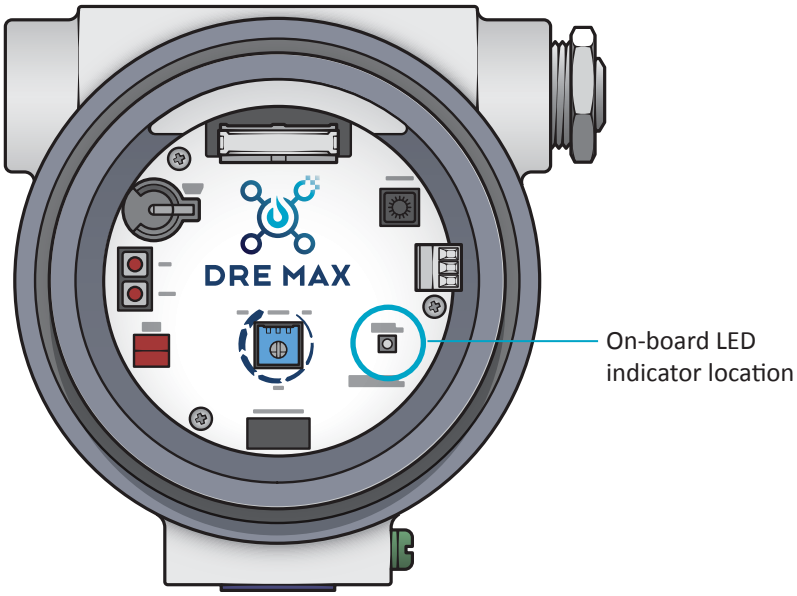


Image 4.3.1 · Onboard LED indicator

4.3.1 Bootloader Mode

The bootloader mode is active when you are performing an upgrade to the firmware. When performing an upgrade the on-board LED indicator light will display the current status of the upgrade.

COLOR	BEHAVIOR		DESCRIPTION
BLUE		Solid on	In bootloader mode, waiting for USB to be inserted
YELLOW		Solid on	Startup
RED		Solid on	Upgrade unsuccessfully
VIOLET		Solid on	Upgrade process in progress
WHITE		Solid on	Upgrade successfully completed

Table 4.3.1 · Bootloader status lights

4.3.2 Normal Operation

The device is in Normal Operation mode once power is turned ON. The LED indicator ring displays the current status of the system (see Section 4.1).

4.4 Tuning Trimmer

The system can be fine-tuned in the field using the **Tuning Trimmer**. The trimmer modifies the output to the VFD from the calculated control value. Turning the trimmer clockwise increases the output while counterclockwise turns it down.

Note: Loctite 425, 3M 1252, Dykem Crosscheck can be used to tamper-proof the trimmer.

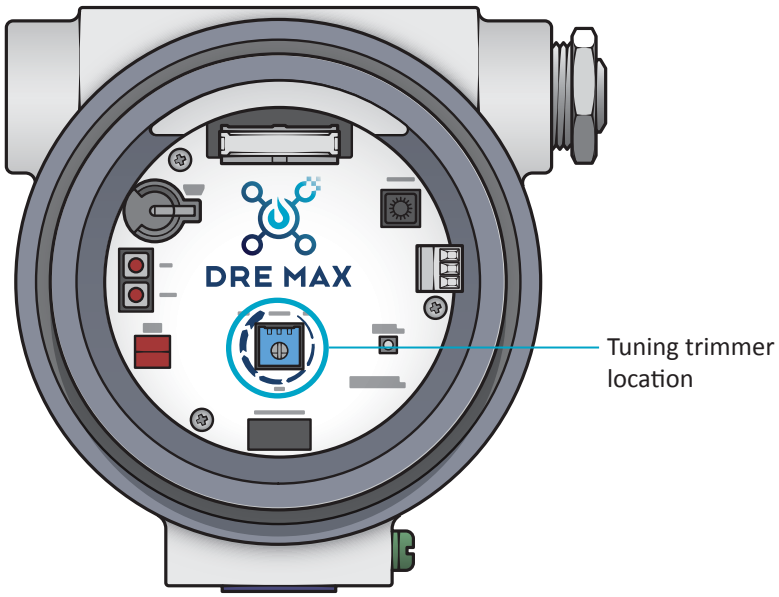


Image 4.4.1 · Tuning trimmer

4.4.1 Tuning Procedure

CASE	STEP	NOTES
FLARE SMOKING	Adjust trimmer by rotating clockwise to increase output to VFD to provide additional air flow until flare reaches latent smoke phase.	
PALE “FLAME”	Adjust trimmer by rotating counterclockwise to decrease output to VFD to reduce air flow until flare reaches latent smoke phase.	

Table 4.4.1 · Tuning options

4.5 Buttons

The **Reset** button restarts the device. The **Aux** button is used to initiate the bootloader for firmware upgrades.

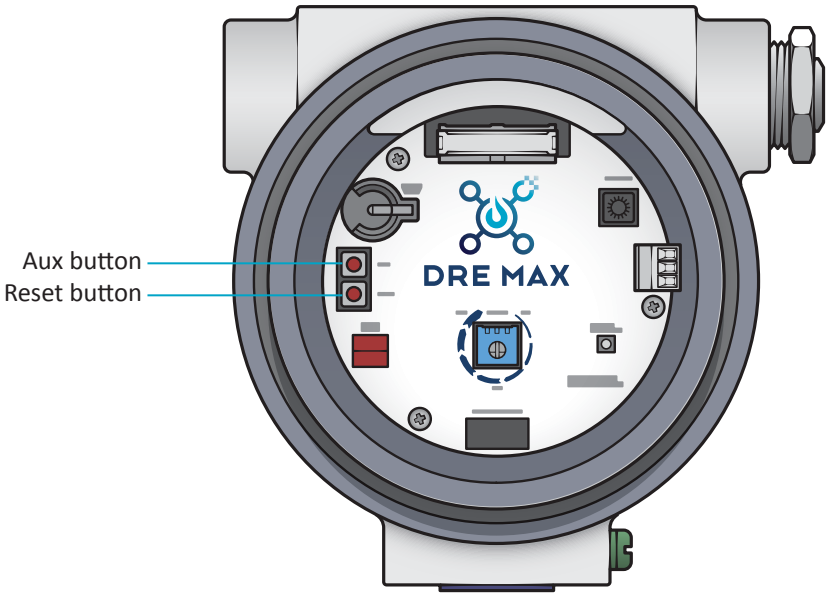


Image 4.5.1 · Reset and Aux buttons

4.6 USB Drive

Used for firmware upgrade only.

NOTICE

Failure to comply with the following safety warning(s) may result in damage to the product.

- Do not connect any other USB devices other an USB drive to this port
- Do not attempt to recharge any device using this USB port

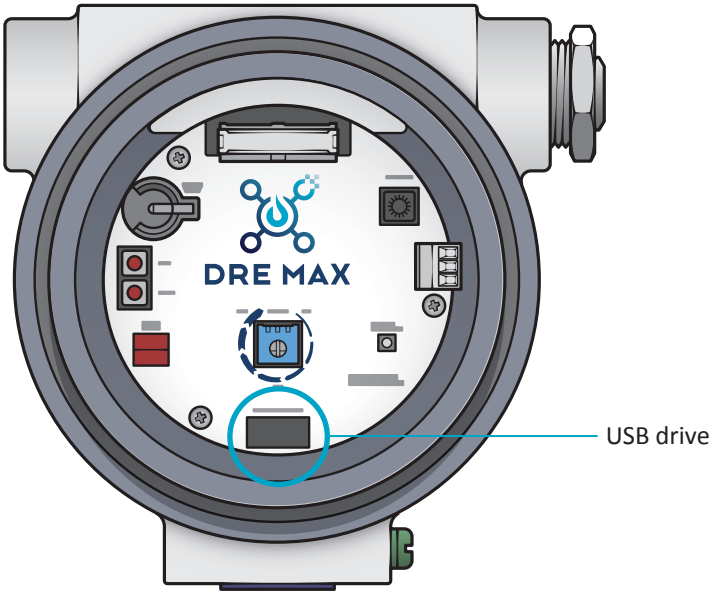


Image 4.6.1 · USB drive

4.7 Device Address

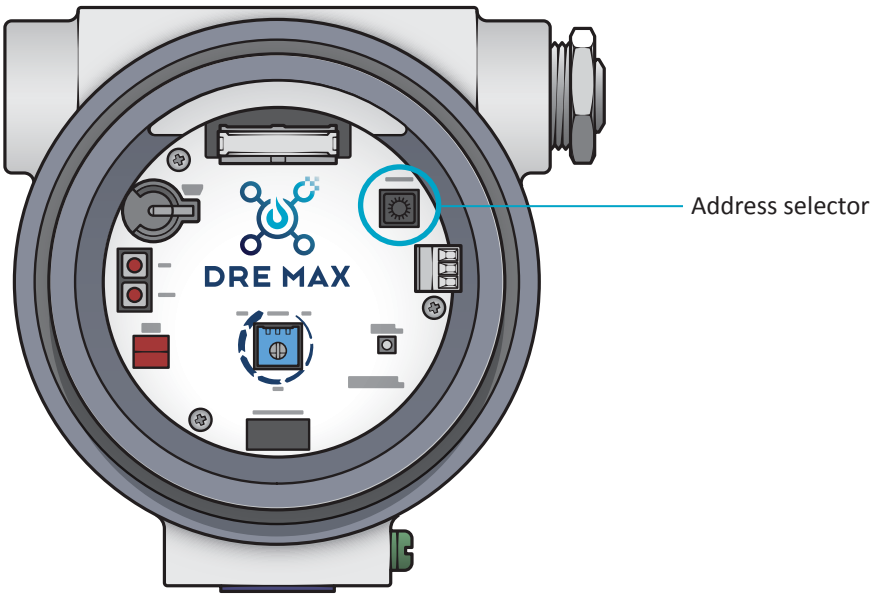


Image 4.7.1 · Device address selector

To set the system address can be selected using the 16-position selection switch found on board using a small flat head screwdriver and selecting the desired address. The address selection is summarized on the following table:

SELECTOR POSITION	CONFIGURATOR ADDRESS	NUMERICAL ADDRESS
0	0	100
1	1	101
2	2	102
3	3	103
4	4	104
5	5	105
6	6	106
7	7	107
8	8	108
9	9	109
A	A	110
B	B	111
C	C	112
D	D	113
E	E	114
F	F	115

Table 4.7.1 · Address selector positions

4.8 Coin Cell Battery

Intended as a future improvement to the device.

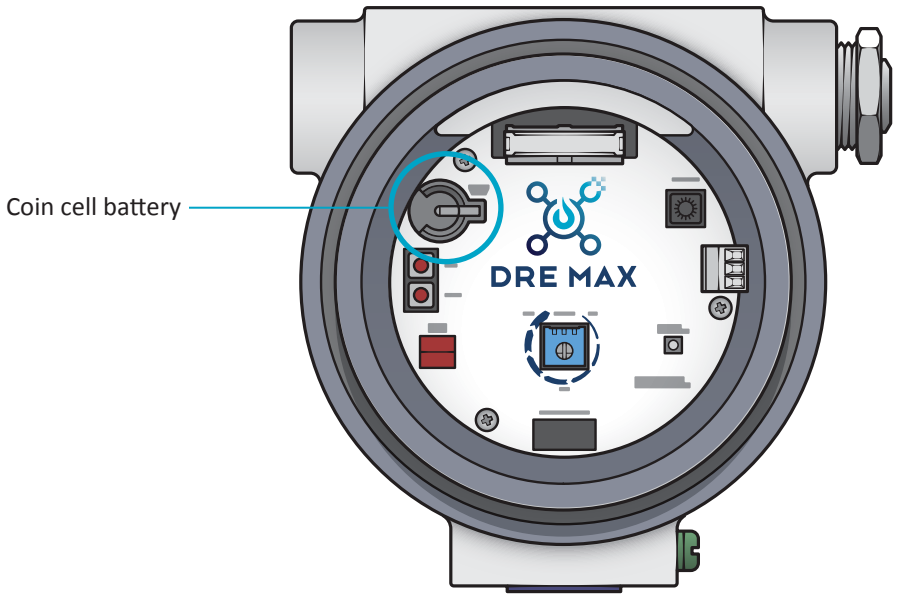


Image 4.8.1 · Coin cell battery

4.9 IDC Connector

This connector is used to bridge the two sides of the device and must remain connected all times.

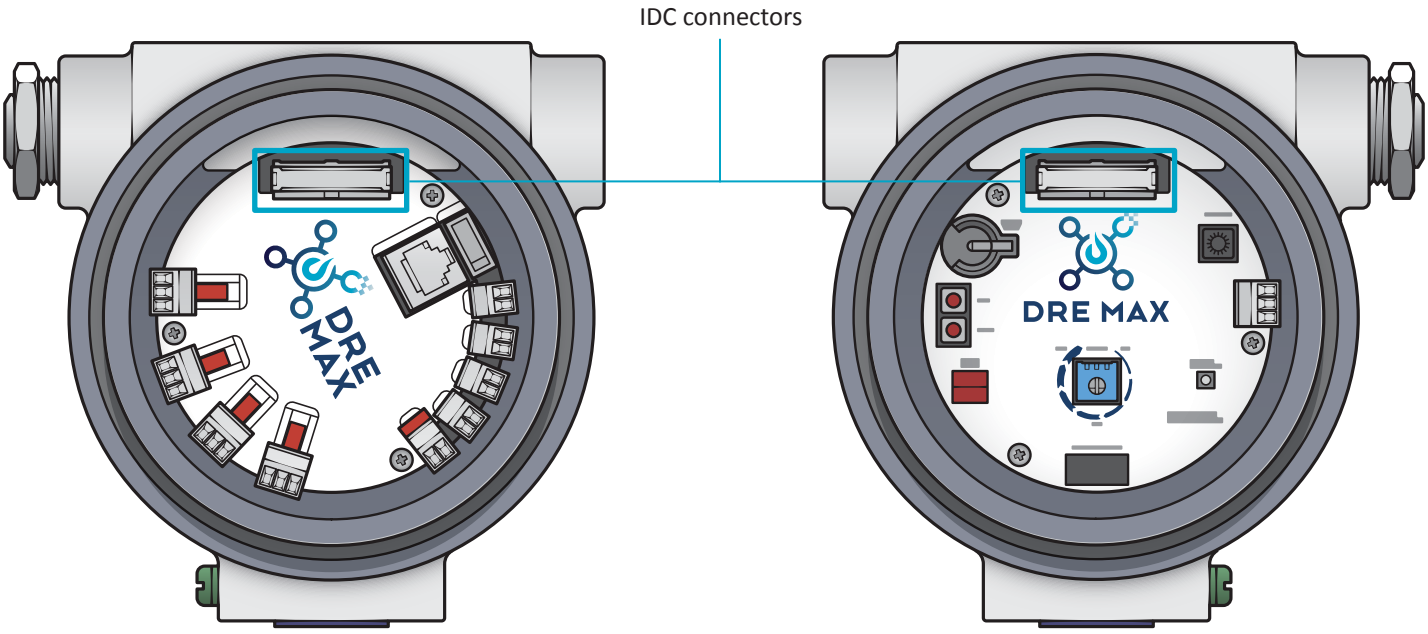


Image 4.9.1 · IDC connectors

4.10 Alarm Output

The alarm output consists of a solid-state relay and a 50mA protection fuse. This output can be interfaced to a digital input, valve, indicator light, relay, etc.

ALARM STATE	SYSTEM STATES REPRESENTED	ELECTRICAL STATE	EQUIVALENT CIRCUIT
ACTIVE	LP FAULT	High Resistance	
	HP FAULT		
	MP FAULT		
	VFD OUT FAULT		
	SYSTEM FAULT		
INACTIVE	RUN	Low Resistance	
	TRIMMER FAULT		

Table 4.10.1 · Alarm output

4.11 HP, MP and LP Transducer Inputs

The transducer inputs support self-powered and loop power 4-20mA transducers or transmitters.

4.11.1 Calibration

To convert from the transducer measurement to the engineering units the following formula is applied:

$$XDCRReading_{engineeringUnits} = (XDCR_{span} \cdot sensorReading_{normalized}) + XDCR_{zero}$$

4.12 NHVD and EGAS Outputs

4-20mA outputs that correspond to the computation and monitoring of the NHV_{dil} metric.

OUTPUT	DESCRIPTION
NHVD	The 4-20mA output for expressing the NHVdil value linearly
EGAS	The 0-20mA output for driving the relat that control the enrichment gas solenoid valve

Table 4.12.1 · OUT0, OUT1 mirror mode

4.13 IN1 Input

4-20mA input that is displayed in the Configurator Live Data as VFD In (%) & (Hz) values.

4.14 ASSIST 4-20mA Output

The 4-20mA output for driving the VFD or assist gas valve.

4.15 Fuses

4.15.1 Power Fuse

The power fuse is a mini automotive fuse rated for 2A. Replace with same type and rating fuse only.

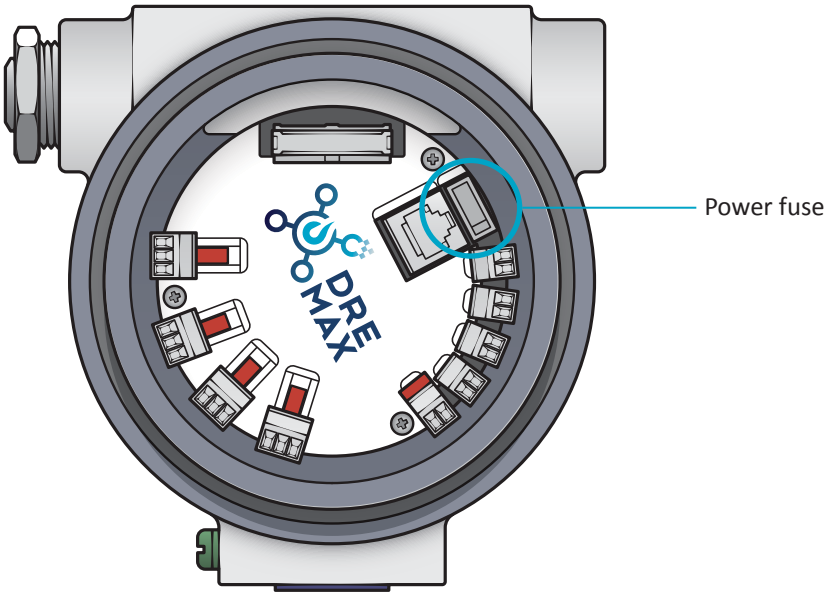


Image 4.15.1 · Power fuse

4.15.2 Signal Fuses

4-20mA input lines and the alarm output lines are protected by a 50mA fuse. Replace with the same type and rating fuse only. The system includes two spare fuses of this kind.

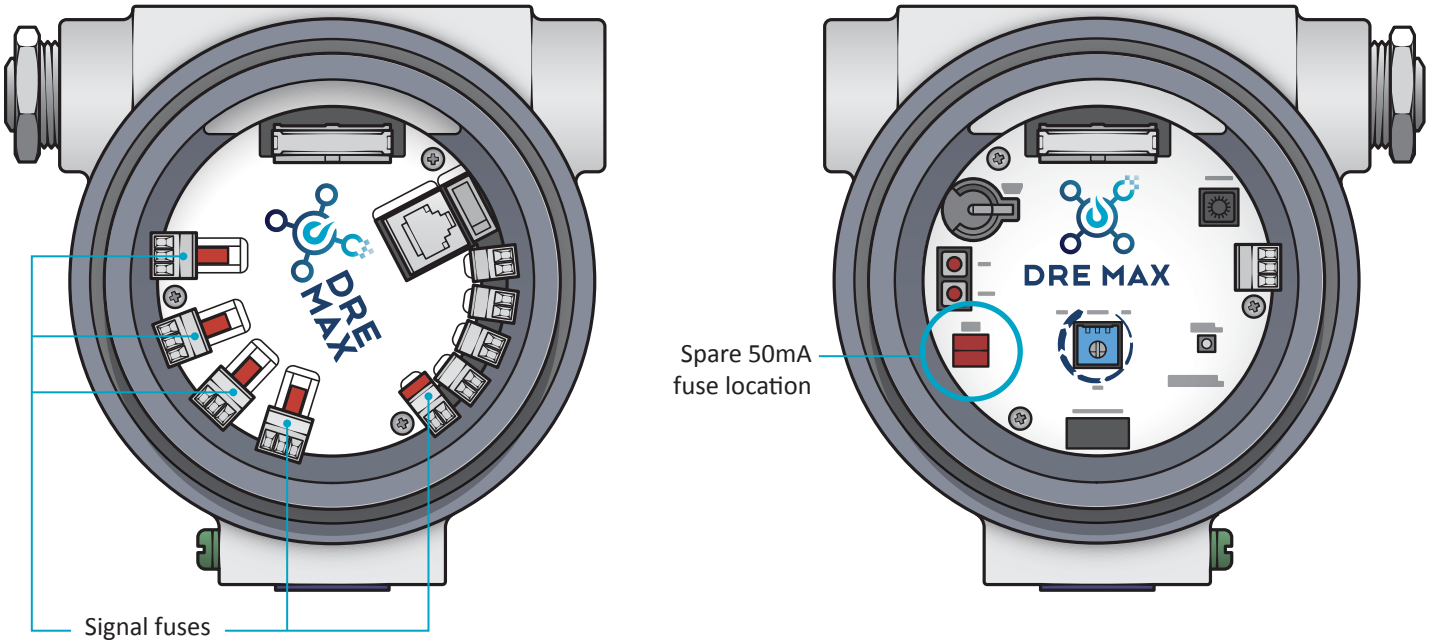


Image 4.15.2 · Signal fuses

4.16 Interfacing with a PLC

The system can interface with a PLC via the **ALARM** output connecting to a digital input in the PLC, in order to convey if the system is in normal operation or in a fault state.

4.17 Interfacing with a Solenoid Valve via Relay

The DRE MAX can drive a relay from the **EGAS** output to drive a solenoid valve to control enrichment gas into the flare. The output is dependent on the NHVdil value in relation to the **EGAS** Output ON Threshold and OFF Threshold values.

5 Operation / State Transition Diagram

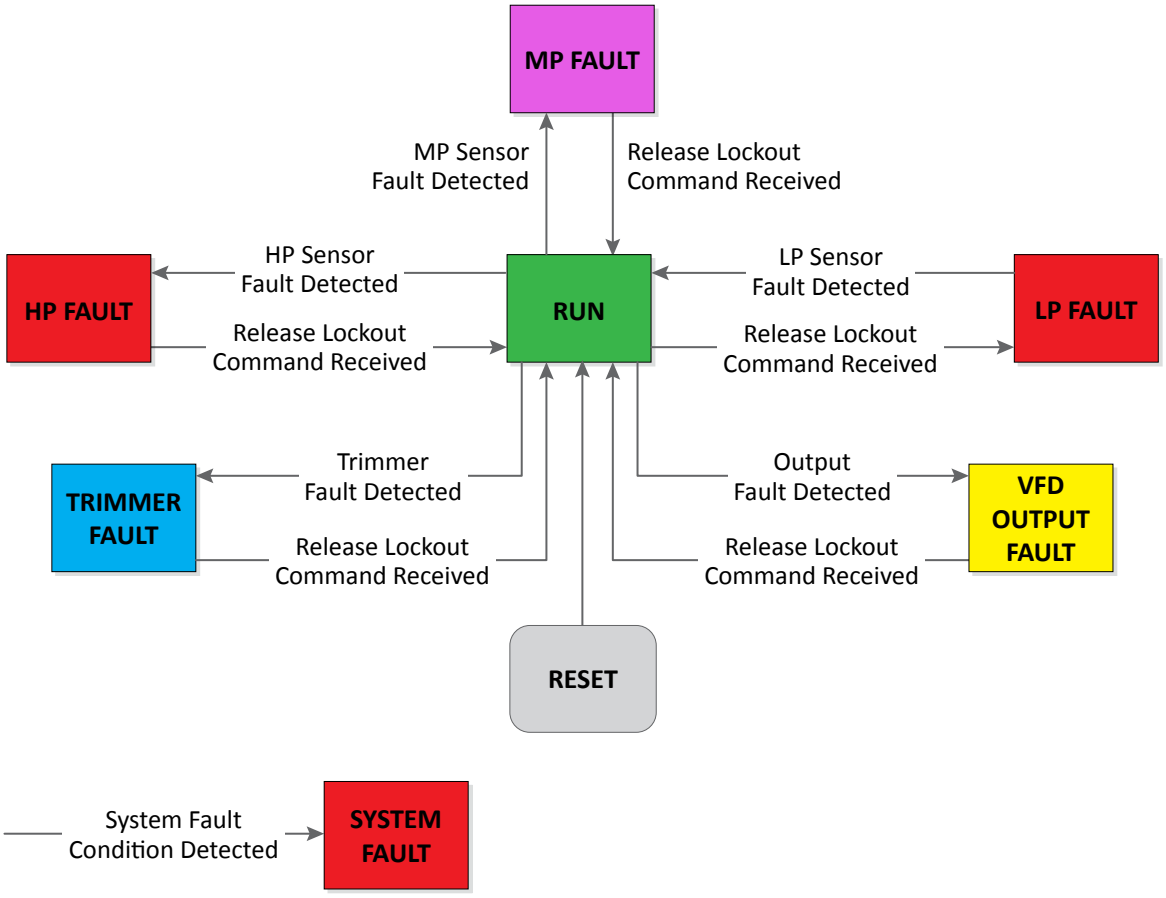


Image 5.1.1 · Operation / State Transition

5.1 RUN

This is the normal running state of the system where the air demand is being computed and sent to the VFD. In this state the system:

- LED is green, pulsing once every 2 seconds
- Alarm output is inactive, meaning circuit loop is closed

5.2 VFD OUT FAULT

The system has determined that a fault has occurred in the 4-20mA output. Possible reasons for this fault include:

- Output driver over-temperature
- The 4-20mA loop circuit is open
- The load impedance is too large to be driven by the DAC and it is causing the loop to go out of compliance

In this state the system:

- Attempts to write the output value to its maximum
- LED is yellow, pulsing once every 2 seconds
- Alarm output is active, meaning the circuit loop is interrupted

5.3 LP FAULT

The system has determined that a fault has occurred in the 4-20mA input for the Low-Pressure side by detecting a current level below 1mA or above 23mA indicating a sensor problem or an open circuit in the loop. In this state the system:

- Attempts to write the output value to its maximum
- LED is red and pulsing twice every 2 seconds
- Alarm output is active, meaning the circuit loop is interrupted

5.4 HP FAULT

The system has determined that a fault has occurred in the 4-20mA input for the High-Pressure side by detecting a current level below 1mA or above 23mA indicating a sensor problem or an open circuit in the loop. In this state the system:

- Attempts to write the output value to its maximum
- LED is red, pulsing once every 2 seconds
- Alarm output is active, meaning the circuit loop is interrupted

5.5 MP FAULT

The system has determined that a fault has occurred in the 4-20mA input for the Medium-Pressure side by detecting a current level below 1mA or above 23mA indicating a sensor problem or an open circuit in the loop. In this state the system:

- Attempts to write the output value to its maximum
- LED is pink, pulsing once every 2 seconds
- Alarm output is active, meaning the circuit loop is interrupted

5.6 SYSTEM FAULT

The system has detected an abnormal behavior, such as being unable to retrieve setting, abnormal operation in the system program flow etc. This most likely indicates a need to replace the unit. In this state the system:

- Attempts to write the output value to its maximum
- LED is solid red
- Alarm output is active, meaning the circuit loop is interrupted

5.7 TRIMMER FAULT

The system has detected out of range reading from the fine tune trimmer. Under this operational state the system behaves in RUN state with the exception that the fine-tuning value is ignored, and the calculated outputs is sent to the VFD without compensation. In this state the system:

- LED is cyan, pulsing once every 2 seconds
- Alarm output is inactive, meaning circuit loop is closed

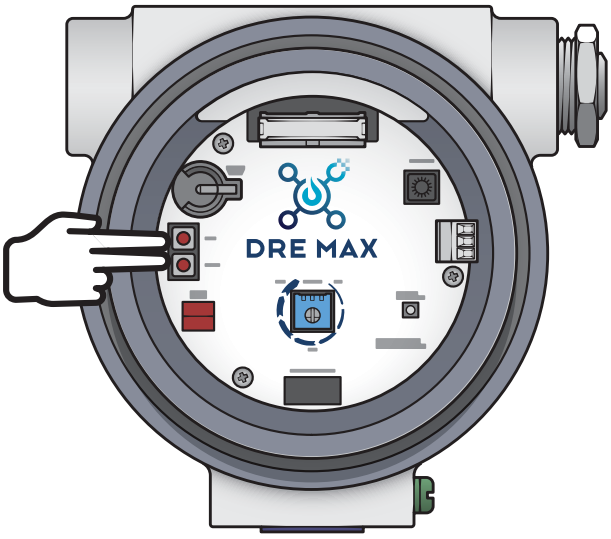
5.8 How to Exit Fault Conditions

Remove the condition causing error from the system and then do either of the following:

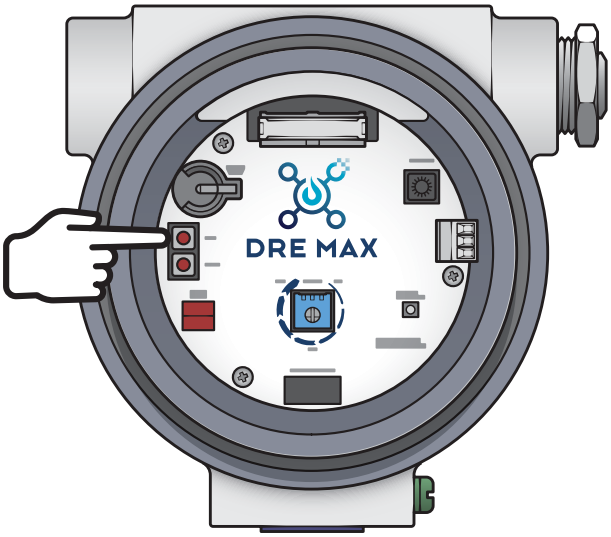
- Power the device off and then restart it using the Power Switch (recommended method)
- Press the Reset Button on the device, then click the Clear Lockout button on the DRE MAX Configurator software (see button on image 3.1.9, page 11)

6 Firmware Upgrade Procedure

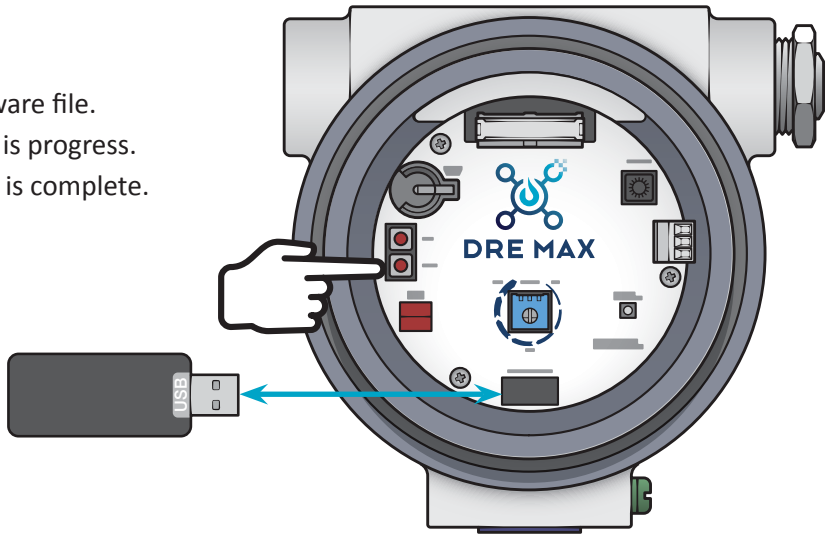
1. Load the updated firmware file onto the root of USB drive (FAT formatted). File must be named “firmware.bin” and be located at the root directory. If the LED goes red during any part of the process, the upgrade was unsuccessful. Find and correct the fault and try again.
2. Press both the **AUX** and **RESET** button together.



3. Release the **RESET** button and hold the **AUX** button until status LED goes from yellow to blue.



4. Insert the USB drive with the loaded firmware file.
5. The LED will turn violet while the upgrade is progress.
6. The LED will turn white when the upgrade is complete.
7. Remove the USB drive.
8. Press the **RESET** button again.



7 Specifications

PARAMETER	MIN	TYPICAL	MAX	UNITS
INPUT POWER VOLTAGE	10	12 or 24	30V	V
INPUT POWER CONSUMPTION		30	200	mA
LP, MP, HP, IN1 LOAD RESISTANCE		20		Ω
ASSIST, EGAS, NVHD	1		24	mA
ALARM OUTPUT VOLTAGE			30	V
ALARM OUTPUT CURRENT			50	mA
ALARM OUTPUT ON-RESISTANCE			10	Ω
VFD OUTPUT LOAD RESISTANCE @12V			250	Ω
VFD OUTPUT LOAD RESISTANCE @24V			500	Ω
OPERATING TEMPERATURE	-40		60	°C
WEIGHT		7		lb.

Table 7.1.1 · Equipment specifications

8 Troubleshooting

PROBLEM	PROBABLE CAUSE	REMEDY	NOTES
DEVICE NOT POWERING UP	Loose screw clamp on connector	Tighten terminal	
	Incorrect polarity	Check polarity on the connection, adjust accordingly	
	Incorrect voltage	Provide a nominal 12V or 24V power source	
	Power switch not in the ON position	Change switch to ON position	
	Power switch not seated correctly on connection point	Remove connector and reseat on RJ45 connector. Listen for “click” sound indication correct engagement	
	Blown 2A fuse	Check fuse. If blown check for possible short circuit conditions including in the LP, HP, MP, IN1 terminals. Replace fuse if required.	
	20 pin IDC connector not seated correctly	Remove connector on both ends and re-seat	

Table 8.1.1 · Troubleshooting

PROBLEM	PROBABLE CAUSE	REMEDY	NOTES
DEVICE NOT COMMUNICATING WITH CONFIGURATOR SOFTWARE	Loose wiring	Check for loose connection. Tighten as required	
	Non-inverting and inverting terminals (A and B) are transposed	Swap wiring in terminals	Historically, there exist industry disagreements on the RS485 terminal naming convention. If the current set up requires the A and B lines to be swapped this is not caused for escalation
	Incorrect address selected	1. Choose correct address on configurator software. 2. Choose correct address on device	Address is only updated after a reset or power cycle.
NO COM PORTS AVAILABLE ON OPENING CONFIGURATOR SOFTWARE	USB to RS485 converter not connected to PC	Connect USB to RS485 converter first, then open configurator software	
	USB to RS485 converter driver not installed in PC	Follow USB to RS485 converter instruction for downloading and installing all required drives for operation	
	Device not powered on	Power on device	
CANNOT COMMIT VALUES	Non-numerical value entered in write column	Make sure value entered are correct numerical values	Some parameters might not allow zero as a valid value
TRIMMER FAULT	Tuning trimmer out of range.	1. Move trimmer to mid position, power cycle attempt re tuning 2. Tune using register as source and entering the desired trim value using the configurator software in advanced mode 3. Replace unit	

Table 8.1.1 · Troubleshooting (continued)

PROBLEM	PROBABLE CAUSE	REMEDY	NOTES
HP FAULT / LP FAULT	Loose wiring	Check wiring for power or other non 4-20mA wiring connected in LP or HP port. a. Fix any incorrect wiring b. Replace fuse	
	Incorrect wiring	Fix any incorrect wiring	
	Open 4-20mA loop	1. Look for loose terminals, tighten as required. 2. Look for broken wires, replace broken wiring.	
	Shorted loop	1. Look for damaged wiring insulation, replace damaged wiring needed. 2. Look for broken wires, replace broken wiring.	
	Unit not providing power for transmitter in loop powered configuration	Measure voltage from HL/ LP port PWR to RET terminal. Measure voltage should be within 1V less than input power. If voltage is lower than expected replace units .	
	Damaged load resistor	Measure resistance from HL/ LP port IN to RET terminal, measure resistance should be 28±5Ω. If resistance is outside range, replace unit.	
	EMI/EMC issues	Relocate device further away from EMI/EMC troublesome devices such as VFD, Motors, Large power supplies	
SYSTEM ERROR	Internal system fault	Power cycle unit. If error remains replace unit.	

Table 8.1.1 · Troubleshooting (continued)

PROBLEM	PROBABLE CAUSE	REMEDY	NOTES
VFD OUT FAULT	Open 4-20mA loop	1. Look for loose terminals, tighten as required. 2. Look for broken wires, replace broken wiring.	
	Overheated 4-20mA driver	Cut off power to device, allow it to cool. Relocate device location with less heat exposure.	
	Loop reach out of compliance voltage	Load resistor too large a. Check specifications for maximum load resistor value. b. Use correct load resistor or power using 24V if using 12V.	

Table 8.1.1 · Troubleshooting (continued)

9 Maintenance and Service

⚠ WARNING!

Failure to comply with the following safety warning(s) may result in serious personal injury or death.

- Do not service in a hazardous area.

Please contact Cimarron Energy, Inc. for information regarding maintenance, parts, or service:
Phone: 1-844-746-1676

Address:11025 Equity Dr., Suite 200, Houston, TX 77041

Website: www.cimarronenergy.com.

10 Replacement Parts

ITEM	PART NUMBER	NOTES
2A AUTOMATIVE FUSE	3194-2ATOM	
50MA TE5 FUSE	3210-014	Two spare fuses are provided with the unit. See Section 4.15.2
COIN CELL BATTERY	2120-004	

Table 10.1.1 · Replacement parts

11 Appendix B-Loop Powered Wiring Diagram (with options shown)

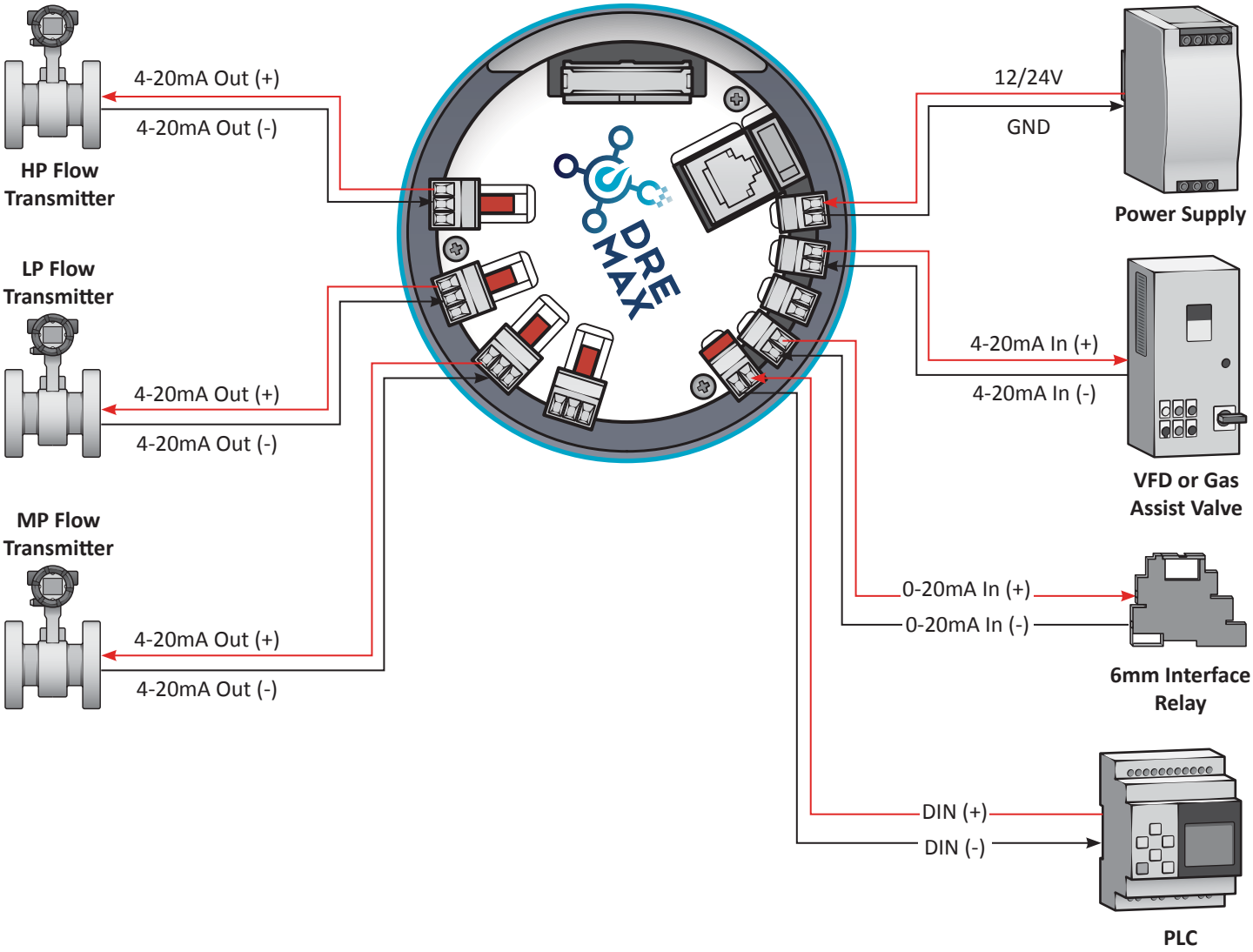


Image 11.1.1 · Wiring diagram: B-Loop powered wiring diagram

12 Appendix B-Self Powered Wiring Diagram (with options shown)

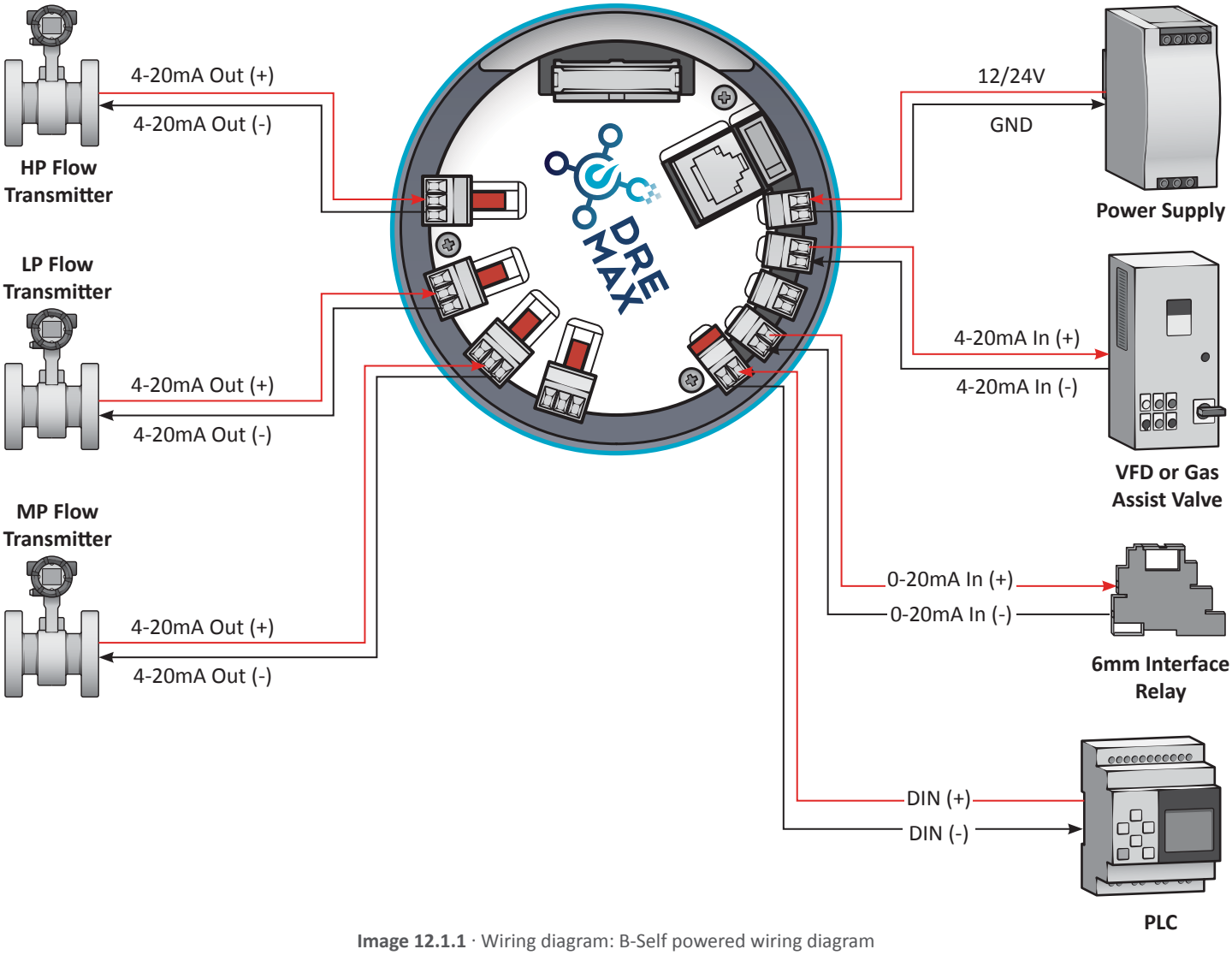


Image 12.1.1 · Wiring diagram: B-Self powered wiring diagram

13 Dimensional Drawing

All units are in inches unless noted otherwise.

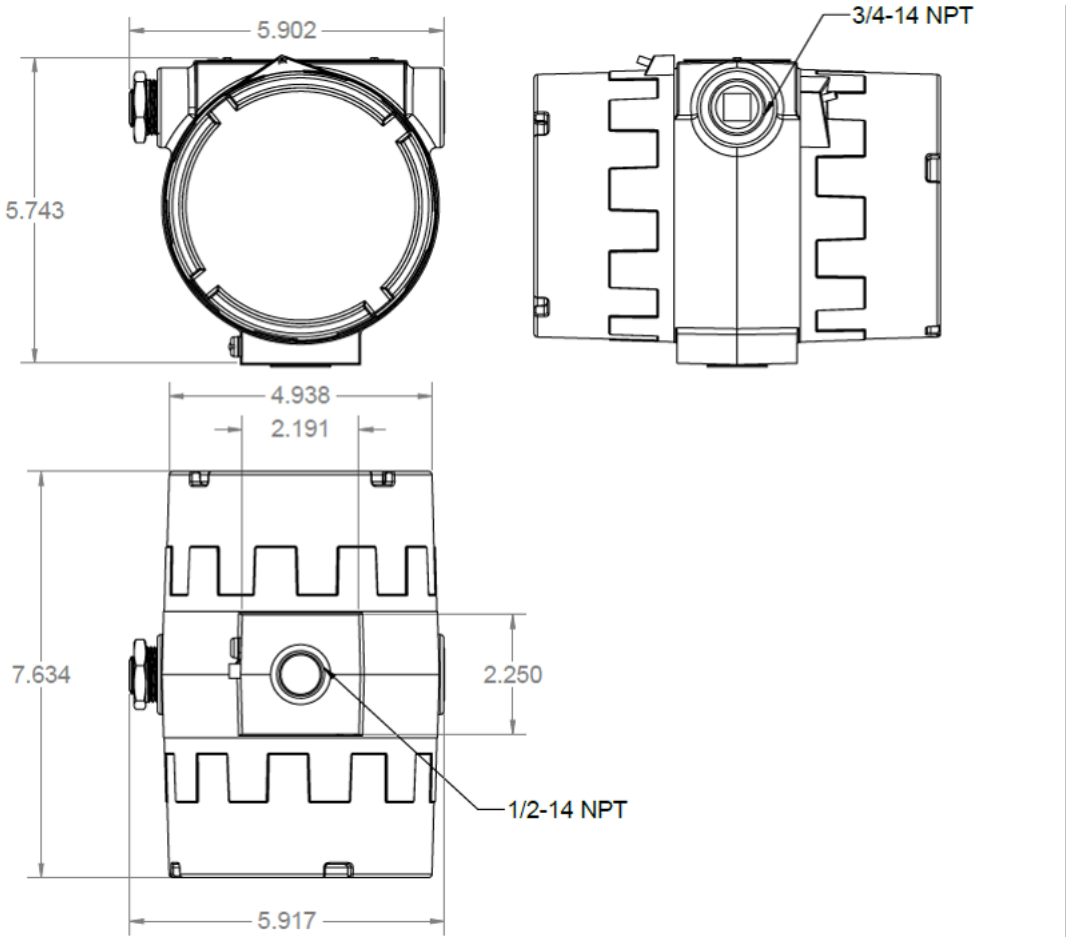


Image 13.1.1 · Dimensional drawing

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https://cimarron.com/dre-max

Revision: 04/2025