SyntriX AHF®

480V

INSTALLATION GUIDE

FORM: AFS-IG-E
REL. Oct 2026
REV. 003
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WARNING	**High Voltage! Only a qualified electrician can carry out the electrical installation of this filter.**

Quick Reference		
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ENVIRONMENT REQUIREMENTS

1. SAFETY

Warnings and Cautions

The following symbols are used in this manual:

	DANGER Failure to comply with the instructions or improper operation may cause serious electric injury and can be fatal.
	WARNING Failure to comply with the instructions or improper operation may cause wounds.
	CAUTION Failure to comply with the instructions or improper operation may cause personal injury and/or damage to the equipment.

General Safety Instructions

	DANGER Do not expose it to where rain or moisture is heavy, and keep it away from combustible liquid, gas or explosive.
	DANGER To avoid high voltage risks, the discharge time of DC capacitors should be above 4 hours. Make sure the operation is performed after full discharge.
	WARNING Installation must be done by well-trained and qualified personnel in a controllable environment.
	WARNING Any maintenance work must be carried out by qualified technical personnel; all power must be cut off before maintenance.

	CAUTION Reserve enough space around the equipment, to maintain good ventilation and easy access for maintenance and operation.
	CAUTION **Read the user manual carefully before connecting the power and keep it easily accessible for future reference.**

WIRING PRECAUTIONS

	WARNING This single AHF has a leakage current from 150mA to 1000mA. Before connecting the power supply, the user must make sure the equipment is properly grounded. When choosing RCCB or RCD equipment, the leakage current of the module should be considered. The RCCB chosen should not be sensitive to the unidirectional DC pulse (Class A) and the transient pulse. Please note that the leakage current of the load will also flow through RCCB or RCD; the grounding of the device must meet the local electrical regulations
	WARNING Compensation capacity and current-carrying capacity must be taken into full consideration for wiring.
	CAUTION The cables connected to the power terminals must be connected to a circuit breaker or other protective devices and the capacity of protective devices should match the capacity of Active Harmonic Filter.

PRECAUTIONS FOR USE

	CAUTION The AHF is used to mitigate power harmonics, improve power factors, and compensate three-phase unbalance. The capacity of AHF should be selected in accordance with harmonic content.
	CAUTION The AHF must be used with external current transformers.
	CAUTION Incorrect CT location settings can cause excessive current draw resulting in unit overheating or blown fuses. Please refer to open and closed loop CT diagrams for reference.
	CAUTION To ensure AHF has good reliability and to avoid overheating, do not block or cover the air inlet/outlet.
	CAUTION No corrosive gas and conductive dust is allowed in the working environment.
	CAUTION The working temperature should be -10℃and 40℃. AHF may derate if beyond this range;

STORAGE PRECAUTIONS

	CAUTION Seal AHF with its original packing materials in case of damage caused by rat invasion.
	CAUTION If immediate installation is not required, make sure to store the equipment in dry and well-ventilated indoor environment, the storage temperature should be -20℃~70℃, and relative humidity should be 5%～95%.

	CAUTION Improper storage conditions, such as humidity, will cause moisture and mildew on PCB and other components; halogen gas will corrode electrolytic capacitors; sulfur-containing gas will corrode copper and other semiconductors and resistance components;
	CAUTION If the module is not used for > 3 months, it should not be opened (sealed bag) or should be resealed with a sealed bag after opening; the temperature for long-term storage should not exceed 40 ℃.
	CAUTION After 1-3 years of storage in a sealed environment with a temperature not exceeding 40 ℃, the first time you turn on the power without turning it on, keep it on for more than 1 hour to activate the internal electrolytic capacitor.
	CAUTION If the module is not sealed, depending on the harsh environment (humidity, temperature, halogen, sulfur, ammonia, salt spray), more than 3 months, the internal components of the module have been corroded or mildewed or damp, when the module is powered on, the risk of damaging the module(s).
	CAUTION Normal temperature (such as normal indoor environment, temperature < 40 ℃, humidity < 70%), more than 6 months to 1 year, according to the first power-on method;
	CAUTION High temperature, humidity is not too high (40~70 ℃, such as arid desert areas), PCB is not moldy, etc. After more than 3 months, power up the unit like an initial power up.
	CAUTION If the humidity is high for a short period of time (1~2 weeks), check that there is no mildew, and that the PCBs are dry.
	CAUTION Unsealed storage creates a high risk of severe module damage.

PRE-INSTALLATION NOTICE

	CAUTION The installation, assembly and power-on of the module must be operated by qualified personnel or supervised by qualified personnel on-site.
	CAUTION Before wiring or connecting terminals, as a precaution, make sure that the input of the SyntriX AHF has been turned off to avoid accidents.
	CAUTION This equipment has leakage current from 100mA to 1000mA. Before connecting power supply, the user must make sure the equipment is properly grounded. When choosing RCCB or RCD equipment, the leakage current of the module should be considered. The RCCB chosen should not be sensitive to the unidirectional DC pulse (Class A) and the transient pulse. Please note that the leakage current of the load will also flow through RCCB or RCD; the grounding of the device must meet National Electrical Code (NEC) or other local regulations
	CAUTION SyntriX AHF should be installed in a clean, well-ventilated indoor environment.

ENVIRONMENT REQUIREMENTS

Before proceeding, it is important to take note of the preconditions required for the environment.

	ATTENTION For rack mount units, cold air enters the unit through the front of the module and hot air is discharged through the rear grid of the module. For wall mount units cold air enters through the bottom of the module and hot air is discharged through the top of the module. Do not block the ventilation holes on either side and clean the front side every 3 months to prevent blockage from dust.
	ATTENTION The ambient temperature at the time of installation must be -10℃~40℃ or derate.
	ATTENTION Ensure that there is no dust or corrosive/explosive gases in the installation environment.
	ATTENTION The unit MUST NOT be installed in an environment with strong magnetic fields, nuclear radiation or high-power RF noise.
	ATTENTION The relative humidity in the environment should be lower than 95%. The presence of steam or condensation may result in permanent damage to the device or endanger personal safety.
	ATTENTION The installation altitude should be lower than 1500m. If it is over 1500m, the equipment must be derated 1% per 100m increase in altitude.

	ATTENTION Avoid severe physical shock, violent impact and large angle tilting in the installation process as this may cause damage and operational failure of the unit.
	ATTENTION During installation, leave sufficient operating space for cooling, maintenance and operation.

2. GENERAL INFORMATION

The purpose of the manual is to properly specify, size, and install the SyntriX AHF.

For the most current SyntriX AHF information, please refer to our website:

https://mtecorp.com/syntrix_ahf/

Scan this QR Code!

This manual is intended for use by personnel experienced in the operation and maintenance of drives. Because of the high voltages required by the filter, drive and the potential dangers presented by rotating machinery, it is essential that all personnel involved in the operation and maintenance of this filter know and practice the necessary safety precautions for this type of equipment. Personnel should read and understand the instructions contained in this manual before installing, operating or servicing the filter and drive to which it is connected.

Receipt & Repair Statement

Upon Receipt of this Filter:
The SyntriX AHF has been subjected to demanding factory tests before shipment. Carefully inspect the shipping container for damage that may have occurred in transit. Then unpack the filter and carefully inspect for any signs of damage. Save the shipping container for future transport of the filter.
In the event of damage, please contact and file a claim with the freight carrier involved immediately.
If the equipment is not going to be put into service upon receipt, cover and store the filter in a clean, dry location. After storage, ensure that the equipment is dry and that no condensation or dirt has accumulated on the internal components of the filter before applying power. For complete storage instructions, reference Storage Precautions in this manual (pg. 8).

Repair/Exchange Procedure
MTE Corporation requires a Return Material Authorization Number and form before we can accept any filters that qualify for return or repair. If problems or questions arise during installation, setup, or operation of the filter, please contact MTE for assistance at:

Toll Free: 1-800-455-4MTE (1-800-455-4683)
International Tel: (+1)-262-253-8200
Fax: (+1)-262-253-8222

Enclosures

MTE enclosures are designed to provide a degree of protection for electrical components and prevent incidental personnel contact with the enclosed equipment. Reference SyntriX AHF website page for list of available enclosed units.

Agency Approvals

UL and cUL listed to UL-61800-5-1 File E497238

Warranty

The warranty period for all SyntriX AHF® active harmonic filter units is:
•18 months from date of installation
Note: Current transformers (CTs) are not covered under the SyntriX AHF® warranty.

See https://www.mtecorp.com/industry-leading-warranty/ for details.

Scan this QR Code!

3. HOW TO INSTALL

Before proceeding, it is important to take note of these preconditions:

	CAUTION The installation, assembly and power on of the module must be operated by qualified personnel or supervised by qualified personnel on-site.
	CAUTION Before wiring or connecting terminals, make sure that the input of the SyntriX AHF has been turned off to avoid accidents.
	CAUTION This equipment has leakage current from 100mA to 1000mA. Before connecting power supply, the user must make sure the equipment is properly grounded. When choosing RCCB or RCD equipment, the leakage current of the module should be considered. The RCCB chosen should not be sensitive to the unidirectional DC pulse (Class A) and the transient pulse. Please note that the leakage current of the load will also flow through RCCB or RCD; the grounding of the device must meet the local electrical regulations
	CAUTION MTE SyntriX AHF should be installed in a clean, well-ventilated indoor environment.

ENVIRONMENT REQUIREMENTS

	ATTENTION The cold air enters AHF through the front grid of the module and hot air is discharged through the rear grid of the module. Do not block the ventilation holes on either side and clean the front side every 3 months to prevent blockage from dust.

Installation Checklist

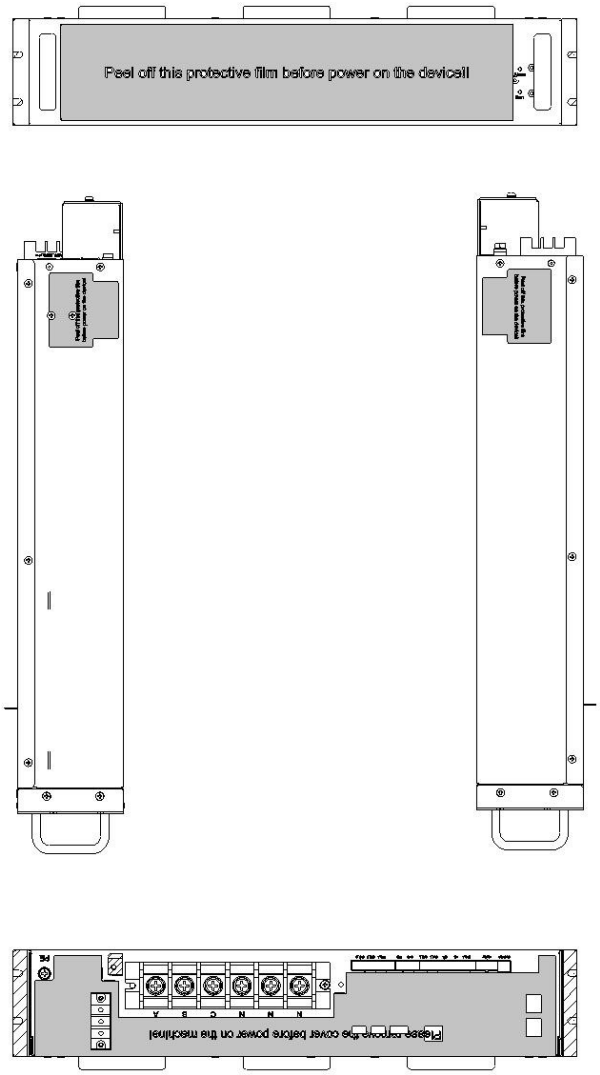
Table 3-1: Installation Checklist

Completed	Checklist Item
☐	Confirm unit is mounted securely and installation location meets clearance requirements
☐	Confirm incoming power wiring is complete and properly torqued
☐	Confirm CT wiring is installed correctly and polarity is verified
☐	Confirm CT placement matches approved one-line diagram
☐	Confirm grounding is complete and verified
☐	Confirm HMI connection is installed and operational
☐	Confirm communication wiring is complete (Modbus TCP/IP, Modbus RTU, CAN, etc. if applicable)
☐	Confirm E-Stop wiring and operation
☐	Confirm control power is wired correctly
☐	Confirm fan operation and airflow paths are unobstructed
☐	Confirm all covers, barriers, and safety guards are installed
☐	Confirm wire labels and terminations are identified
☐	Confirm no loose hardware, debris, or foreign material inside enclosure
☐	Confirm insulation and spacing meet applicable standards

Dust-proof Sticker

	NOTICE All the modules have dust-proof stickers to protect the module from the dust while storing. The dust-proof stickers must be removed before the module is installed at site.

Figure 3-1: Dust-proof Sticker



This guide covers the startup of two or more SyntriX AHF modules operating in parallel (combining corrective current), controlled by a single 7" HMI. For single-module or 4.3"-HMI-only startup, see the companion quick start guides.

How to read the screenshots: a red box marks the button or field to press in that step.

Before You Begin

- Modules are mounted, and power cables (L1/L2/L3/PE) and CT wiring are complete per the SyntriX Installation Guide.
- You know the CT ratio — read it from the CT nameplate (e.g., 500:5 is entered as “500”).
- You know the total number of modules and the total system capacity in Amps.
- Serial communication network cables are ready to connect between modules (RS485 (+/–) terminals, max 15 m).
- The 7" HMI cable is ready to connect to the monitor port.
- System power is OFF until instructed.
- You have the HMI password 654321 — the same password logs in on both the 4.3" module screens (Step 4a) and the 7" HMI (Step 5a).
- Allow time for one unavoidable wait: the One-click parameter download can take up to 5 minutes. It is run once, as the communication check in Step 5d.
- Enclosed units: the DIP switch addresses and the 4.3" HMI Local/Master addresses are set at the factory, and the module fronts are not accessible in the field. Wire power and CTs (Step 1), energize the unit (Step 4 power-up bullets), then go directly to Step 5 — Steps 2 and 3 and Steps 4a–4c do not apply.

Table 3-2: Non-Enclosed Startup sequence

Step	Power state	What you do
1	Power OFF	Wire power cables (L1/L2/L3/PE) and CT cables — all units.
2	Power OFF	Connect the serial communication network (RS485 (+/–) terminals), the 7" HMI cable(s), and the EPO daisy-chain. Loose or wall-mounted modules only — factory-wired on enclosed units.
3	Power OFF	Set the DIP switch address on each module (repeat per module). Loose or wall-mounted modules only — factory-set on enclosed units.
4	Modules energized	Energize all modules (all units), then set the 4.3" HMI address on each module — addressing applies to loose or wall-mounted modules only; it is factory-set on enclosed units.
5	Modules energized	Program parameters on the 7" HMI, download a 5th-harmonic-only setting once to verify communication, then enter the full harmonic configuration.
6	Modules energized	Start the unit from the 7" HMI and verify compensation.

Table 3-3: Enclosed Startup sequence

Step	Power state	What you do
1	Power OFF	Wire power cables (L1/L2/L3/PE) and CT cables. The serial communication network, 7" HMI cable, EPO daisy-chain, DIP switch addresses, and 4.3" HMI addresses are all factory-wired and factory-set — Steps 2 and 3 and Steps 4a–4c do not apply.
5	Modules energized	Energize the unit (480 VAC, 3-phase) using the power-up bullets at the start of Step 4, then program parameters on the 7" HMI: download a 5th-harmonic-only setting once to verify communication, then enter the full harmonic configuration.
6	Modules energized	Start the unit from the 7" HMI and verify compensation.

Installation Procedures

Step 1 — Wire Power and CTs (All Units)

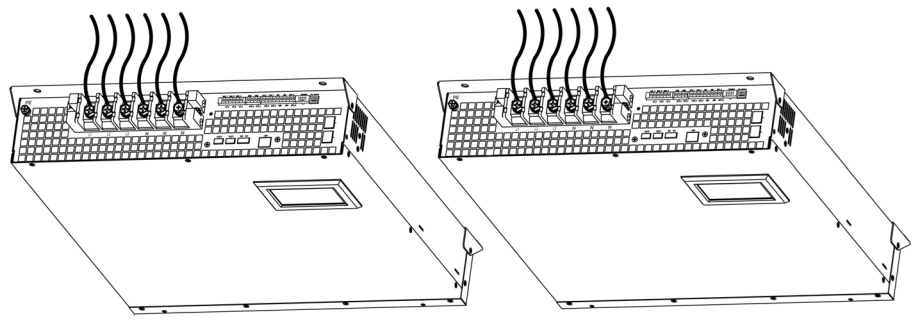
All units: wire the power cables (L1/L2/L3/PE) and the CT secondaries per the Installation Guide. Verify CT secondary wiring lands on CT_A / CT_C with GND returns — never open-circuit an energized CT secondary. Serial communication network, 7" HMI, and EPO connections are covered separately in Step 2; on enclosed units those connections are made at the factory.

Refer to Table 3-2 for module installation and Table 3-3 for cabinet installation.

Multiple Wall-Mounted Modules

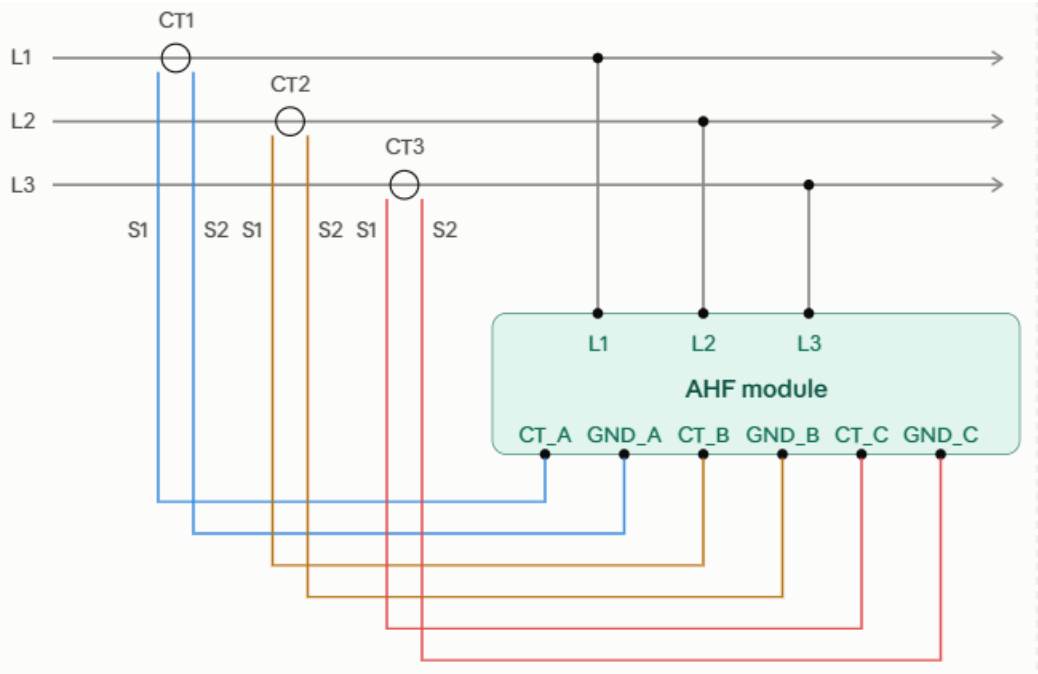
Figure 3-2: Illustrated wiring sequence

Step 1-1: Power Cables Connection To The Grid

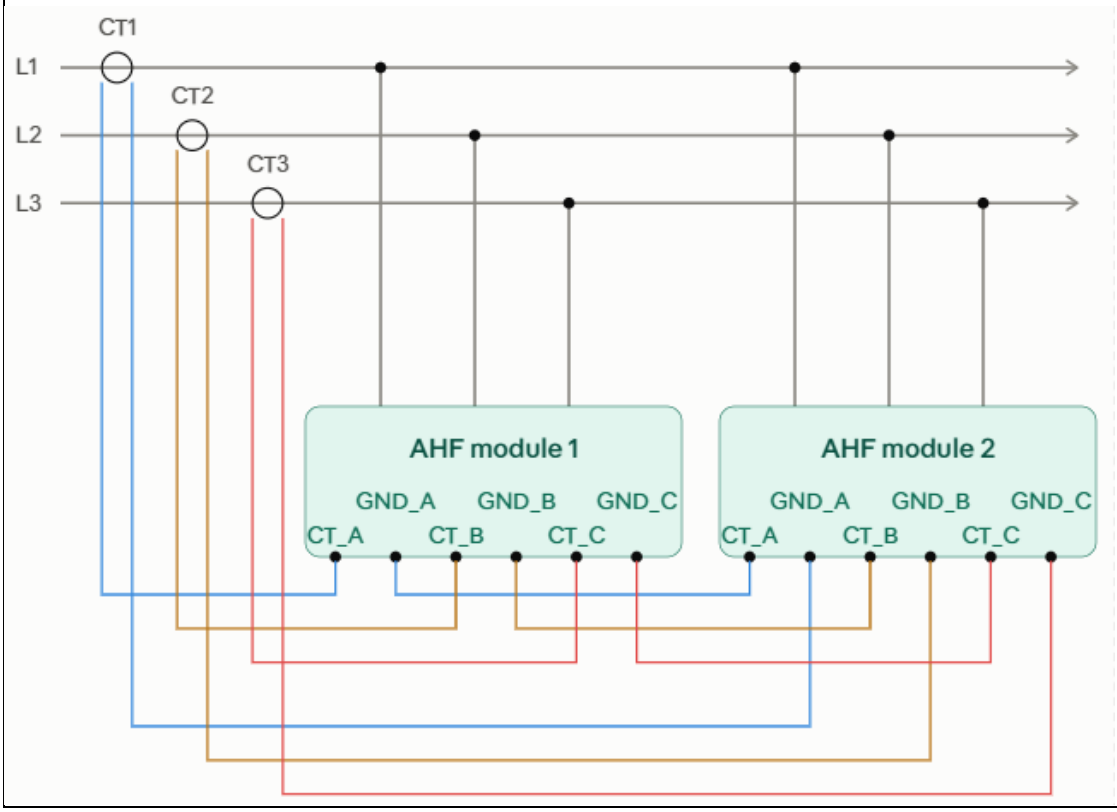


Step 1-2: CT Connections to the Module(s)

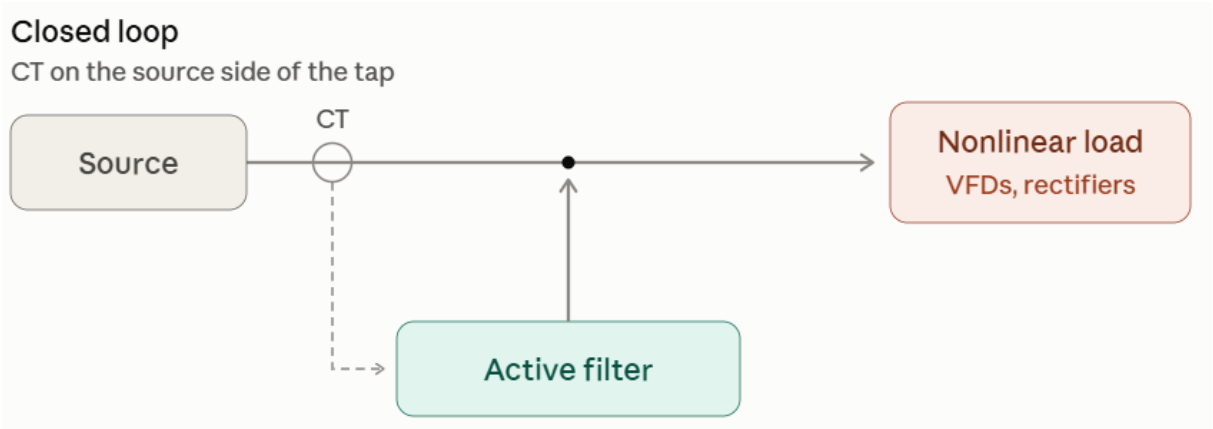
Single Module

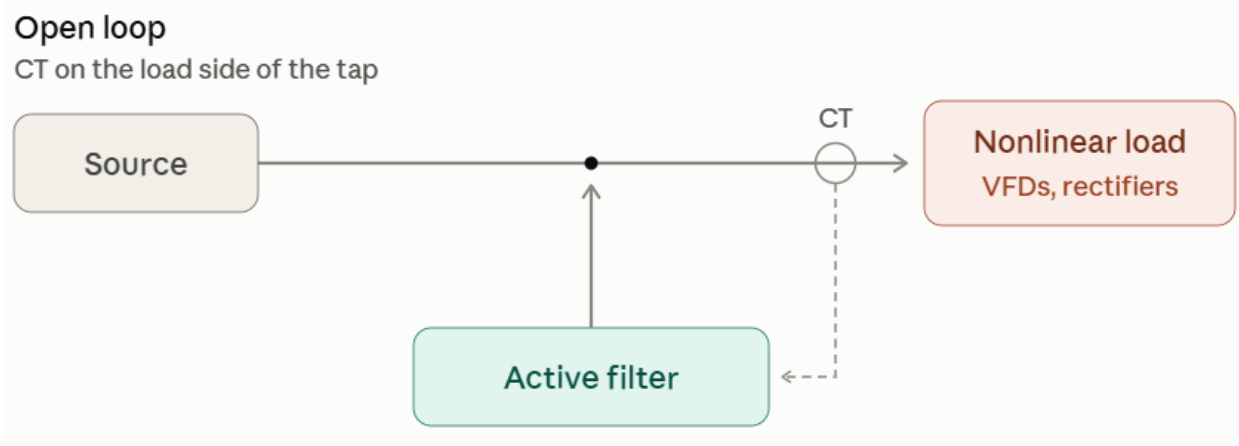


Parallel Modules

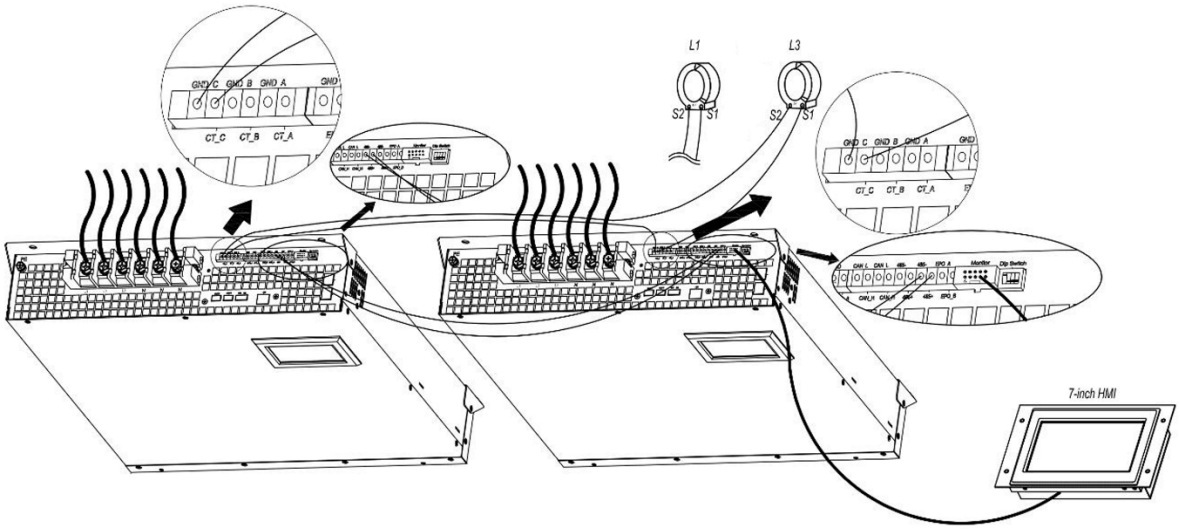


Step 1-3: Position CTs in system (Closed loop preferred)





Step 1-4: 7-Inch HMI Connection



Note: For 7" HMI control, complete Step Four (7" HMI connection).

Enclosed units — stop here and skip to Step 5: Steps 2 and 3 and Steps 4a–4c do not apply (serial communication network, 7" HMI cable, EPO, DIP switch addresses, and 4.3" HMI addresses are all set at the factory and the module fronts are not accessible). You still have to energize the unit first: with power and CT wiring complete, apply power using the power-up bullets at the start of Step 4 (480 VAC, 3-phase; confirm each module powers up with no active alarms), then go directly to Step 5 to program the 7" HMI.

Step 2 — Wire the Serial Communication Network and 7" HMI (Non-Enclosed)

Enclosed units: skip this step — the inter-module serial communication network, 7" HMI module cable, and EPO daisy-chain are wired at the factory, and the module fronts are not accessible. Energize the unit using the power-up bullets at the start of Step 4, then continue at Step 5.

Note on terminology: the modules operate electrically in parallel (their corrective current combines), but all inter-module communication is serial over the RS485 network.

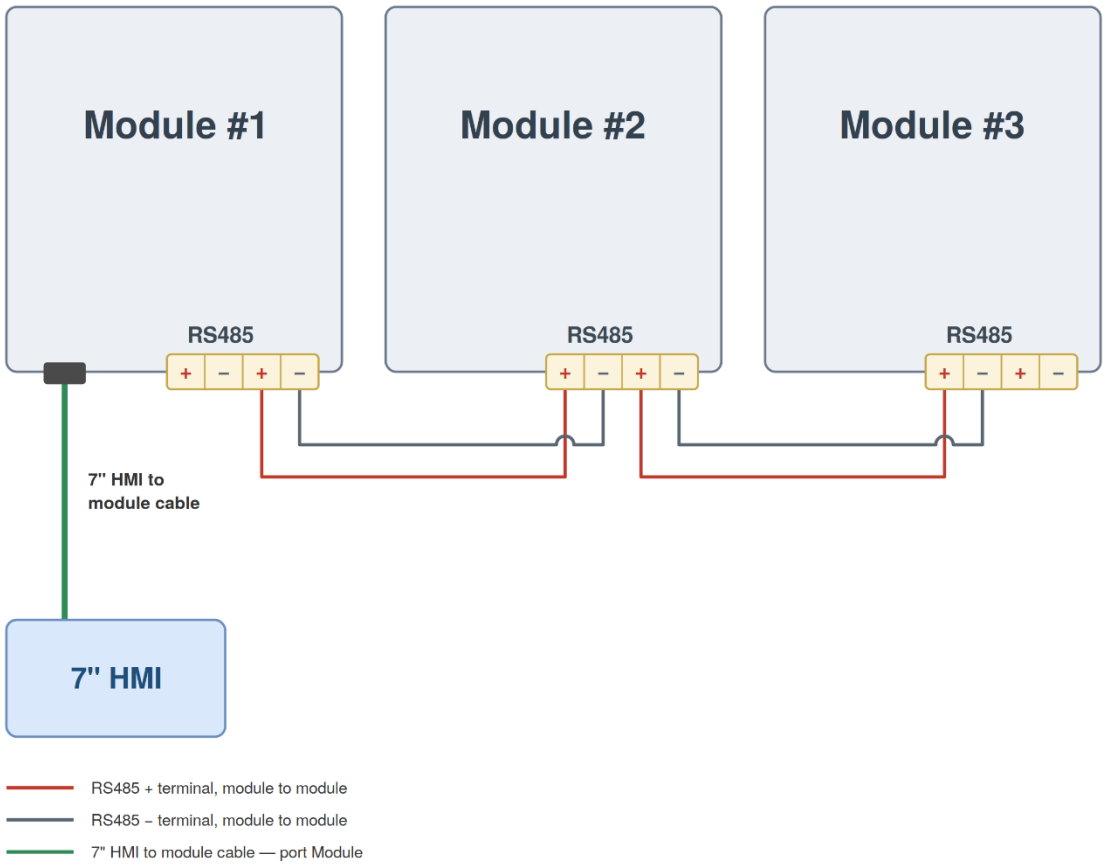
Figure 3-3: Rear signal panel communication terminals

Rear signal panel communication terminals — RS485 (485+ / 485–, two pairs so modules can be daisy-chained), EPO_A / EPO_B, the Monitor ribbon connector for the 7" HMI cable, and the DIP switch.

Connection checklist — confirm each of the following on loose or wall-mounted modules:

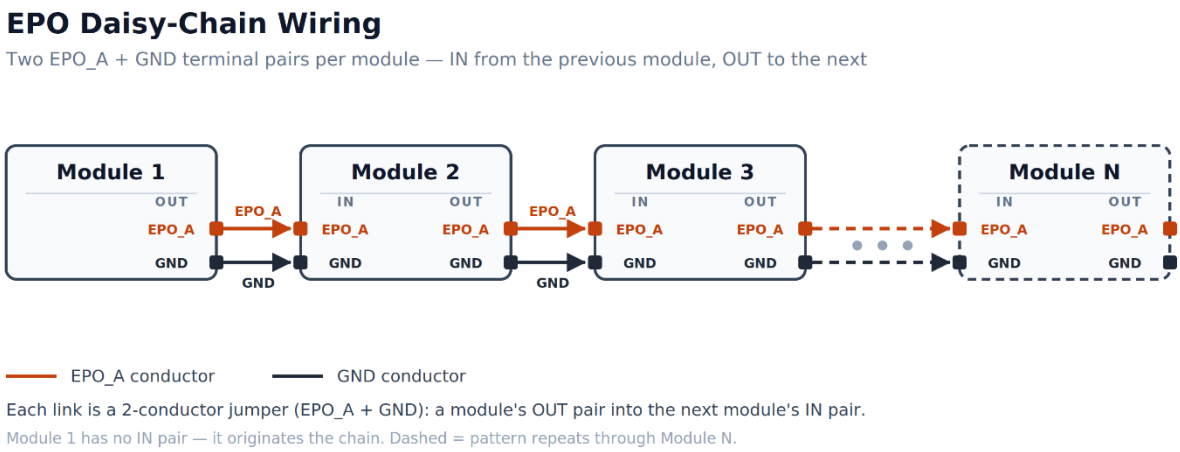
- Connect the serial communication network cable between modules using the RS485 (+/–) terminals (max 15 m; use equal-length CT signal runs per the Installation Guide).
- Connect the 7" HMI cable to the Monitor port (ribbon connector next to the DIP switch).
- If used, daisy-chain the EPO signal between modules (EPO_A / GND).

Figure 3-4: RS485 Communication Wiring



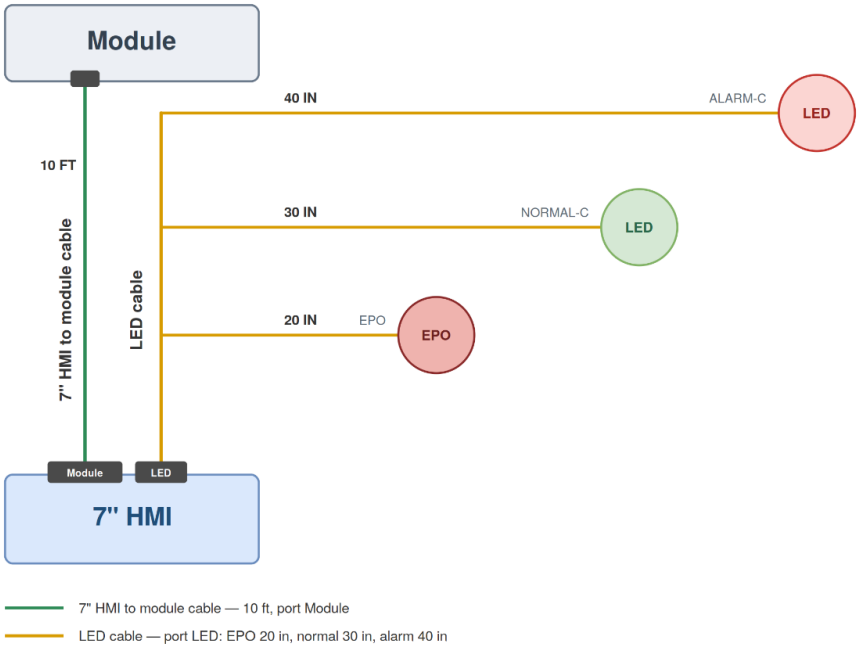
RS485 wiring: each module has two +/– terminal pairs bridged internally, so the bus is daisy-chained module to module. Land the 7" HMI module cable on Module #1, then run a twisted pair from Module #1's second pair to Module #2's first pair and repeat for each additional module. The polarity is always + to + and – to –.

Figure 3-5: EPO daisy-chain Wiring



The EPO circuit is daisy-chained through every module: the EPO_A + GND pair on each module's OUT terminals is jumpered to the EPO_A + GND pair on the next module's IN terminals, so a single emergency-power-off signal drops the whole system. Module 1 sits at the head of the chain, and the same OUT → IN pattern repeats module to module through the last module in the chain.

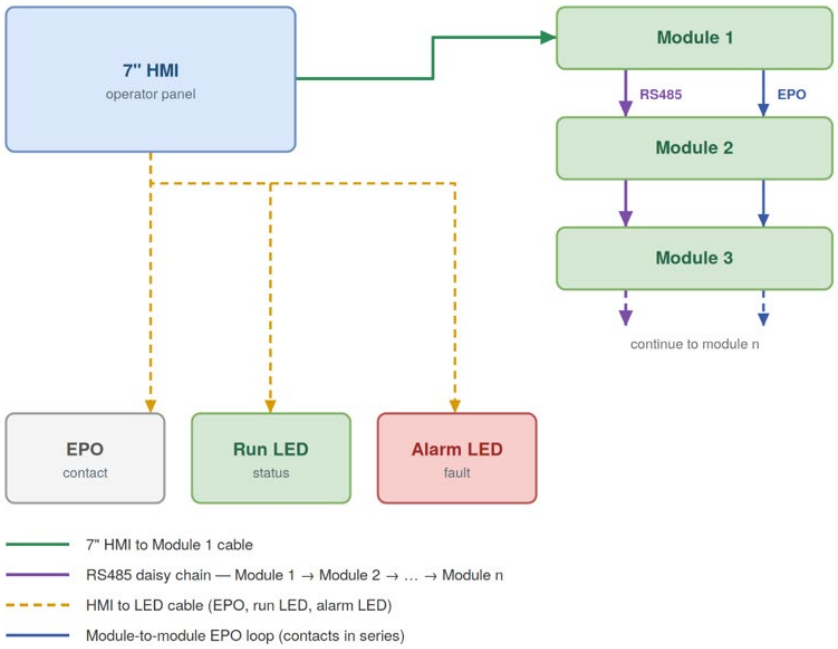
Figure 3-6: 7” HMI to Module Cable Diagram



The 7" HMI has two cable connections. The M port takes the 10 ft 7" HMI to Module Cable, which lands on the Monitor port of Module #1 — this is the link used for all programming, monitoring, and Power ON/OFF; the HMI is master to every module on the RS485 bus, so it connects to Module #1 only. The L port takes the LED cable, which breaks out the discrete signals: EPO at 20 in, NORMAL-C (run indicator, green) at 30 in, and ALARM-C (alarm indicator, red) at 40 in.

7" HMI to Module 1, RS485 serial communication network and EPO loop daisy-chained module to module, and the LED cable breakout (EPO contact, run, alarm).

Figure 3-7: Communication overview

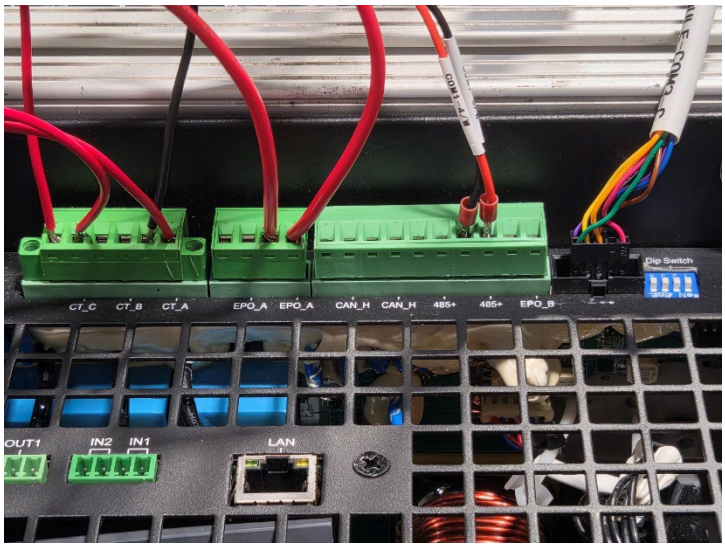


The 7" HMI is the master and connects to Module #1 only: its M port lands on the Monitor port of Module #1 via the 10 ft cable. From there the RS485 serial communication network daisy-chains module to module (+ to +, – to –), and the EPO loop follows the same path with EPO_B → EPO_A contacts in series, so one EPO signal drops the whole system. The HMI's L port feeds the LED cable, which breaks out the EPO contact (20 in), NORMAL-C run/green (30 in), and ALARM-C alarm/red (40 in).

As-built photos of the rear signal panel:

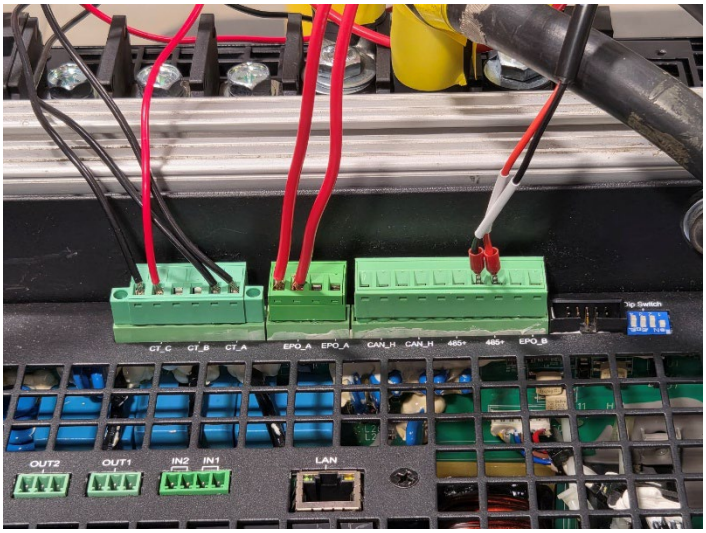
CT terminals, EPO, RS485, 7” HMI and DIP switch

Figure 3-8: Module 1 Wiring



Module 2 — power terminals (left) and signal terminals (right)

Figure 3-9: Module 2 Wiring



✓ **Checkpoint:** verify that power, CT, serial communication network (RS485 (+/–) terminals), EPO, and 7" HMI cables are all connected and secure before you set addresses.

Enclosed units: addressing is factory-set and the module fronts are not accessible, so Steps 2 and 3 and Steps 4a–4c do not apply. Energize the unit using the power-up bullets at the start of Step 4, then continue at Step 5. Loose or wall-mounted modules: continue with Step 3.

Step 3 — Set the DIP Switch Address for module(s) (Non-Enclosed)

Enclosed units: skip this step — the DIP switches are inside the enclosure and are set at the factory. Every module on the parallel bus needs a unique communication address. The DIP switch is on the rear signal panel, next to the Monitor connector (labeled “Dip Switch”).

Heads up: The switch block is mounted with its printed labels upside-down: switch 1 is nearest the outer edge and “ON” is toward the bottom of the block. Set addresses with the module powered OFF.

The HMI is the master to all modules — Unit 1 = Machine Number 1, Unit 2 = Machine Number 2, Unit 3 = Machine Number 3. Ensure all DIP switch settings are correct and firmly seated before proceeding.

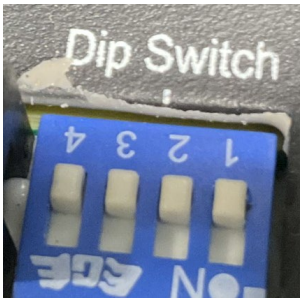
Table 3-4: DIP Switch Address Reference

Full DIP switch address reference — machine (unit) numbers 1–8. SW1 is the least-significant switch; ON = 1.

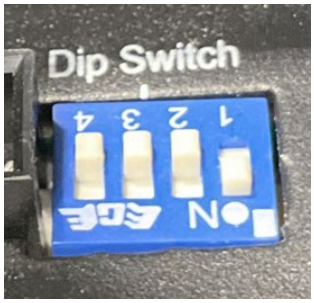
SW1	SW2	SW3	SW4	Machine Number
0	0	0	0	1
1	0	0	0	2
0	1	0	0	3
1	1	0	0	4
0	0	1	0	5
1	0	1	0	6
0	1	1	0	7
1	1	1	0	8

Figure 3-10: DIP Switch Reference Images

Unit 1: all four switches OFF



Unit 2: switch 1 moved to ON



Step 4 — Power up and Set the 4.3" HMI Addresses (Non-Enclosed)

Power up the modules first — this applies to every installation:

- Confirm all modules and communication cables are connected correctly.
- Energize the power supply feeding all AHF modules (480 VAC, 3-phase).
- Confirm each module powers up correctly (status LEDs, indicators, or displays).
- Verify there are no active alarms or fault indications before continuing.

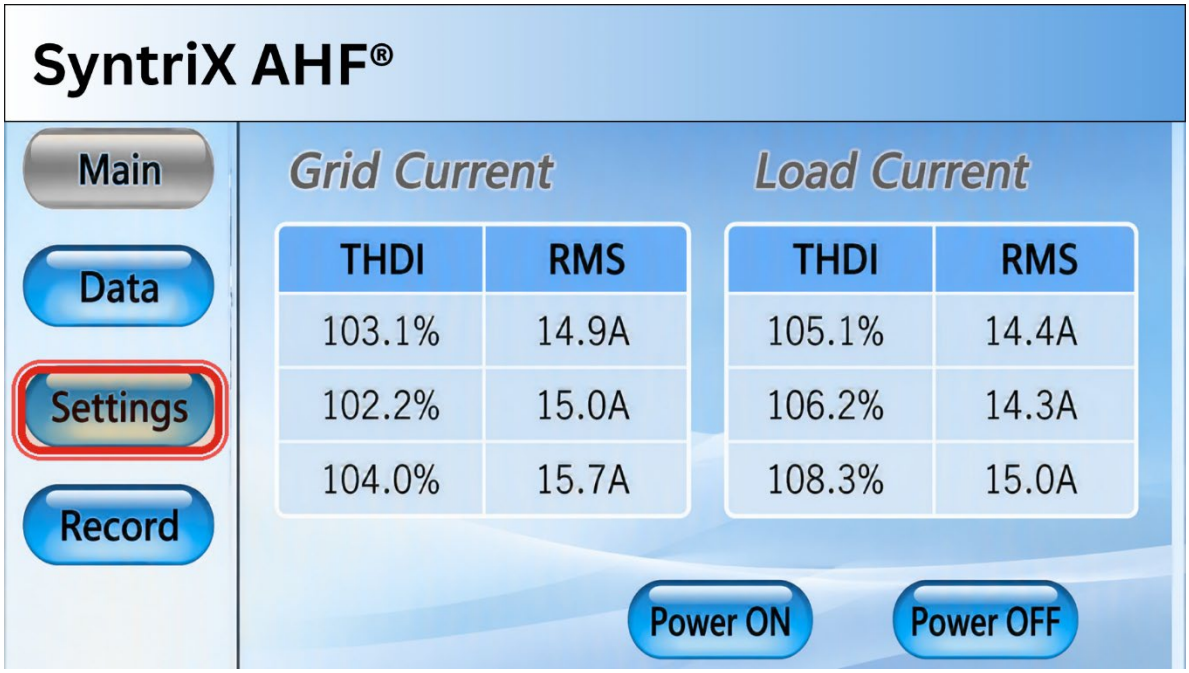
If the module(s) have an accessible 4.3” HMI then steps 4a–4c apply. On enclosed units the 4.3” screens are not accessible and their addresses are factory-set — after power-up, go to Step 5.

Each module’s built-in 4.3" touchscreen must be given a matching address so the 7" HMI can find it on the bus.

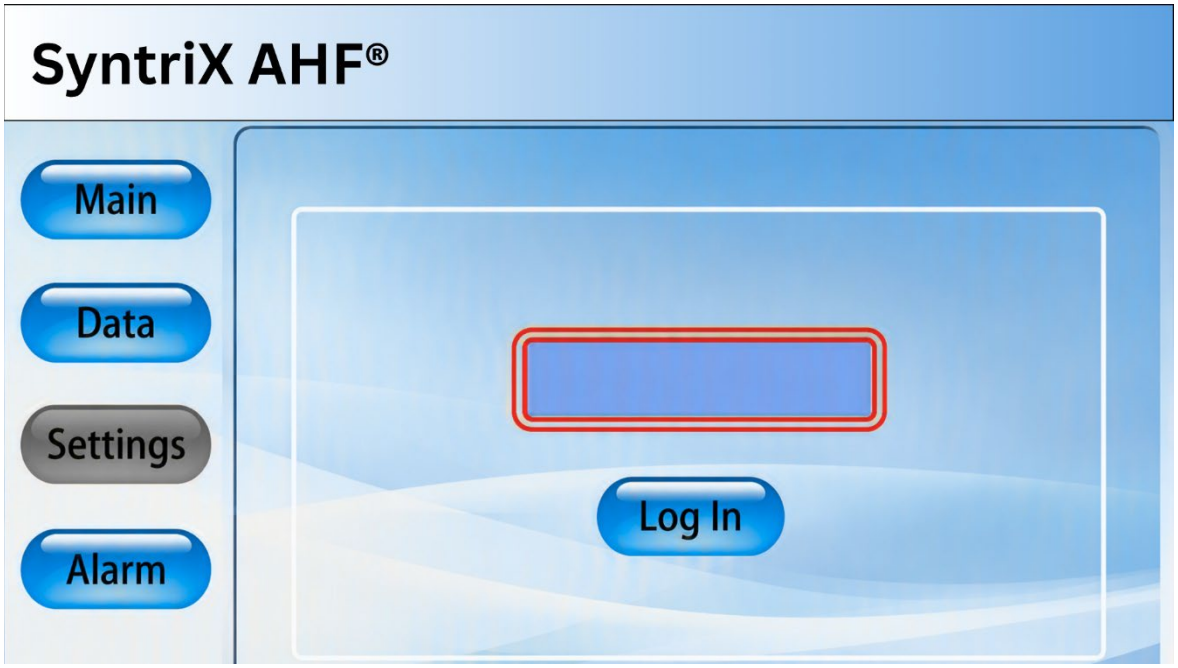
Open Settings and log in

From the Main screen, tap Settings. Tap the password field, enter the password 654321 on the keypad, tap OK, then tap Log In.

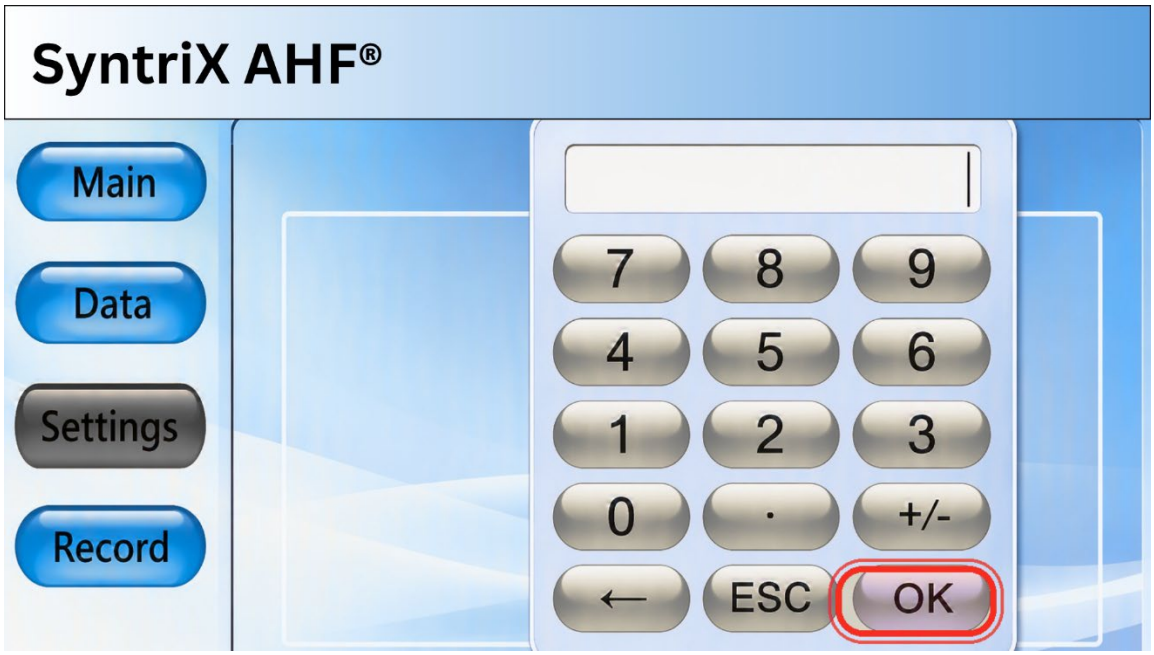
Figure 3-11: Main screen images Tap “Settings” in the left menu



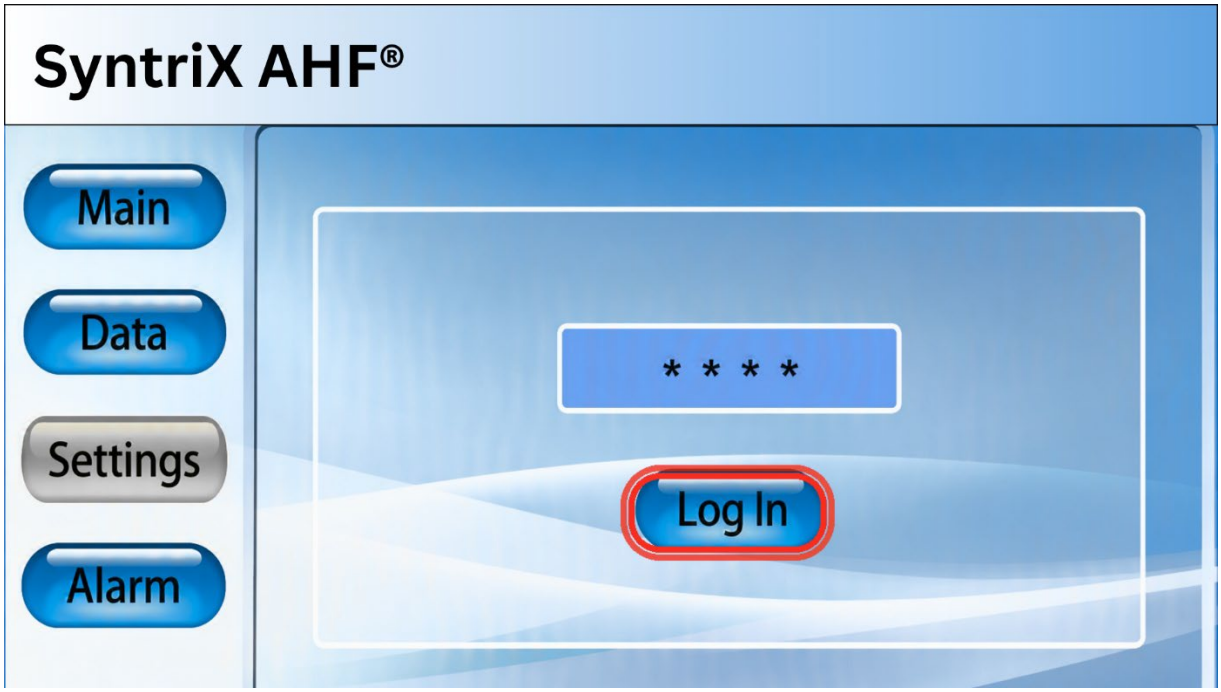
Tap the password field to open the keypad



Enter 654321, then tap OK



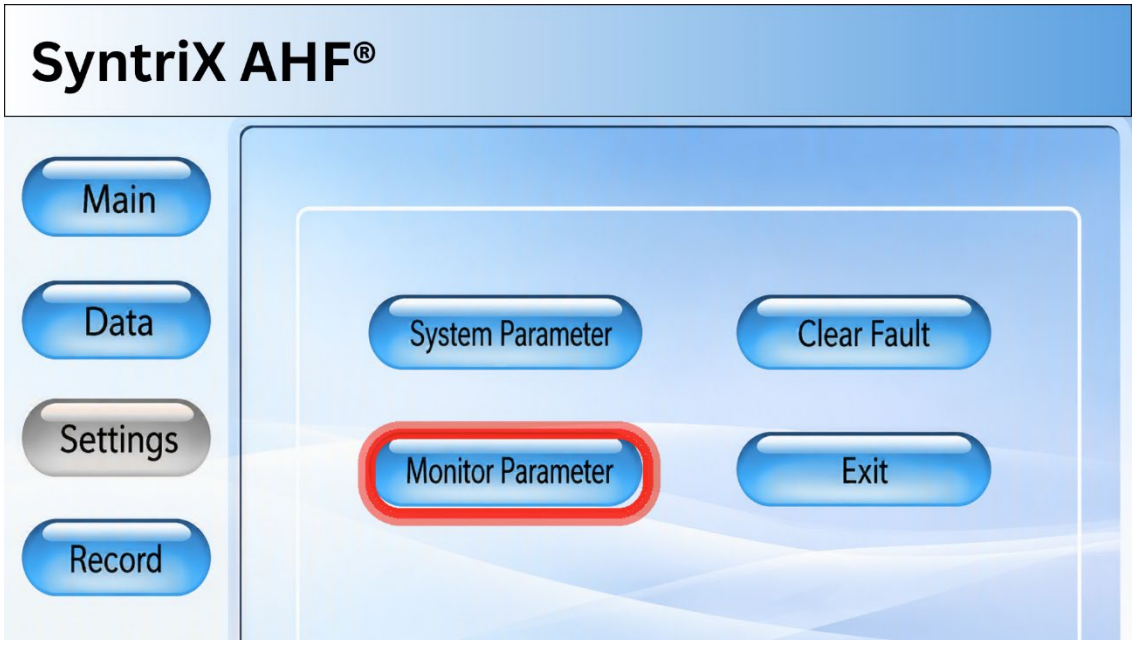
Now tap "Log In" to enter the settings Menu



Open Monitor Parameter

Tap "Monitor Parameter"

Figure 3-12: Settings Menu



Set Local Address and Master Address

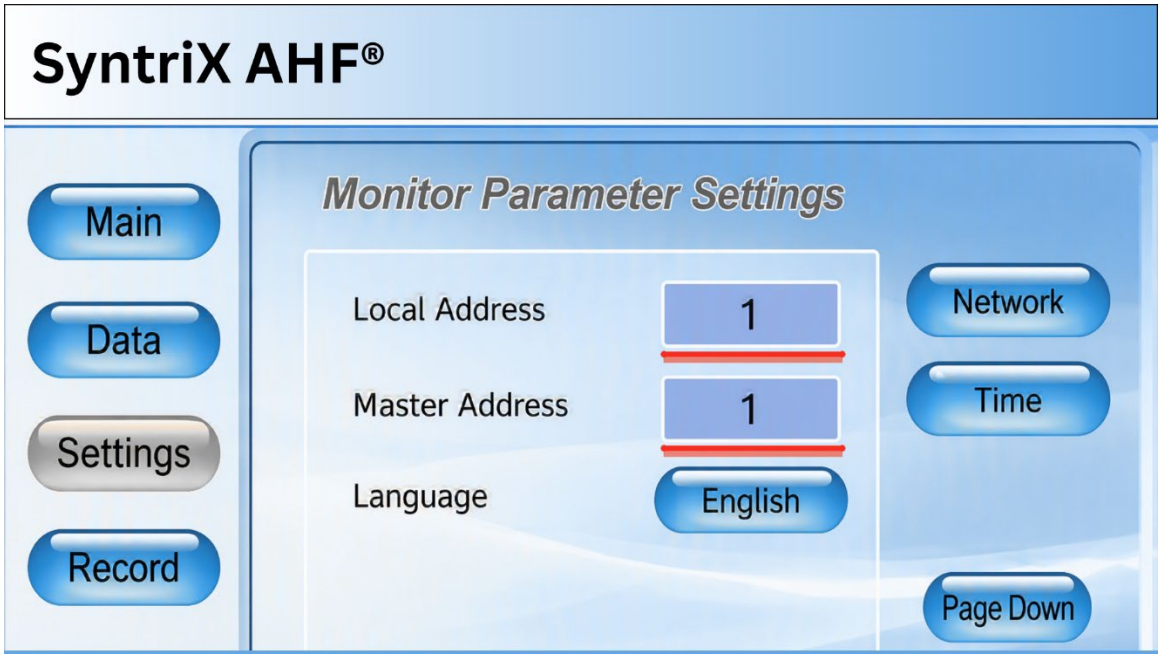
On each module's built-in 4.3" screen, open Monitor Parameter and set both Local Address and Master Address to that unit's number (the two values always match — see the table below). Repeat 4a–4c on every module.

Table 3-5: Local Address and Master Address

Module	Local Address	Master Address
Unit 1	1	1
Unit 2	2	2
Unit 3	3	3
Unit n	n	n

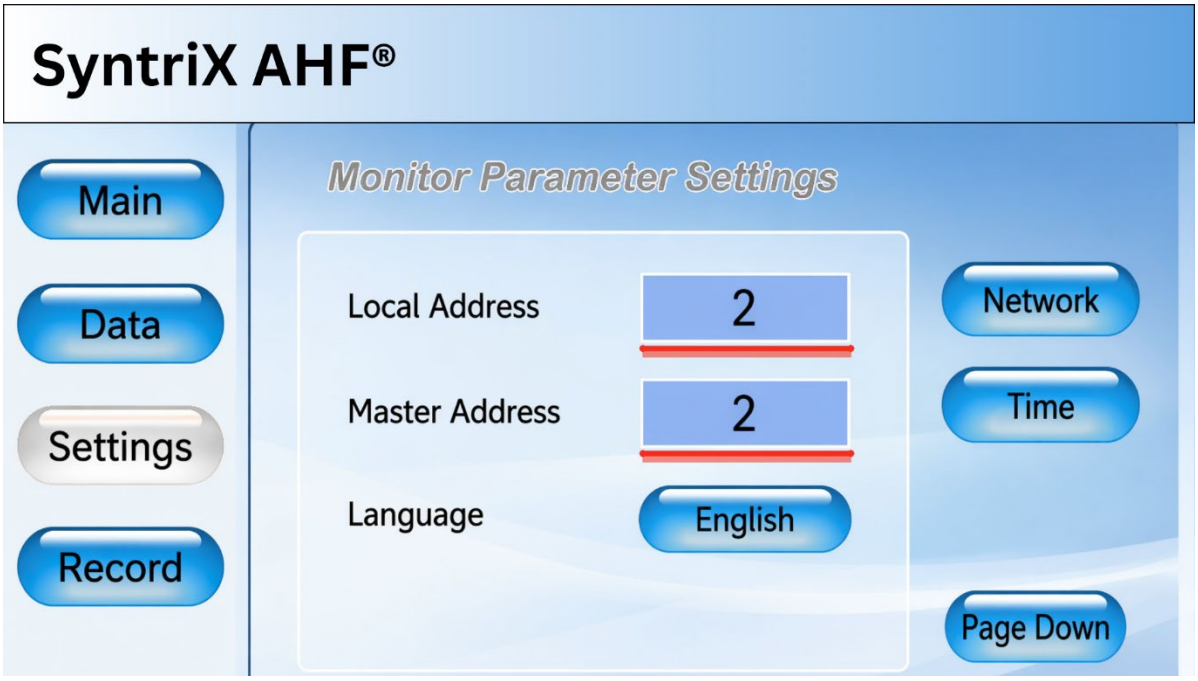
Unit 1: Local Address 1 / Master Address 1

Figure 3-13: Settings Screen Images



With Module 1 addressed, you can now repeat steps 4a – 4c for module 2. Repeat for all modules.

Unit 2: Local Address 2 / Master Address 2



✓ **Checkpoint:** each module's 4.3" screen shows its own unit number for both Local Address and Master Address before continuing to Step 5.

Step 5 — Program Parameters on the 7" HMI (All Units)

With all modules wired, addressed, and energized, program the system from the 7" HMI.

Log in (Get Permissions)

Enclosed Units you can now power on and interact with the 7”HMI

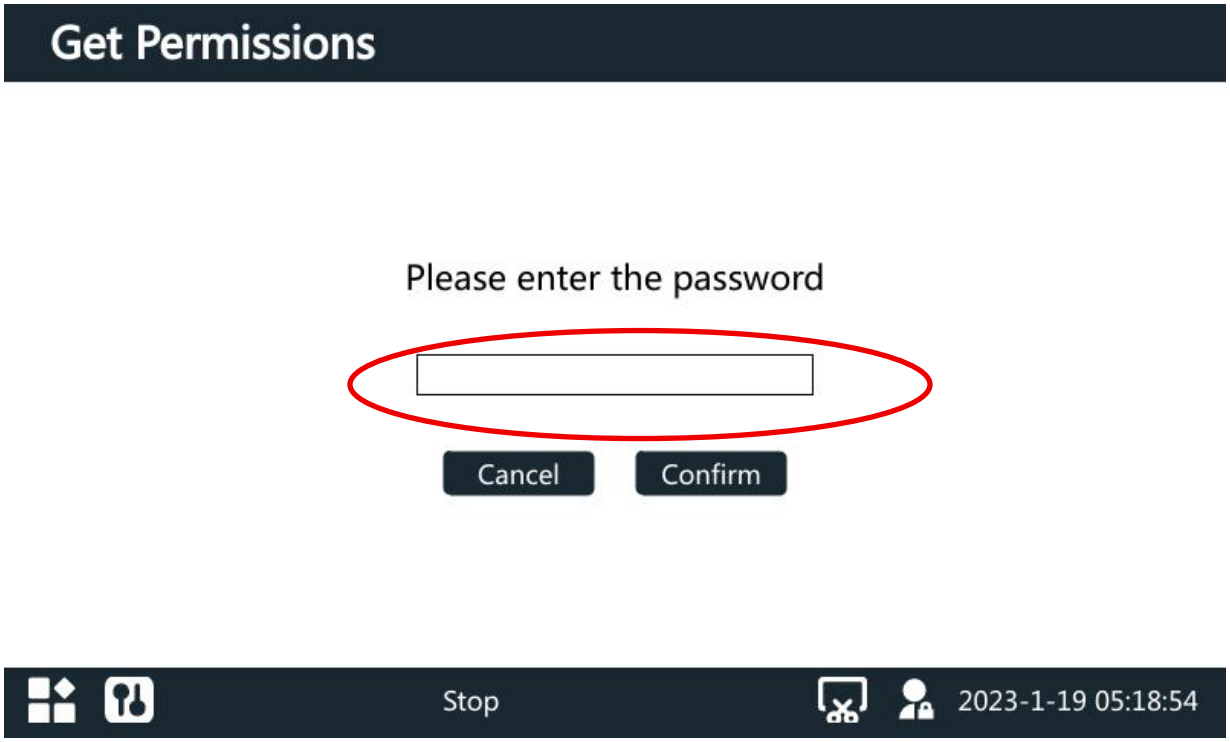
From the home screen, open the menu (bottom-left icon) and select Setting. When prompted, enter the advanced password 654321 and tap Confirm.

Grid THDI vs. Load THDI

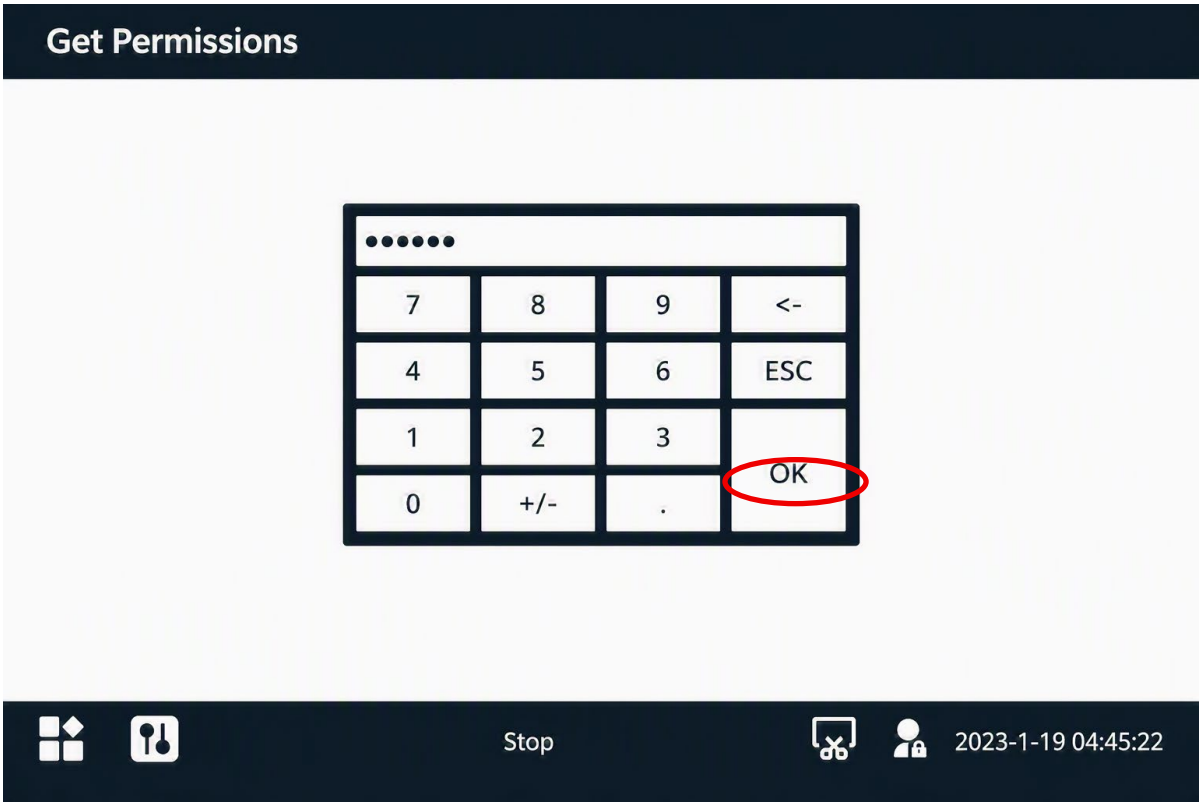
Figure 3-14: 7" HMI home screen

7" Menu screen — tap Setting

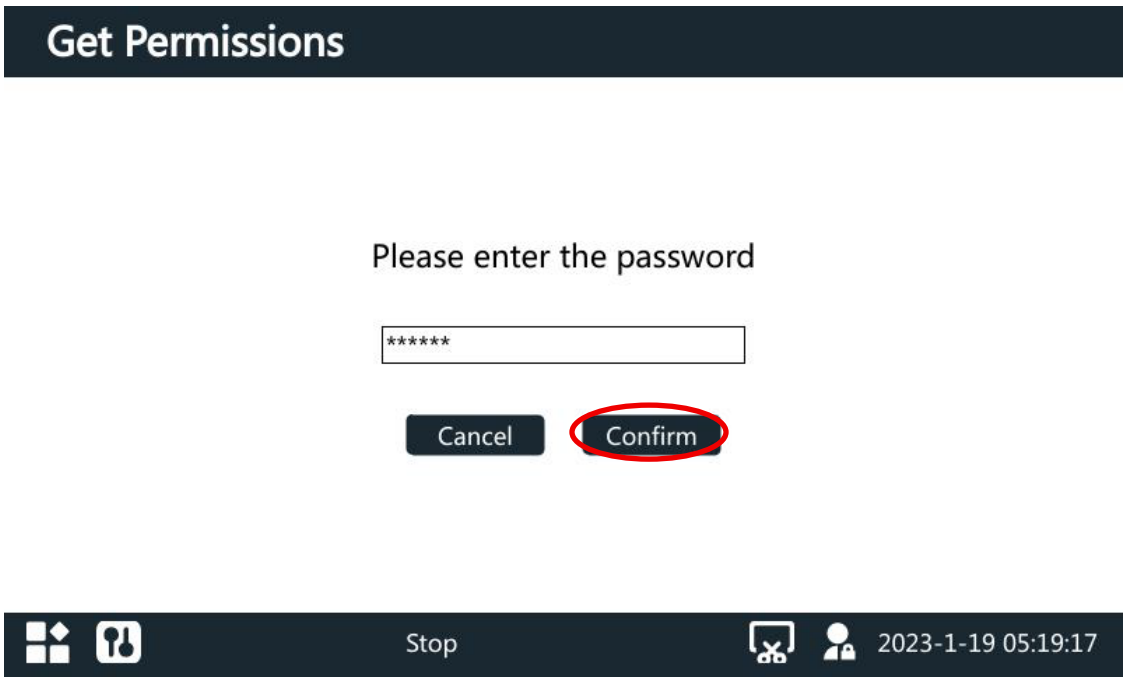
Tap password box



Enter 654321, then click OK



Click Confirm



System tab — values shown are an example; set each field per the table above and your site requirements

Figure 3-15: System screen

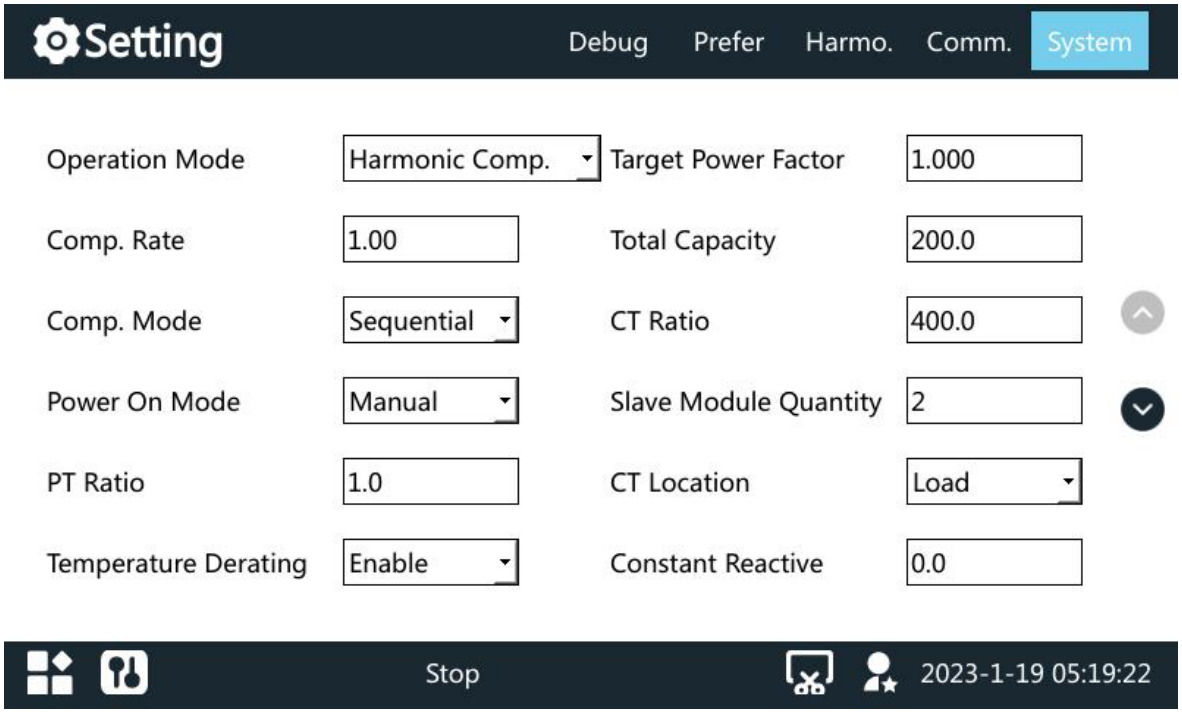


Table 3-6: Parameter Settings

Work straight down the table below — the rows follow the order the fields appear on screen (left column top to bottom, then right column), and the shaded rows tell you when to page to the next screen. Fields not listed here are left at their factory settings.

Parameter	Setting	Notes
System tab page 1 — start here		
Operation Mode	Harmonics Comp.	Current Distortion Mitigation Only
Comp. Mode	Sequential	Sequential or Intelligent mode. Sequential is the preferred mode.
Power On Mode	Manual	Prevents auto-start on power-up
Total Capacity	Sum of all modules (A)	e.g., 200 A unit (2 modules) = 200
CT Ratio	As labeled on CTs	500:5 is entered as “500”
Slave Module Quantity	Number of modules in system	e.g., 2 for a 300 A unit
CT Location	Load Side (open loop) or Grid Side (closed loop)	Set to where the CTs are physically installed — load side = open loop, supply side = closed loop. This determines the Harmonics tab mode in Steps 5c and 5e.
Tap the down arrow (right side of the screen) twice → System tab page 3 (page 2 has no required settings)		
Voltage Class	440/480	
Target Vol.	277 V (L-N)	480 V system
Freq Range	60 Hz	
Ext. Passive Filter	0	
Tap the down arrow once → System tab page 4		
Network Config.	3P3W	3-phase, 3-wire

Note: Slave Module Quantity equals the total number of installed modules, including the master (e.g., a 3-module system is set to “3”), and every module is set to the same value. The HMI reboots after the slave module quantity is updated.

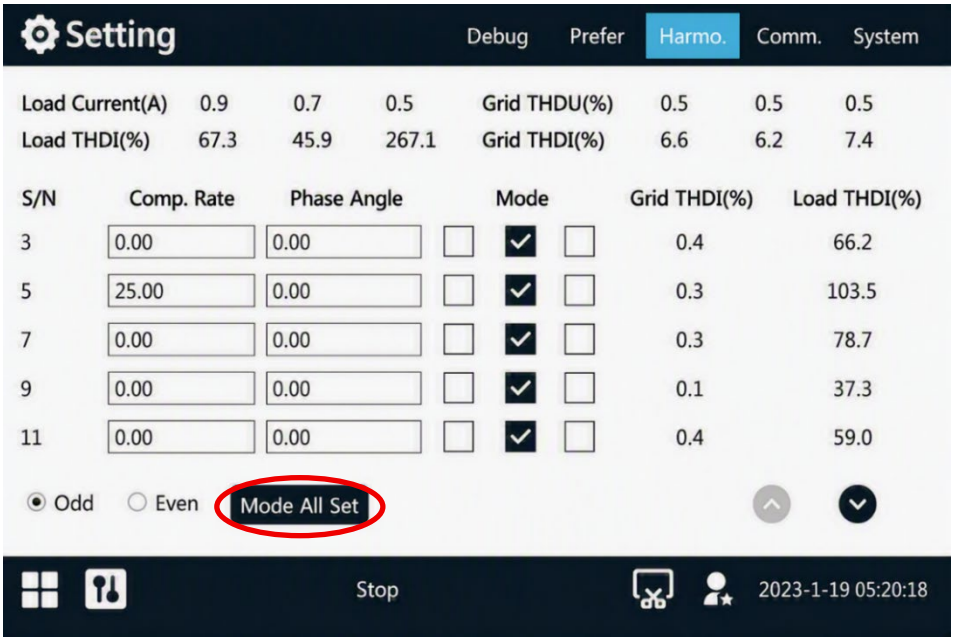
⚠	**CAUTION** Incorrect CT location settings can cause excessive current draw resulting in unit overheating or blown fuses. Please refer to open and closed loop CT diagrams for reference

Setting → Harmo. tab (communication check pre-set and mode selection)

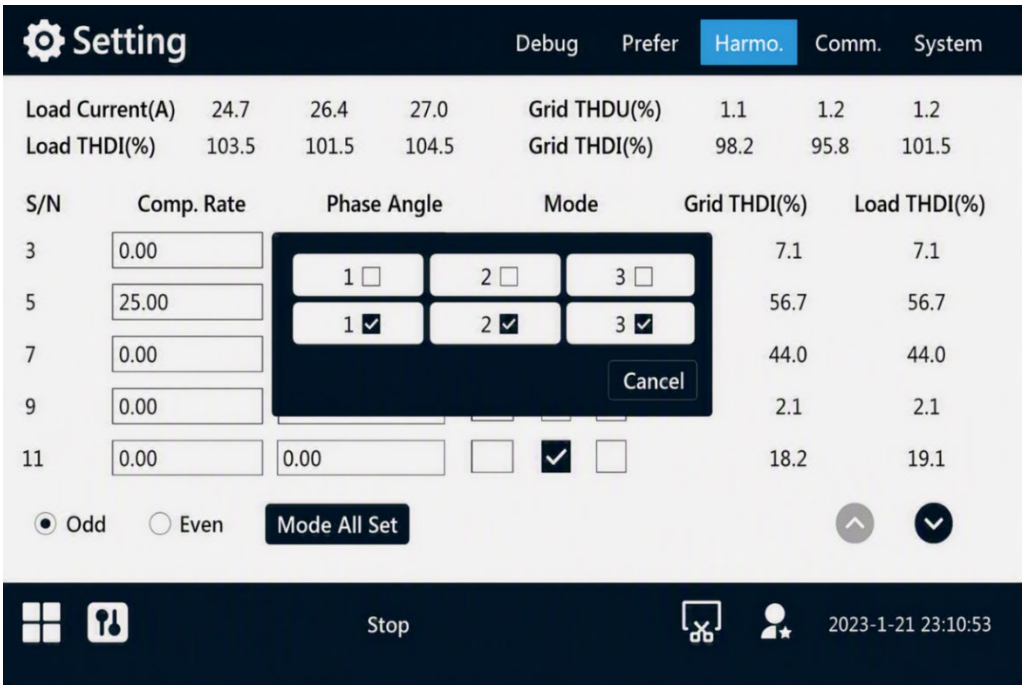
This step does two things: it sets up the download that validates communication with every module, and it establishes the correct compensation mode for the CT location. On the Harmonics tab, set the 5th harmonic Comp. Rate to 25. Leave every other harmonic order at 0 with its mode checkbox unchecked. The mode you select here is the mode carried forward into the full configuration in Step 5e, so it must match the CT location — an incorrect mode will not compensate properly.

Figure 3-16: Harmonics screen

Communication check pre-set — 5th harmonic Comp. Rate = 25.00 with its mode checkbox enabled; every other order left at 0.00 and unchecked.



Mode All Set dialog — top row (empty box) clears that mode from every harmonic order; bottom row (check mark) applies it to every order.



Select the mode for the 5th harmonic based on the CT location set in Step 5b:

Table 3-7: Harmonic Correction

CT Location (Step 5b)	Mode for Harmonic Correction
Closed loop — grid-side CTs	Mode 2 and/or Mode 3 (resonance suppression)
Open loop — load-side CTs	Mode 1 and/or Mode 3 (resonance suppression)

To set the mode, tap Mode All Set on the Harmonics tab. The dialog shows two rows of buttons, numbered 1–3 for the three modes: the top row (empty box) clears that mode from every harmonic order, and the bottom row (check mark) applies that mode to every order. The modes are independent - applying one does not clear another. To change modes, clear the old one first, then apply the new one: to go from Mode 1 to Mode 2, tap 1 in the top row (empty box), then tap 2 in the bottom row (check mark).

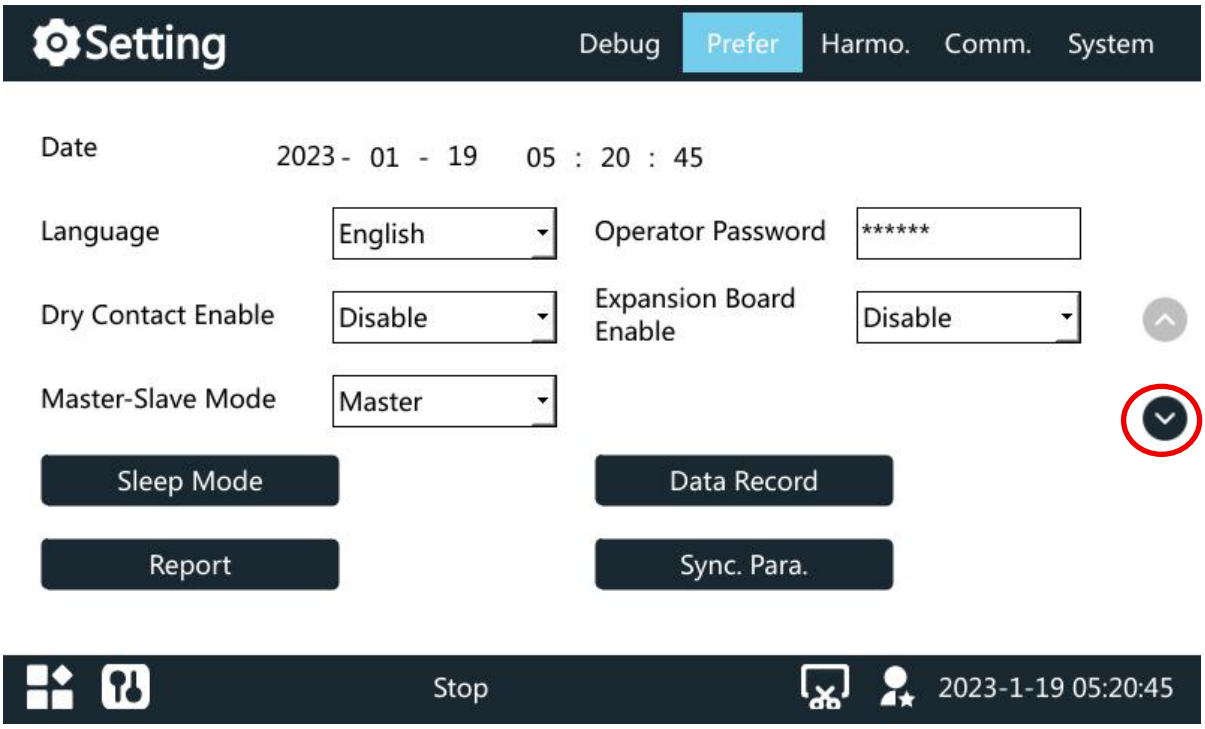
Use the Odd / Even selector to page between harmonic groups and confirm that only the 5th order shows a non-zero Comp. Rate — with its mode checkbox enabled — before continuing to Step 5d.

Setting → Preference tab (One-click Para. Set — communication check)

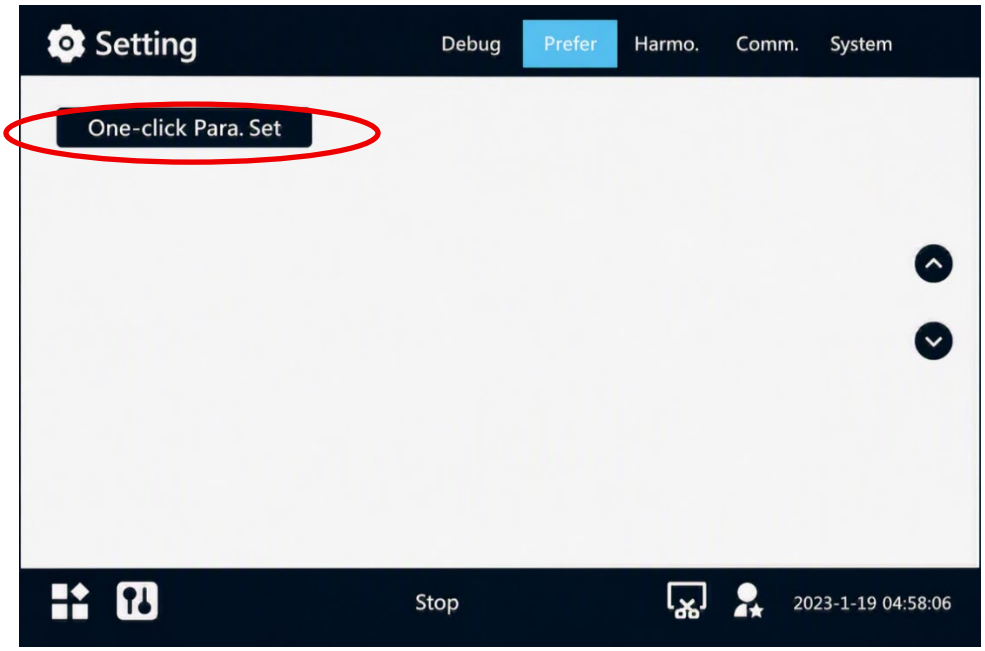
Open the Preference tab and use the down arrow to reach the second screen. Tap One-click Para. Set to download the settings to every connected module. This is the only time One-click Para. Set is run. The download may take up to 5 minutes to complete. Because only the 5th harmonic is enabled at 25%, this download does not commission the filter — its purpose is to prove that the 7" HMI can write to every module over the serial communication network. If the download reports an error, or a module does not accept the parameters, suspect an address conflict (Steps 3 and 4) or a serial communication network wiring fault (Step 2) before going any further.

Figure 3-17: Preference screen

Preference tab page 1 — tap the down arrow on the right-hand side.



Preference tab page 2 — tap One-click Para. Set to download the parameters to every module; allow up to 5 minutes for the download to finish.

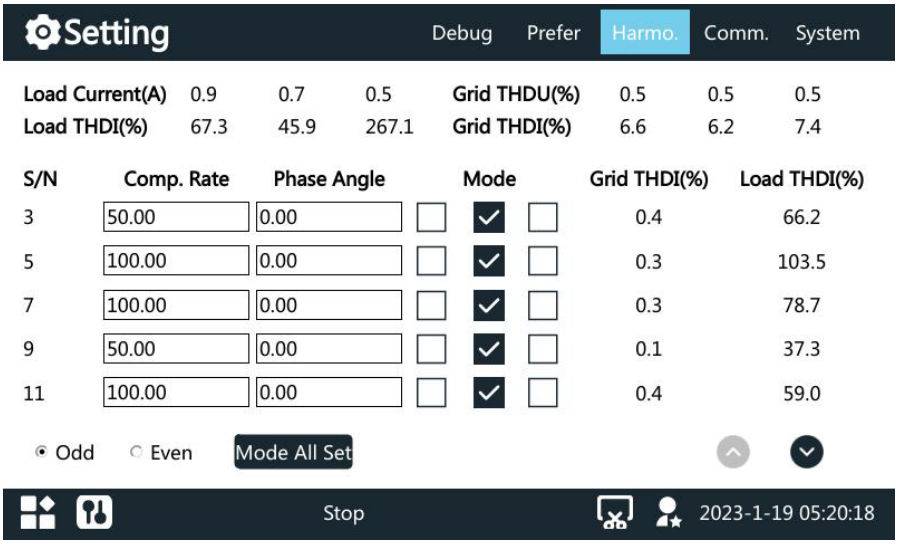


✓ **Checkpoint:** the parameter download completes on every module with no alarms — communication between the 7" HMI and all modules is confirmed — before continuing to Step 5e.

Setting → Harmonics tab (full harmonic configuration)

Figure 3-18: Harmonics screen – Full Configuration

Harmonics tab layout — per-harmonic Comp. Rate, Phase Angle, and Mode checkboxes, The Comp. Rate values shown here are an example of the full commissioning set from Step 5e.



Return to Setting → Harmonics tab and set the Comp. Rate for each order in the table below, enabling that order's mode checkbox as you go. Use the same mode as Step 5c (closed loop: Mode 2 and/or Mode 3; open loop: Mode 1 and/or Mode 3), the Odd / Even selector to page between groups, and Mode All Set to apply or clear a mode across all orders at once.

Table 3-8: Harmonic Targets

Full commissioning harmonic targets — Comp. Rate by harmonic order (all listed orders also need their mode checkbox enabled).

Harmonic order	Comp. Rate	Notes
5, 7, 11, 13, 17, 19, 23	100	Typical 6-pulse harmonics — the primary targets
2nd	100	Even order — enable only if the harmonic spectrum shows it present
Higher Orders	100	Above the 23rd — enable only orders the Info. tab spectrum shows present

Before setting these values, view the harmonic spectrum on the 7" HMI Info. tab and note which orders are actually present at a high level in your system, this may include even orders such as the 2nd. Use the table above as the starting point, then set the Comp. Rate on the harmonic content that the spectrum shows. Orders that are not present can be left at 0 with their mode checkbox unchecked.

Only use phase angle adjust when running in open loop control. The phase angle adjust range is [-0.1, -1]. Phase angle adjustments should be done in small increments i.e -0.1 -> -0.15 -> -0.2, etc. Confirm if the current distortion for the specified harmonic order improves.

Info. → Harmo. tab, Grid (green) vs. Load (red) current by harmonic order.

Figure 3-19: Example Harmonic Spectrum

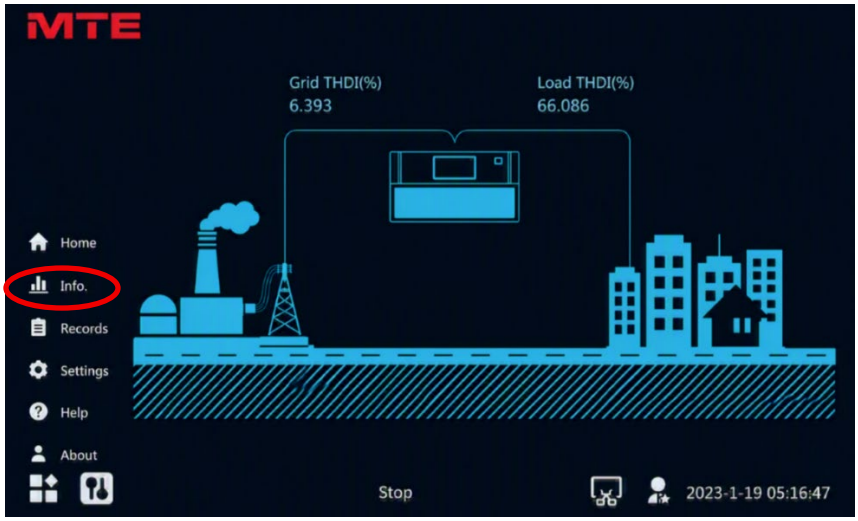
Do not run One-click Para. Set again — it is used once only, in Step 5d. The Comp. Rate and Mode values entered here take effect as they are entered, so no second download is required.

✓ **Checkpoint:** every harmonic order to be corrected shows its intended Comp. Rate and mode on the Harmonics tab, with no active alarms, before continuing to Step 6.

Step 6 — Power ON and Verify (All Units)

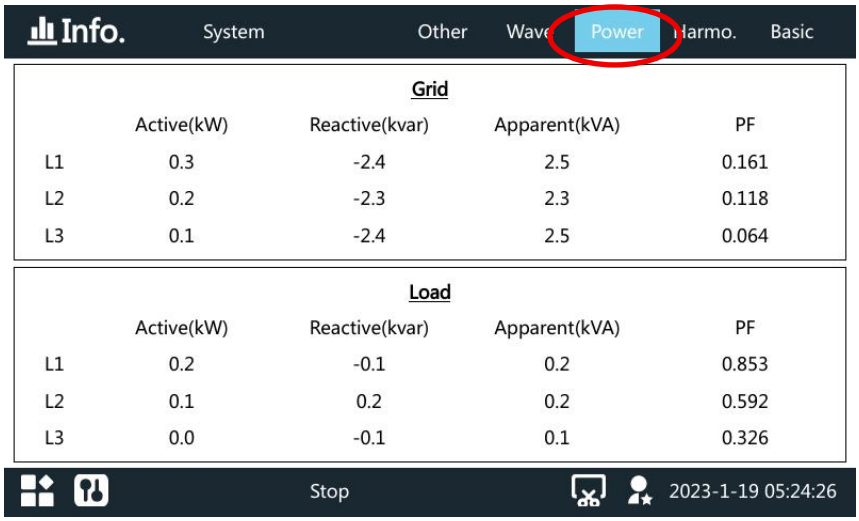
On the 7" HMI: Navigate to the Info. Tab using the lower left icon, .

Figure 3-20: Power On Screen



Info. → Power tab — Grid Active(kW) must be positive on all three phases before starting.

Figure 3-21: Info/Power Screen



Grid

	Active(kW)	Reactive(kvar)	Apparent(kVA)	PF
L1	0.3	-2.4	2.5	0.161
L2	0.2	-2.3	2.3	0.118
L3	0.1	-2.4	2.5	0.064

Load

	Active(kW)	Reactive(kvar)	Apparent(kVA)	PF
L1	0.2	-0.1	0.2	0.853
L2	0.1	0.2	0.2	0.592
L3	0.0	-0.1	0.1	0.326

If the kW is negative, then CTs are most likely placed backwards.

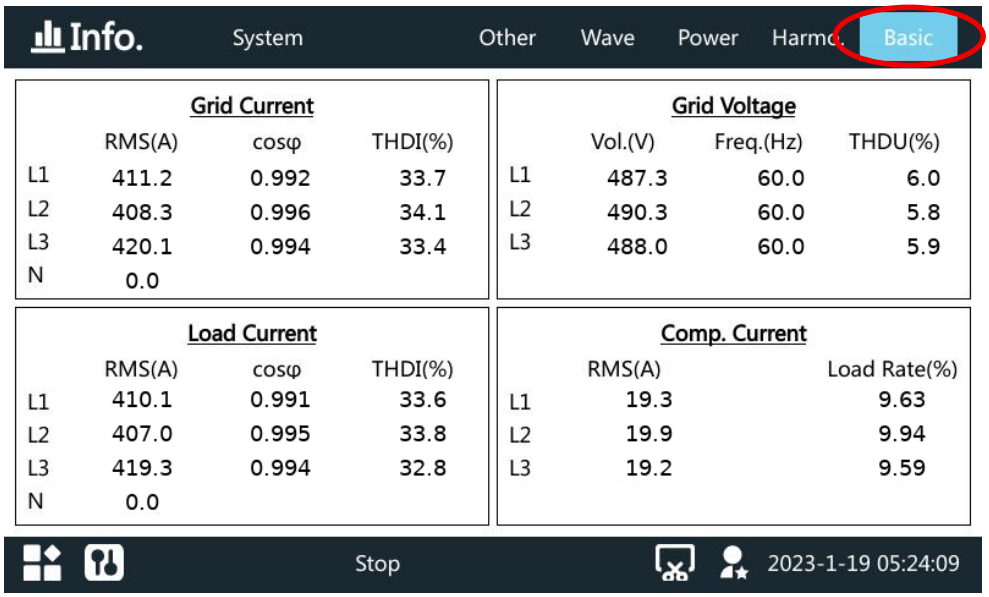
Info. → Wave tab — live grid voltage waveforms for L1/L2/L3; use the three dropdowns to select which trace each channel displays.

Figure 3-22: Info/Wave Screen

Optional: if you want to view the waveforms, use the three dropdowns to select L1, L2, and L3. Nothing on this tab needs to be verified before starting.

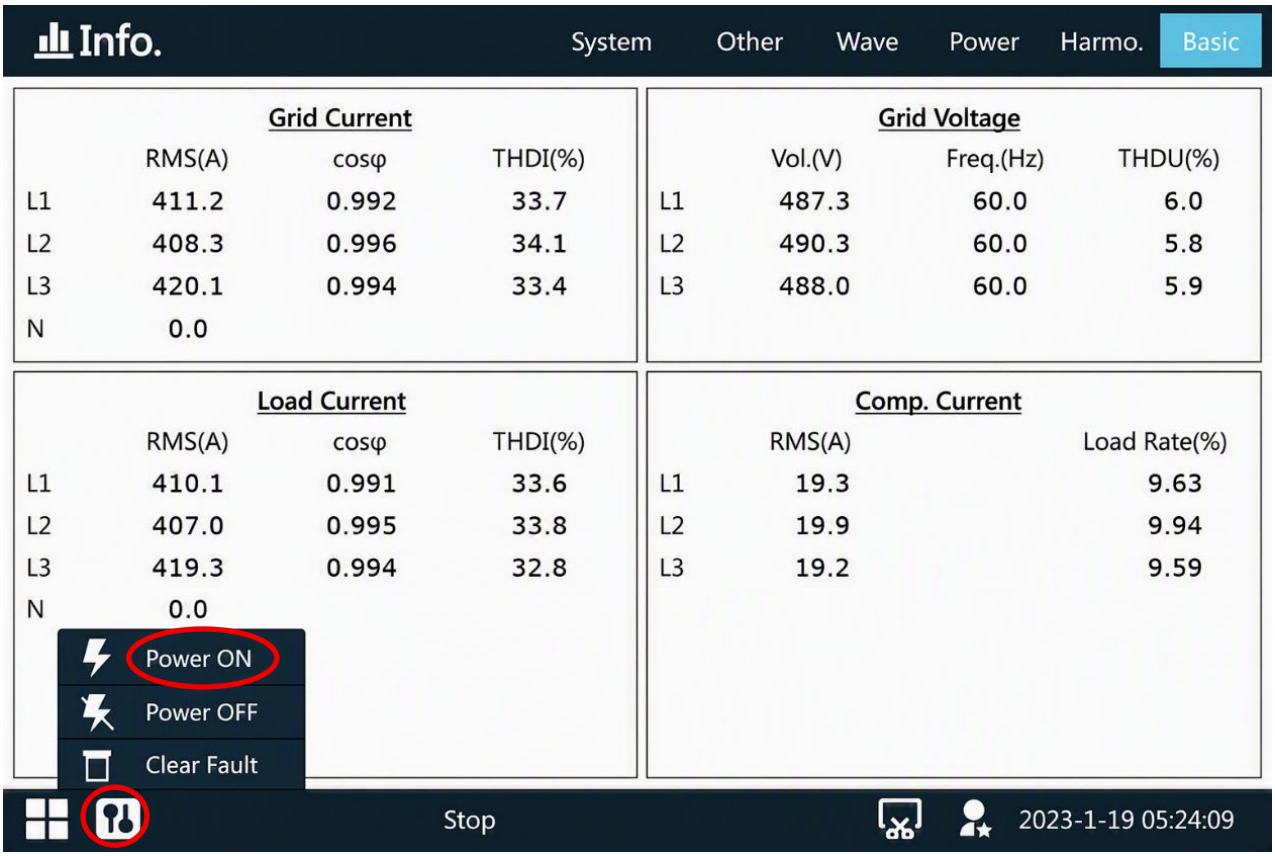
Info. → Basic tab — use this tab to monitor performance.

Figure 3-23: Info/Basic Screens



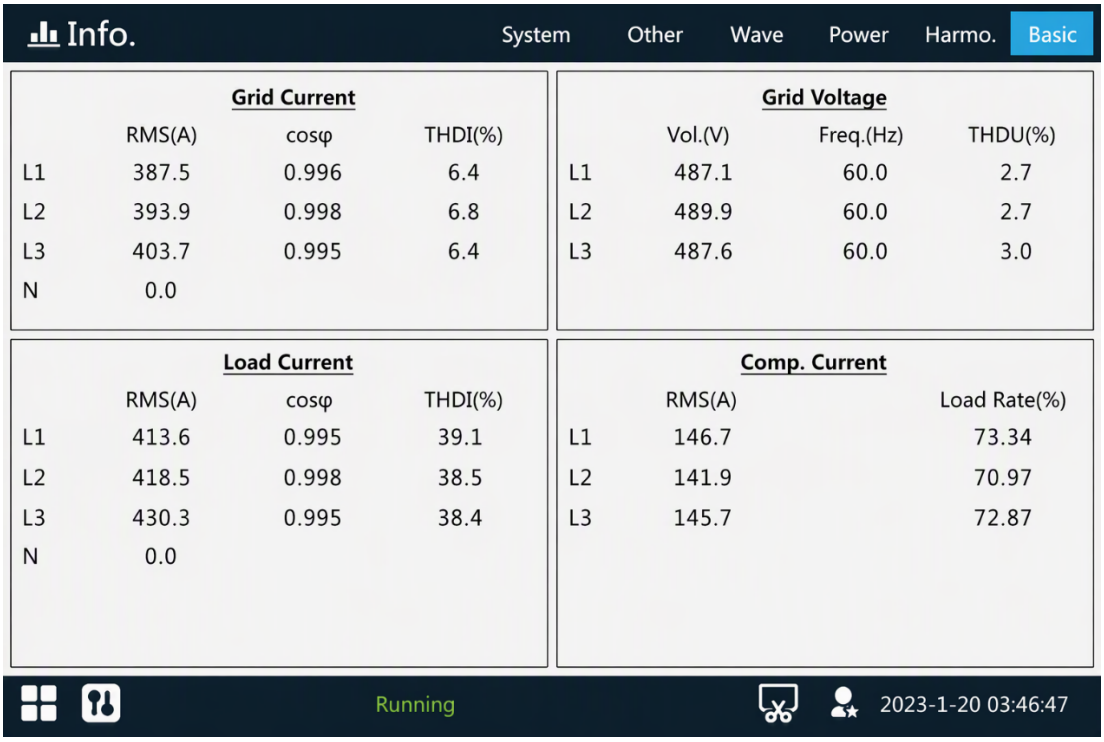
On the Basic tab, watch per-module output current (every module should be contributing), unit load percentage, module temperature, and Grid vs. Load THDI. In Sequential mode the modules should share current evenly as load rises.

Slider Icon → Power ON
The unit will now attempt to power on.



At start-up the output current ramps over several seconds and Grid THDI should begin to fall. If the unit alarms or trips, note the alarm code and re-check Total Capacity, CT Ratio, and CT Location (Step 5b) and the harmonic settings (Step 5e); also confirm no CT secondary is open.

Unit performance after running



Info. System Other Wave Power Harmo. Basic

Grid Current	RMS(A)	cosφ	THDI(%)
L1	387.5	0.996	6.4
L2	393.9	0.998	6.8
L3	403.7	0.995	6.4
N	0.0		

Grid Voltage	Vol.(V)	Freq.(Hz)	THDU(%)
L1	487.1	60.0	2.7
L2	489.9	60.0	2.7
L3	487.6	60.0	3.0

Load Current	RMS(A)	cosφ	THDI(%)
L1	413.6	0.995	39.1
L2	418.5	0.998	38.5
L3	430.3	0.995	38.4
N	0.0		

Comp. Current	RMS(A)	Load Rate(%)
L1	146.7	73.34
L2	141.9	70.97
L3	145.7	72.87

Running 2023-1-20 03:46:47

Fine tuning: if one harmonic order remains high, adjust that order's phase angle in small increments per Step 5e (open loop only) and confirm the current distortion for that order improves.

- Verify on the Info. tab that Grid Current THDI reads well below Load Current THDI and that every module shows output current.

Questions: Contact MTE Applications Engineering, or IT Helpdesk (helpdesk@mtecorp.com) for document access issues.

4. TROUBLESHOOTING

For common failures some failures and alarms can be solved by the user on site. If it can't be resolved, please contact MTE.
The failures caused by improper use, such as CT cable reverse, CT polarity error, power cable phase sequence error and parameter setting error, can be found by checking the data in the power on process.
For poor compensation effect and no alarm information, please contact MTE.

Table 4-1: Troubleshooting Guide

Alarm	Common cause	Solution
Inverters short-circuit fault	Short-circuit, the current is beyond the tolerant range of SIC MOSFET	Contact MTE engineer
Output current abnormal	The load current changes too fast Resonance	Check if the current load changes fast when the alarm appears. If so, use password '654321' to enter the setting, change 'Comp. mode' to sequential, change 'Input current abnormal' to 'Disable' If the alarm is caused by resonance, please refer to resonance debugging manual and contact MTE
Inverters overheat	The environmental temperature is high. Ventilation is blocked. Fan is broken.	Check if the ambient temperature is over 40℃ Check the air flow way of module Check whether all fans are working. Check whether the setting parameter 'Temperature derating' is enabled.
CT ratio setting error	The current load is bigger than the rated current of CT CT wiring is wrong	Check whether we choose the correct size of CTs. Check the CT cable wiring
Inverter overload	The module faulty alarm Resonance	Try to click 'Clear Alarm' on the HMI to see if the alarm will disappear If the alarm is caused by resonance, please refer to resonance debugging manual and contact MTE
Frequency abnormal	Input voltage frequency is beyond range [45Hz~62.5Hz] Frequency is over range. Faulty alarm	Check if the grid frequency is beyond the range: 45-62.5Hz Try to click 'Clear Alarm' on the HMI to see if the alarm will disappear
Input voltage abnormal	Voltage is beyond module tolerable range Wire connection error Fuse is broken	Check whether the voltage level is beyond the range of products. Check the connection of the power cable. If the voltage is normal and the cable connection is correct, please contact MTE engineer, it might need to check the internal fuse
Input phase sequence error	Phase sequence connects wrong	Check the power terminal connection

Alarm	Common cause	Solution
Monitor parameter setting fault	CT location is wrong Total capacity setting is wrong	Check if the CT location setting is correct Check if the total capacity setting is correct
Emergency shutdown	Emergency button is pressed down the emergency button is normal closed type The connection of EPO is not correct. False alarm of monitor. The module is broken	Check if the emergency button is pressed down Check if the emergency button is normal closed type, if so, please change to normal open type Try to click 'Clear Alarm' on the HMI to see if the alarm will disappear If all things are fine, please contact MTE engineer
Communication failure	RS485 cable connection is wrong Dip switch setting error	Check the cable connection of RS485 Check if the dip switch is correct
	communication parameter setting is not correct Slaver modules are too many, communication delay. If the product has WIFI module inside, check if the local address setting matches with dip switch setting	Check the communication setting parameters on HMI (Local address, baud rate)
Offline fault	The dip switch setting error Internal cable wiring is not connected well.	Check the dip switch, change it to correspond number. The setting of dip switch could be referred to user manual if the dip switch setting is correct, please contact MTE engineer.
Can Bus Error	Incompatible group of parameter settings (Supply CT Location with Mode 1 Harmonics)	Use preferred settings groups (Sequential – Supply Side – Mode 2) OR (Intelligent -Load Side -Mode 1)

5. APPENDICES

Appendix I: Customer Readiness Checklist

Complete this checklist before the scheduled commissioning visit to confirm the site, equipment, and personnel are ready for a safe and efficient startup.

Completed	Checklist Item
☐	Confirm customer equipment is operational and safe to energize
☐	Confirm load can be adjusted during commissioning
☐	Confirm IL / Isc information is available and verified
☐	Confirm that qualified electrician is onsite
☐	Confirm filter has been fully wired
☐	Confirm appropriate personnel are onsite
☐	Drive system representative available
☐	Controls / automation representative available
☐	Confirm access to HMI and system settings
☐	Confirm communication network details are available (if applicable)
☐	Confirm required PPE and safety procedures are in place
☐	Confirm commissioning schedule and points of contact

Notes / Open Items:

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_____

_____

Appendix II: Installation Checklist

Complete this checklist during installation to verify that all required wiring, connections, and safety items are finished before commissioning and startup.

Completed	Checklist Item
☐	Confirm unit is mounted securely and installation location meets clearance requirements
☐	Confirm incoming power wiring is complete and properly torqued
☐	Confirm CT wiring is installed correctly and polarity is verified
☐	Confirm CT placement matches approved one-line diagram
☐	Confirm grounding is complete and verified
☐	Confirm HMI connection is installed and operational
☐	Confirm communication wiring is complete (Modbus TCP/IP, Modbus RTU, CAN, etc. if applicable)
☐	Confirm E-Stop wiring and operation
☐	Confirm control power is wired correctly
☐	Confirm fan operation and airflow paths are unobstructed
☐	Confirm all covers, barriers, and safety guards are installed
☐	Confirm wire labels and terminations are identified
☐	Confirm no loose hardware, debris, or foreign material inside enclosure
☐	Confirm insulation and spacing meet applicable standards

Notes / Open Items:

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SyntriX AHF® Installation Guide	AHF-IG-E
Responsibility: Field Marketing Manager Approved By: C. Dillner ISO Section 7.2.3	

Revision	Date	Revision History	Changed By
001	09/23/25	New Document	---
002	09/18/26	Updated Version	CJD
003	10/15/26	Changed document part number from AHF-IG-E	CJD