

RELIABLE POWER FOR EVER

maxfine[®]



MLTS SERIES
LARGE POWER UPS

CE

TECHNICAL PARAMETERS

MODEL		MLTS 10 ÷ 800kVA
TECHNOLOGY	Low Frequency On - line double conversion	
INPUT	Nominal voltage	380/400/415V 3-three phase 4-wire
	Rated frequency	50/60Hz
	Input Voltage range	-25% ~ +20%
	Input Frequency range	45 ÷ 65 Hz
	Input Soft Start	0-100% 5-300 seconds settable
	Input Power factor	>0.98 (if harmonic filter is added) Above 400KVA >0.85
	Current harmonic distortion	<4.5% (if harmonic filter is added)
BYPASS	Permitted voltage range	+20% ~ - 40%
	Frequency	50/60 Hz ± 10%
OUT PUT	Inverter out put voltage	380/400/415V 3-three phase 4-wire
	Voltage stability	± 1% (steady status) ±3% (transient status)
	Frequency	50/60 Hz
	Mains power synchronization window	±5%
	Actually measured frequency accuracy (internal clock)	50/60 Hz ± 0.05Hz
	Output power factor	0.9 (output 90kW per 100kVA)
	Dynamic stability	±5% in 5ms
	Inverter Overload	At 0.9 power factor 110% ,125%,150% of the rated current for 1h/10'/1'
	Short circuit current from inverter	3Ph 1.6in for 5 seconds , 1Ph,2.9in for 5 seconds
	Maximum Bypass capability	1500% for 5ms,1000% for 100ms, 500% for 5 second
	Phase shift characteristic	With 100% balanced load <1° With 100% un balanced load <1°
	Total harmonic distortion (THD)	10-80kVA 100% liner load <3% non linear load <5% 100-800KVA 100% linear load <1% non linear load <3%
	RECTIFIER OUTPUT	Charger output voltage stability
DC ripple voltage		≤1%
SYSTEM	Operating temperature range	0°C ÷ +40°C
	Storage temperature	-25° ~ 55°C (inverter efficiency is up to 98%)
	System efficiency (full load)	up to 94%
	Relative humidity	<95% non condensing
	Maximum operating height	≤ Elevation 1000m. for elevation above 1000m. derate by 1% for every increase of 100m
	Acoustic noise @ 1 metre	60-70dB
	Protection level	IP20

MODEL	POWER kVA / kW	UPS DIMENSION D x W x H mm	Net Weight Kg	Shipping Kg	INPUT / OUT PUT
6MLTS 10K	10 / 9	800 x 570 x 1195	217	272	III / III
6MLTS 20K	20 / 18	800 x 570 x 1195	273	328	III / III
6MLTS 30K	30 / 27	800 x 570 x 1195	316	371	III / III
6MLTS 40K	40 / 36	800 x 570 x 1195	330	385	III / III
6MLTS 60K	60 / 54	760 x 880 x 1600	483	553	III / III
6MLTS 80K	80 / 72	760 x 880 x 1600	525	595	III / III
6MLTS 100K	100 / 90	805 x 1160 x 1600	800	890	III / III
6MLTS 120K	120 / 108	805 x 1160 x 1600	903	993	III / III
6MLTS 160K	160 / 144	945 x 1400 x 1900	1219	1349	III / III
6MLTS 200K	200 / 180	945 x 1400 x 1900	1425	1555	III / III
6MLTS 300K	300 / 270	1040 x 1640 x 1900	1800	1950	III / III
6MLTS 400K	400 / 360	1040 x 1640 x 1900	2050	2200	III / III
12MLTS 500K	500 / 450	1040 x 2800 x 1900	3700	3950	III / III
12MLTS 600K	600 / 540	1040 x 2800 x 1900	4500	4750	III / III
12MLTS 800K	800 / 720	1100 x 3900 x 1950	6400	6700	III / III

Product specifications are subject to change without further notice.



MLTS 10 - 800K

**PRODUCT
FEATURES**

EFFICIENT ENERGY - SAVING ENVIRONMENTAL - PROTECTION INNOVATION:

MLTS series UPS , one of the top European products with nominal capacity from 10 KVA to 800 KVA. It has application in key equipment for the power system protection, could provide high quality power, with high level of availability and scalability, and invest to minimize Total Cost of Ownership (TCO).

APPLICATION :

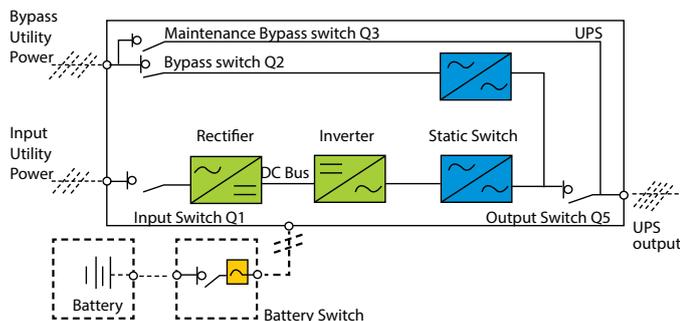
Mainly used in large IDC rooms, bank/securities settlement center, communication network management center, semi-conductor product lines and large automation production with it's control system. According to the special needs of users was improved, used in large sports venues, conference room, theater, highway and railway tunnels metal halide lamp lighting system.

- Use advanced 6th generation DSP and full digital control technologies to realize higher system stability.
- Output power factor is 0.9, carrying capacity than conventional UPS with 10% above, as users reduce investment cost.
- Advanced distributed active parallel technology can realize parallel operation of 6PCS UPS units without the need of centralized bypass cabinet.
- 6-inch extra large LCD that can display 12 languages (English, French, Spanish, Russian, Chinese, and so on)
- Extra wide input voltage and frequency range make it adapt to severe power grid environment.
- Standard input/output filter improves the system EMC performance.
- Extra strong capability to withstand output overload and short circuit, ensuring the system stability and system safety under extreme conditions.

- Layered independently - sealed ventilation channel and surplus fan, circuit boards with protective paints and a dust filter embedded make it highly efficient to dissolve heat and protect the product effectively under severe environment.

EXCELLENT ELECTRICAL PERFORMANCE:

- Online double transform structure, double DSP control technology MLTS series UPS Using real online double transform structure. This architecture is currently the best to solve the power structure. The framework can almost completely solve all the power problems, such as power utility high and low voltage, voltage instantaneous fall, reduce oscillations, high voltage pulsed, voltage fluctuation, surge voltage, harmonic distortion, clutter interference and frequency wave power supply problems. It also provides continuous, stable and pure sine wave power for the load.
- Adopt double DSP high speed digital signal processing chip in collaborative central CPU microprocessor common to the system control, feedback, measuring, display, communication etc. for all-round real-time processing, and make the system parameters keep the same when environment (temperature, humidity, noise etc.) changes. Even if the input signal distorted, it can also provide accurate current, voltage, frequency and waveforms output. This technology has powerful control functions, thus realizing the computer system's comprehensive power management.



MLTS SERIES WORKING PRINCIPLE:

- MLTS series UPS use AC-DC-AC converter. The first level transform (AC-DC) adopts SCR 3-phases full controlled rectifiers. 3-phase AC input voltage transform into stable DC bus voltage. Rectifier hold concurrently and charger function, and adopts the advanced temperature compensation technology, so that prolong battery life. Inverter main power adopts high power insulation gate bipolar transistors (IGBT) as its inverter unit. Controller adopts advanced space vector pulse width modulation(SVPWM) technology. And the DC Bus voltage inverter back to AC voltage.
- Rectifiers and inverter work at same time when the Utility Power is normal and at the same time to supply power to the load and to the battery charge. When the utility power anomalies, rectifier stop working, turn by the battery by inverter to power supply to the load. If the battery voltage drops to discharge the termination voltage, and utility power hasn't returned to normal, UPS will shutdown (if two utility power different source and bypass the normal, system will let bypass supply power). Battery discharge and terminate voltage already preset. Inverter fault or overload, still can have external communications bypass

through bypass switch Q2 and static bypass to supply power for the load. In addition, if UPS need maintenance or repair, UPS can through internal manual control maintenance bypass switch Q3 to supply power to the load. UPS normal operation, except maintenance bypass switch, all other switches are closed.

SUPER OUTPUT OVERLOAD CAPACITY:

Inverter power with a strong output overloads capacity, archive "Inversion state priority" thinking. As we know, to measure the reliability of UPS power supply one important indicator of the level that's strong anti-output overload. This means that when user put large non-linear load and form transient surge overload output situation, not only ensure the UPS inverter is intact, but will not overload the inverter output due to poor Bypass switch AC power supply situation. The reason is that when the UPS power supply in the implementation of the inverter AC bypass switch operation period, the City regulator may not have a regulated power supply and inverter power output characteristics of the transient voltage difference between too large to damage the UPS.

The typical overload capacity of ups as follow:

- Three phases ups working:
 - 110% rated load for one hour. 125% rated load for ten minutes. 150% rated load for one minute
- Single phase ups working: 200% rated load for 30 seconds UPS
- Will continue to maintain the load by the inverter power supply status.

(Note: output power factor is 0.9)

WITH A STRONG ANTI-STEP OF LOAD AND SHORT CIRCUIT OUTPUT CAPABILITY:

UPS power supply operation in the worst working conditions encountered by the user in the UPS output load 100C rated load for the input or the removal operation. The most serious situation is that UPS output is short circuit. Since the maxfine UPS, configure a unique design of the output current limiting circuit. Even if the user inadvertently caused by the output short-circuit fault, it's UPS inverter will not be damaged. Typical UPS output capacity of short circuit:

- Three-phase work, the output current is limited to 160% nominal output current, 5 seconds.
- Single-phase operation, the output current is limited to 290% nominal output current, 5 seconds.

SUPERIOR ABILITY WITH THREE PHASE UNBALANCED LOAD:

For the three phase in/three phase out UPS, even with a peak in the ratio (crest ratio) is 3:1 in the non-linear loads like computers, they can't reduce the rated output power conditions and provide users with distortion less than 3-5% high-quality sine wave power. Moreover, as the machine is equipped with adaptive equilibrium adjustment circuit, when followed 100C unbalanced load (one phase no-load, two phase full load), they can ensure that the three-phase voltage difference than 2C, and phase difference between the $120^\circ \pm 1^\circ$ ranges. This indicator was higher than similar products of other companies.

N + X REDUNDANT DESIGN OF AUXILIARY POWER SUPPLY:

Controlled circuit of auxiliary power for each provide reliable, stable power protection so that ensure all the control circuit to work properly. To ensure the normal operation of UPS systems play a key role. MLTS Series UPS's auxiliary power adopt 1+1 redundancy design, when one of the auxiliary power failure, can be continued by another auxiliary power supply. UPS continue to operate normally, while the LCD screen displays this warning message.

UNIQUE BATTERY PROTECTION FUNCTION:

Battery and UPS by connecting an external battery switch, the battery switch is a "three-stage" DC switch than can be manually closed, and has a control circuit controlled by the UPS electronic tripping device. Effectively reducing the past due to battery leakage or short circuit caused the fire risk for the safe operation of the engine room has provided a guarantee. Battery switch has the following characteristics:

- Battery isolation, safe and reliable;
- Short-circuit protection;
- In case , battery voltage cause the inverter lock, the switch off
- Automatically to avoid battery discharge damage;
- Fitted with a remote emergency stop button, emergency stop
- Button can be used remotely disconnect the switch; Protection from misuse

EASY MAINTENANCE OF STRUCTURE DESIGN:

Having user-friendly control panel modular inline graphic design, to ensure reliable connection between the plug plates, the connection is configured with a connector locking mechanical "locking" device. Users simply open the cabinet door that can be observed a glance at the control panel of the UPS "self diagnosis status monitor the work of the state. As a result, users can quickly access to nearly 70-90 species of fault alarm indication, and improve the maintainability of this UPS.

EFFICIENCY, ENERGY-SAVING, ENVIRONMENTAL PROTECTION DESIGN THE EFFICIENCY OF MACHINE IS UP TO 94%:

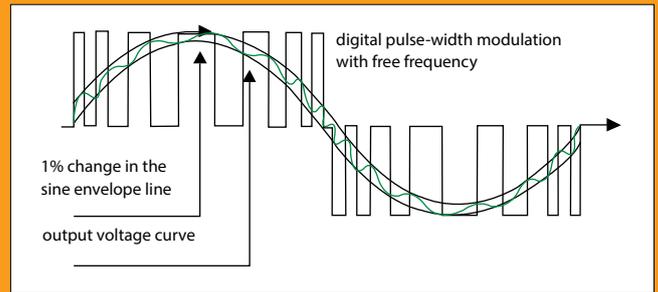
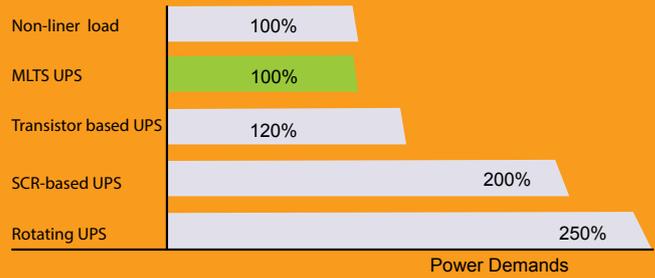
Overview of large UPS equipment, efficiency, impact significantly on energy costs that percentage of minor differences can save considerable operating costs. Our design team from all side improve efficiency and make a lot of effort. Especially for the actual operation of the load rate (example : 50% of the load operation, etc.) were carefully considered.

UPS LOAD POWER	400 KW		
Efficiency between the ups with others	4%	3%	2%
Save power per hour (KW)	16	12	8
Save time per year (H)	8760	8760	8760
Save power per year (KWH)	140160	105120	70080
The electricity price (USD)	0.2	0.2	0.2
Save fees of electricity per year (USD)	28032	21024	14016
Save fees for five years (USD)	140160	105120	70080

Note: This series of ups machine efficiency is 94%, ECO mode 98%, other brands of domestic power ups efficiency of the unit segment is 80-90%

CLEAN STABLE OUTPUT WAVEFORM:

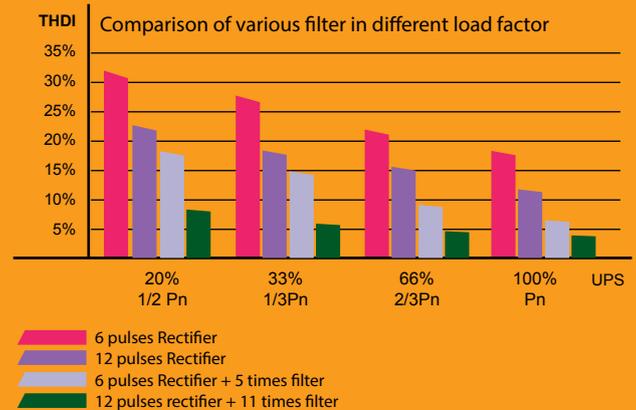
Output voltage curve 1% change in the sine envelope line digital pulse-width modulation with free frequency 250% 200% 120% 100%. Rotating UPS SCR based UPS, transistor-based UPS, MLTS UPS power demands non-linear load of 100% to ensure the nonlinear load voltage distortion is equal or less than 3% of the min capacity of kinds of ups need:



HIGH INPUT POWER FACTOR LEVEL, HARMONIC DISTORTION CANCELLATION: SAVE COST OF ENERGY CONSUMPTION, REDUCE POWER POLLUTION:

As well-known, the rectifier filtering load (such as computer, communication equipment, appliances or general UPS) was introduced to power grid largely and the power grid will be polluted in higher harmonic current that caused by pollution through the whole power supply system. Over current that flow past mid line and motor load are heat abnormally. To deal with those problems, we provide some solutions to eliminate the harmonic pollution so that ensure quality of power reach the standard of Green power :

MLTS series are adopted optional input filter and 12 pulses rectifier filter, the solution improves the input power factor to above 0.95, reduce the input harmonic current to 10%.



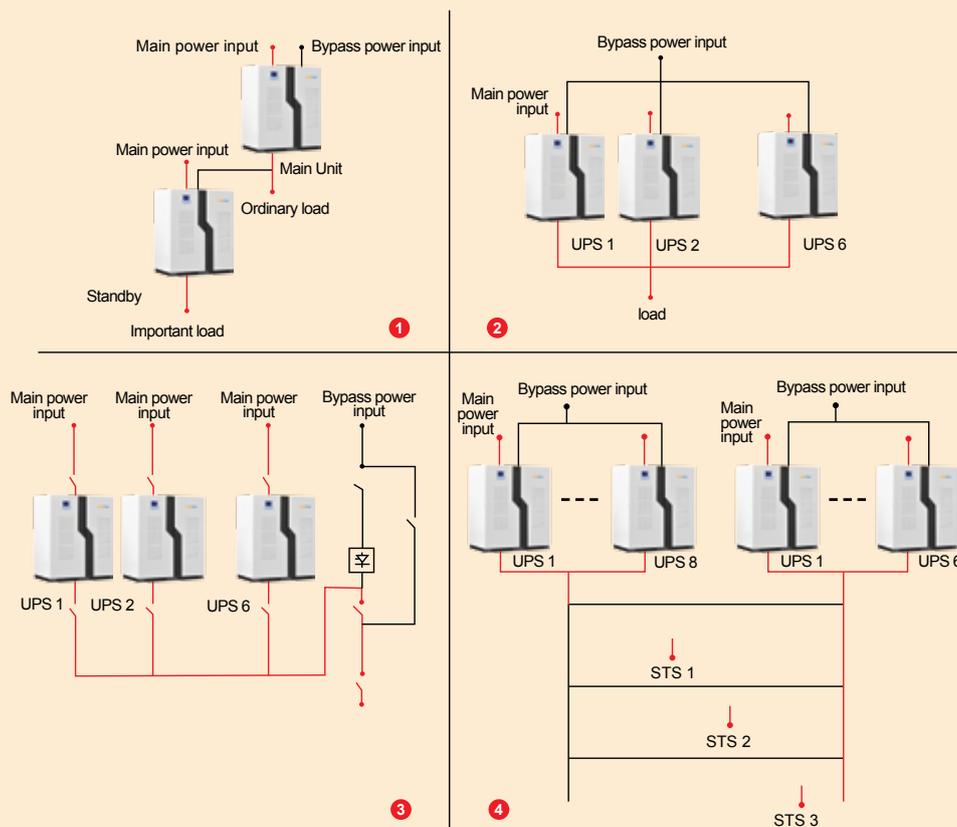
It is true that the 5 times filter is the largest in 6 pulses rectifier, and it can retrofit filter 5 times to restrain harmonic, 11 times is the largest in the 12 pulses rectifier and it can retrofit filter 11 times to restrain harmonic. Correlation table for harmonic after retrofitting filter as follows:

Harmonic time	6 pulses rectifier	6 pulses rectifier +5 time filter	12 pulses rectifier	12 pulses +11 times filter
5	32	2	1	1
7	3	1	1	1
11	8	7	9	3
13	3	2	4	2
17	4	3	1	1
19	2	2	1	1

Harmonic suppression impact obvious with filter

**CORE OF HIGH AVAILABILITY CONFIGURATION
GREAT PARALLEL OUTPUT FEATURES**

- There are frequency busbar and current busbar in parallel control system, they can control each UPS phase relation and flow equalize low of output feature. So the system not only ensure each UPS located in general UPS power supply can share load current, but also it can reduce the circulation may be happened in parallel system to zero.
- Moreover, because of sensitive circulation survey, it can survey that the operative mode of UPS power supply system constantly and with high reliability (MTBF reach to 1 million hours), it is the top level in the similar type.



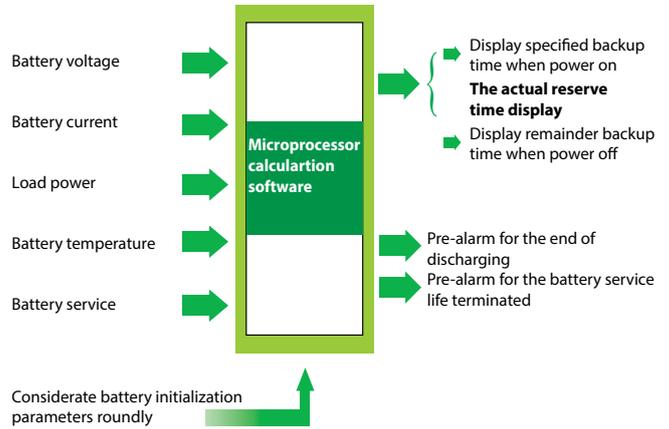
HIGH RELIABLE UPS POWER SOLUTIONS:

- Hot back-up redundant system. Adopt two sets of high reliable MLTS series UPS, spare UPS in series bypass of the main UPS. Main and spare UPS can work alternately.
- N+1 directly parallel redundant system. Up to six modules in parallel. Any one drop out when it fault. Load power supply was not affected, Auto bypass and maintenance bypass are built in each UPS.
- N+1 concentration bypass parallel redundant system. Many MLTS series UPS in parallel, Any one can dropout when it fault. Load power supply was not affected. No bypass in the each interior, adopts concentration bypass.
- Parallel double bus system with STS static transfer switch. Double bus system adopts redundant UP design, improves system's reliability and availability. The rate is either N or N + 1 for each bus UPS capacity and the relative load.

ABUNDANT MANAGEMENT INTERFACE CONVENIENT FOR OBSERVATION AND EASY-TO-USE DISPLAY SYSTEM

- By LED light emitting diode constitute the UPS power simulation operational process chart with LCD screen that form the people-machine a conversing menu which display UPS operation parameters and alarm/fault. This operation control of the display system is readable and easy to operate and see. Due to the design high-tech microprocessor monitoring technology, advanced "Self-diagnosis" management system and built in storage unit, users can be easily obtained as follows UPS operation information
- This information is based on "control simulation screen". The words on the display and sound alarm a forms simultaneously to the user notification, and also shows which happened alarm/fault the properties, types and time of occurrence. Obviously, this is very helpful in the user for failure analysis and exclusions, so that greatly improve UPS maintainability.
- Using the programmable automatic test software for UPS itself and batteries executes preventive functional testing, and shows the remaining battery capacity. This is helpful to discover in time and eliminating fault hidden trouble.
- Using RS. 232 or RS. 485 and auxiliary power supply monitoring software, in our company UPS systems, the UPS in remote parameter display the microcomputer and computer terminals on the network. When abnormality occur, it can also display historical data and fault occurred frequency statistics in the computer terminal for analysis.

- Programmable battery monitor software can execute self-diagnosis test regularly and display battery charging capacity and backup time automatically
- Supply battery charging system with temperature compensation and automatic regulation functions.
- Equipped with battery overvoltage charging protection and automatic equalized charging timing controller.



Initial voltage E_0 , initial internal resistance R_0 , initial temperature T_0 , Initial capacity C_{10} , discharge coefficient k_1 - k_2 , charging coefficient a_1 - a_2 , Quantity for series connection and parallel, cut-off voltage.....

PERFECT BATTERY MANAGEMENT SYSTEM

- High performance battery management consists of charging technology with "constant current then constant voltage" features and battery monitoring software with strong development function. Excellent performances for the regulate system as follows:
Charging current-limiting technology is adopted, overcurrent charging will not appear.
- To refuse discharge deeply, it adopt microprocessor monitoring technology that can adjust threshold level of battery's discharge voltage automatically according to user's real capacity.

UNIQUE OPTION, ONE-STOP SERVICE

- SNMP card • Parallel card • Dry contact card • C class lighting protection case • Outlet option • Bypass flow equalize inductance • Battery temperature transmitter • JBUS/MODBUS interface card • UPS generator room signal adapter • 5 times harmonic or 11 times harmonic filter • Load busbar synchronization (LBS) cable

LCD DISPLAY

A. UPS Information

- UPS name
- UPS model
- Current time and date
- Local number for parallel UPS system
- UPS warning information

B. Live data

Parameters as below shall be displayed in the LCD screen. All the displayed electric parameters shall be updated one time per 5 seconds. The error is less than 2% between display number and the real number.

• Main circuit input

- Three phase main circuit input voltage
- Three phase main circuit input current
- Three phase main circuit input frequency
- Three phase main circuit input power factor

• Bypass input

- Three phase main bypass input voltage

Bypass input frequency

• UPS output

- Three phase output voltage
- Three phase output current
- Three phase power factor
- Three phase output frequency

• Load information

- Three phase load percent
- Three phase active power, apparent power
- Load power factor

• Battery

- Battery voltage
- Battery current
- Battery backup time prediction
- Environment / temperature
- Battery capacity

• Load for starting up

- Three phase total apparent power
- Three phase total active power
- Three phase total reactive power

C. Records for historical events

Update records for Historical events immediately when the fault occurs. It can records 10000 historical events at the most.

D. Menu language

12 languages

E. Set information is permitted

- Date format
- Date and time
- Communication address
- Communication mode
- Com 1 baud rate
- Com2 baud rate
- Com3 baud rate
- Telephone

F. Control interface

- Start battery maintenance self testing
- Start system self-testing
- End up testing



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