



# MASTER CONTROL SYSTEMS, INC.

## MODEL MBC7

## PRECISION-AUTOMATIC FLOAT BATTERY CHARGER



This Charger has been specifically designed for unattended applications requiring a highly regulated float charger. It will carry continuous or intermittent loads up to 100% of the charger rating.



### These Chargers provide:

- Automatic Float Operation—output is accurately regulated to meet battery demand.
- Current Limiting at rated capacity
- A.C. Line Voltage compensation
- D.C. Voltage regulation
- Two Rate, float-equalize toggle switch
- Completely solid state control

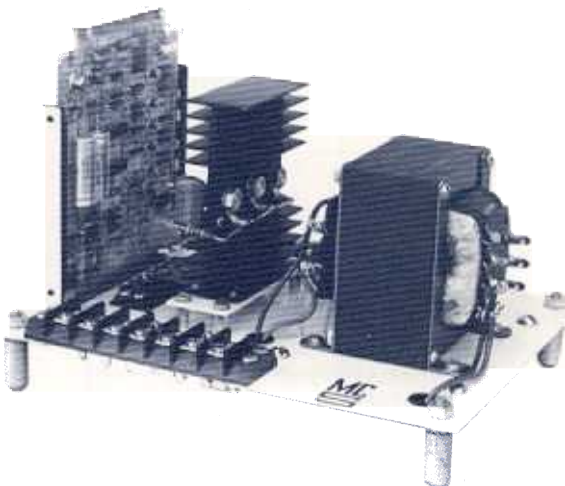
### FLOAT CHARGER SERVICE

A battery which is continuously connected to a bus, is said to "float" when the voltage of the charger is only slightly greater than the open-circuit voltage of the battery.

Chargers used for this type of service are termed "Float Chargers." When there is no load on the system, they supply only enough current to replace the power lost thru the internal leakage of the battery. When a load is applied to the system, a properly designed float charger will pick up this load, up to 100% of its rating. Any excess load will be supplied by the battery, but when the excess load is removed, the charger will continue to operate at a higher rate so as to recharge the battery.

Properly floated batteries provide an un-interruptible power supply for protective equipment, such as fire alarms, switch gear, etc. In the event of A.C. power failure, the battery will supply the total demand. Upon power restoration, the charger will supply the total demand with any excess, up to maximum charger rating, going toward charging the battery.

In order for a system of this type to operate at maximum efficiency, the voltage output of the charger must be very carefully controlled. The Model MBC7 Charger meets all of the above criteria.



Chassis Mounted

## CHARGER OPERATION

The model MBC7 is a completely solid state device, utilizing SCR control for regulating the charge current.

The voltage control monitors battery voltage and compares it to a double regulated reference voltage. This results in output voltage regulation of  $\pm 0.2\%$  with line variations of  $\pm 10\%$ . Operational amplifiers are of the high gain type so that output voltage regulation is within  $\pm 0.2\%$  from no load to full load. A current amplifier monitors the output current and compares it to a reference voltage so as to give precise current limiting.

## REMOTE SENSING

To utilize the full capabilities of the MBC7 Charger, remote sense terminals are provided so that the exact battery terminal voltage can be monitored. This eliminates charge lead voltage drop errors, increasing accuracy and reducing charge time.

## CURRENT LIMITING

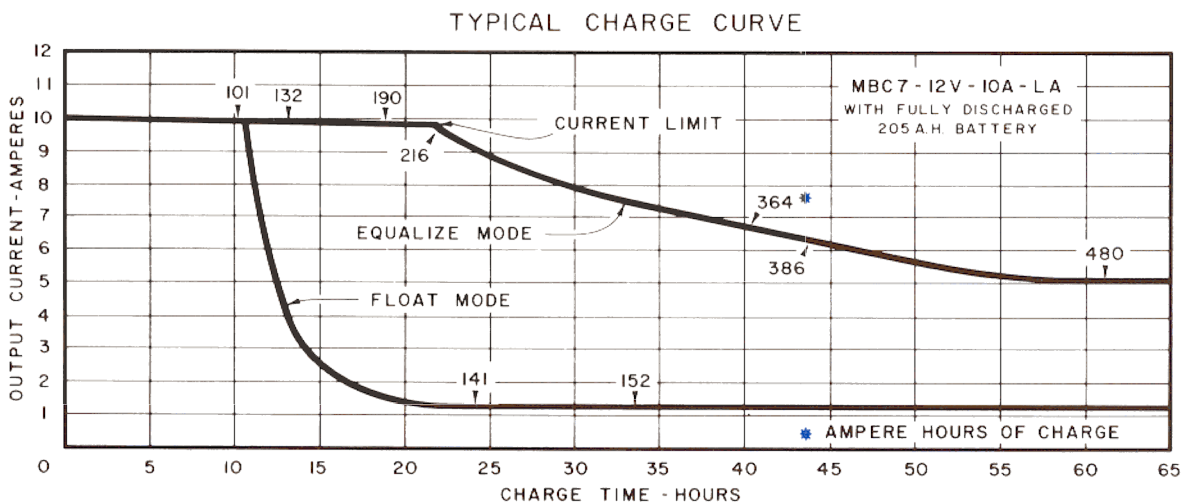
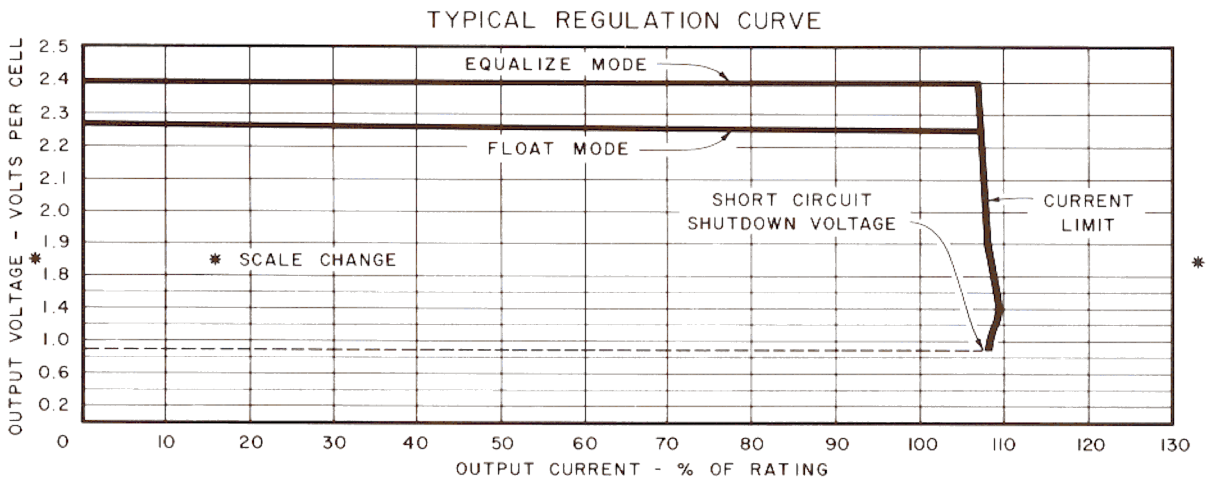
Overloads or even short circuits on the output of the charge will not damage the charger since it current limits at rated capacity. Charger is polarity protected so that it will not be damaged if battery polarity is accidentally reversed.

## EQUALIZING FEATURE

Floated batteries have a tendency to develop differences (inequalities) in the charge level among the individual cells. This condition can be corrected by applying an "equalizing" charge at periodic intervals by raising the charger output voltage by several tenths of a volt per cell for a specified time. A manual toggle switch is provided for this purpose.

## POWER FAILURE

The charger will not discharge the battery, even on extended periods of power failure.





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# PRECISION-AUTOMATIC FLOAT BATTERY CHARGER

## Construction Features:

- Voltmeter and Ammeter are standard
- Both A.C. and D.C. Fuses are provided
- All semiconductors and integrated circuits are silicon and hermetically sealed
- Modular construction (Plug-in printed circuit regulator board)
- Remote sensing terminals are provided
- Float and equalize voltage levels are factory preset for the specific battery type.
- No transformer tap settings are required
- Charge output is completely isolated from A.C. power

## CHARGER PERFORMANCE SPECIFICATIONS

MODE SWITCHING: Front—Panel Toggle Switch.

INPUT LINE REQUIREMENTS: Nominal 117V. A.C. at 60 Hertz.  
Range of input voltage: 105-125V. A.C.

RECOMMENDED BATTERY CAPACITY: 5.0 to 23.0 Times rated current.

The following specifications apply at 117-125V. A.C. input at 25°C in either mode.

MAXIMUM OUTPUT CURRENT: Current limited at rated current  $\pm 10\%$ .

TEMPERATURE STABILITY: 0.088%/°C. Maximum.

OPEN CIRCUIT LEAKAGE: 50mA Maximum.

OUTPUT VOLTAGE LIMITS: Nominal Value (Factory Set)

BATTERY TYPE:	LA (1.275 S.G.)	FL (1.220 S.G.)	NC (High rate)
EQUALIZE:	2.40 V/Cell	2.29 V/Cell	1.55 V/Cell
FLOAT:	2.25 V/Cell	2.17 V/Cell	1.42 V/Cell

VOLTAGE REGULATION—LOAD:  $\pm 0.2\%$  Maximum—No Load to Full Load.

VOLTAGE REGULATION—LINE:  $\pm 0.2\%$  Maximum for 10% line change.

OUTPUT DRAIN (A.C. INPUT OFF): 10mA Maximum.

OUTPUT TERMINAL VOLTAGE FOR CHARGER SHUTDOWN (WITH SHUTDOWN OPTION): + 4.0 Volts Maximum.

## MALFUNCTION ALARMS

Master Controls low voltage alarm option (LVA) provides a set of dry contacts, rated for 10 amperes @ 115V. A.C. which transfer in event of power failure, low battery voltage and loss of charger output. The low voltage sensing point is below the normal float voltage but above the normal full charged open circuit voltage. Upon loss of charge current the battery voltage will drop from float circuit to open circuit voltage causing the relay contacts to transfer. There will be some delay in sensing loss of charger output, depending on the battery load. Sensing A.C. power failure or blowing of the input fuse(s) is instantaneous. This scheme is recommended where battery loads are normally less

than charger rated output. Larger loads will cause an alarm.

Master Controls alarm option CFA operates in the same manner as the LVA above except that the low voltage sensing circuit is locked out during periods of high charge currents, thus preventing false alarms under these conditions. This scheme is recommended where battery loads occasionally exceed charger rated output and are not to cause an alarm.

High voltage alarm (HVA) can also be supplied where the application necessitates its use.

## Sample Specifications

The battery charger shall be a Master Control's Model MBC7 or approved equal. It shall be a completely solid state device, utilizing SCR control for regulating the charge current. The charger shall have two ranges (equalize and float). Voltage setting for both ranges shall be factory preset for the specific battery type and shall not be field adjustable. It shall maintain its rated output voltage within  $\pm 0.2\%$  with A.C. input variation of  $\pm 10\%$ . Output voltage regulation between no load and full load shall be within  $\pm 0.2\%$ .

## The Charger shall have:

- Automatic Overload Protection (Current Limiting)
- Semiconductors and integrated circuits to be silicon and hermetically sealed
- D.C. Voltmeter and Ammeter
- Fused A.C. input and D.C. output
- Shutdown when battery is fully charged



## Ordering Information:

- State Master Control's Model number
- A.C. input voltage, frequency and phase
- Number and type of battery cells
- For Nickel Cadmium specify whether high or low rate type
- Specific gravity of lead acid battery
- Ampere Hour Capacity of Battery
- Continuous D.C. load
- Allowable Recharging Time from full discharge
- Indicate application i.e. Stationary, Mobile or Marine

## MODEL DESIGNATION

MODEL NUMBER	CHARGER					BATTERY	
	U.L. Listed	Nominal Output D.C. Volts	Rated Output D.C. Amp.	Max. A.C. Amps. Input at 120 VAC	Approx. Weight Lbs. (KG)	No. of LA or FL Cells	Recommended Capacity Range (A.H.)
MBC7-12-5 (*)	X	12	5	1.5	24 (11)	6	25-115
MBC7-12-10 (*)	X	12	10	3	35 (16)	6	50-230
MBC7-12-20 (*)		12	20	6	36 (16)	6	100-460
MBC7-24-5 (*)	X	24	5	3	35 (16)	12	25-115
MBC7-24-10 (*)	X	24	10	6	36 (16)	12	50-230
MBC7-24-20 (*)	X	24	20	12	38 (17)	12	100-460
MBC7-30-5 (*)		30	5	4	30 (14)	15	25-115
MBC7-30-10 (*)		30	10	8	38 (17)	15	50-230
MBC7-32-5 (*)		32	5	4	30 (14)	16	25-115
MBC7-32-10 (*)		32	10	8	38 (17)	16	50-230
MBC7-36-5 (*)		36	5	5	30 (14)	18	25-115
MBC7-36-10 (*)		36	10	9	40 (18)	18	50-230
MBC7-48-2 (*)		48	2 1/2	3	26 (12)	24	12-65
MBC7-48-5 (*)		48	5	6	36 (16)	24	25-115
MBC7-48-10 (*)		48	10	12	38 (17)	24	50-230
MBC7-130-2 (*)		130	2 1/2	7	39 (18)	60	12-65
MBC7-130-5 (*)		130	5	15	46 (21)	60	25-115
MBC7-130-10(*)		130	10	30	121 (55)	60	50-230
MBC7-130-20(*)		130	20	—	186 (84)	60	100-460

- (\*) Add Suffix (LA) to model number when charger is for use with automotive lead acid batteries having 1.265-1.285 sp. gr.
- (\*) Add Suffix (FL) to model number when charger is for use with float service lead acid batteries having 1.200-1.220 sp. gr.
- (\*) Add Suffix (NC) to model number when charger is for Nickel Cadmium Batteries.

Most battery manufacturers recommend that the equalizing current of the charger be not less than C/20 with C representing the ampere hour capacity of the battery. As an example, a 200 ampere hour battery would require that the charger have the capability of providing an equalizing current of 10 amperes. Charger output recommendations are based on this premise.

Consult factory for acceptability of charger applications for battery size outside the recommended range.

Specifications subject to change without notice.



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