Application

Micro-Master controller used for horticultural and agricultural applications with Filter Flushing and Chemical Fertiliser Injection Programs

Features

- 16 and 25 station models
- Sequential and Grouping
- 2 Independent Programs. A,B (Non overlapping)
- Permanent program memory
- Filter Flushing Program (4 stations)
- Chemical/Fertiliser Injection Program (2 cycle)
- 240 VAC or 12 VDC
- 12 VDC Solar power option using standard 24 VAC solenoids
- Load and save facility for 7 complete file programs (i.e. Prog. A; Prog. B; Injection; Filter etc.) for easy seasonal recall

Programming

- 14 Day Calendar with 9 Programming options per day
- Station watering options
  0-9999 seconds, 1 sec. increments
  0-9999 minutes, 1 min. increments
  0-9999 volume units, 1 unit increments
- 9 starts per day per program
- Cyclic irrigation, 0-99 repeat cycles per each program start
- Water Budget feature adjusts 0-250% per each program, 1% increments
- Global Rain On/Off to disable all programs
- Time Zone facility to minimise operation costs for Off-Peak irrigation
- Load and save facility for 7 complete file programs (i.e. Prog. A; Prog. B; Injection; Filter etc.) for easy seasonal recall
- Inter Station Delay 0-250 secs
- Pump off Delay 0-99 secs
- Auto Skip Facility:
  A1: 0-250 secs at irrigation start to allow system to stabilize
  A2: Operational Scanning time/ frequency (0-250 secs)

Micro-Master® 4500
Precision controller designed specifically to agricultural irrigation specifications

- In group mode, the seven terminals allotted to chemical injection and filter flush can be used for irrigation valves if chemical injection/filter flush not used

Operation

- Manual Operations: Program Start; Station Start; and Time Set Station Start
- Suspend and Restart during irrigation cycle
- Manual station to station advance during irrigation cycle
- Manual Stop

Filter Flushing

- Filter Flushing Program (4 Stations) with Time or Pressure Differential Starts

Chemical Injection

- 2 Cycle Chemical or Fertiliser Program with pre-wet / pre-mix; delay and post wet capability
- Chemical Injection can be suspended during filter flushing

Inputs

- Three flow meter inputs to log irrigation and two chemical flows
- Sensor Inputs: Prog. A start; Prog. B start; Reset; Hold; Auto Skip; PD Actuated (filters)

Reports

- Reports: Flow Totals as well as Irrigation or Electrical Failures with station skip
- Reports totaliser for each irrigation and chemical station in volume or time
- Separate flow records for chemical 1 and 2
- Fault Reporting

  Monitors flow or pressure switches connected to the ASKIP terminal and utilises the auto skip programmable delay times

Memory

- Permanent program memory maintains all saved programs if power fails. No standby battery is required
- 9 volt Alkaline battery (included) keeps correct time during power failure (150 hours nomimal)

Power Sources

- 240 VAC or 12 VDC in the one unit
- 12 VDC using 12 VDC solenoid coils
- 12 VDC Solar power option with inverter utilising standard 24 VAC solenoids

Protection

- Extensive Protection against field and mains power surges. Relay outputs to field valves ensures reliable operation under the most severe conditions
- Isolated logic board protected by additional transformer which diverts surges to earth

Communications/Software

- Windows based* Software for PC applications allows for easy central location programming and fault reporting
- RS232 and RS485 connections mounted on terminal strip
- RS232 and RS485 ports can operate concurrently
- Tipping rain bucket terminal (for use with central control)
- Radio Master ready

* Compatible with Windows 98, 2000, ME, XP and Vista

Application

The improved Micro-Master controller used in horticultural and agricultural applications with Filter Flushing and Chemical Fertiliser Injection Programs

Features

- 16 and 25 station models
- Backlit display screen makes the display visible in the dark
- Sequential and Grouping
- Grouping mode allows a maximum of 25 groups each with up to 8 valves per group (2amp limit)
- Permanent program memory
- 8 Independent Programs
- Pump Start Facility

Programming

- 14 Day Calendar with 9 Programming options per day
- Station watering options
  0-9999 seconds, 1 sec. increments
  0-9999 minutes, 1 min. increments
  0-9999 volume units, 1 unit increments
- 9 starts per day per program
- Cyclic irrigation 0-99 repeat cycles per each program start
- Water Budget feature adjusts 0-250% per each program, 1% increments
- Global Rain On/Off to disable all programs
- Time Zone facility to minimise operation costs for Off-Peak irrigation
- Inter Station Delay 0-250 secs
- Pump off Delay 0-99 secs
- Auto Skip Facility:
  A1: 0-250 secs at irrigation start to allow system to stabilize
  A2: Operational Scanning time/ frequency (0-250 secs)
- In group mode, the seven terminals allotted to chemical injection and filter flush can be used for irrigation valves if chemical injection/filter flush not used

Operation

- Manual Operations: Program Start; Station Start; and Time Set Station Start
- Suspend and Restart during irrigation cycle
- Manual station to station advance during irrigation cycle
- Manual Stop

Filter Flushing

- Filter Flushing Program (4 Stations) with Time or Pressure Differential Starts

Chemical Injection

- 2 Cycle Chemical or Fertiliser Program with pre-wet / pre-mix; delay and post wet capability
- Pre-wet time programmable as a percentage of the station runtime
- Run time for second chemical programmable per station
- Delay time between chemical 1 and 2 programmable as percentage of station runtime
- Chemical Injection can be suspended during filter flushing

Inputs

- Three flow meter inputs to log irrigation and two chemical flows
- Sensor Inputs: Prog. A start; Prog. B start; Reset; Hold; Auto Skip; PD Actuated (filters)

Reports

- Reports: Flow Totals as well as Irrigation or Electrical Failures with station skip
- Reports totaliser for each irrigation and chemical station in volume or time
- Separate flow records for chemical 1 and 2
- Fault Reporting
  Monitors flow or pressure switches connected to the ASKIP terminal and utilises the auto skip programmable delay times

Memory

- Permanent program memory maintains all saved programs if power fails. No standby battery is required
- 9 volt Alkaline battery (included) keeps correct time during power failure (150 hours nomimal)

Power Sources

- 240 VAC or 12 VDC in same unit
- 12 VDC (using 12 VDC solenoids)
- 12 VDC Solar power option includes inverter utilising standard 24 VAC solenoids

Protection

- Extensive Protection against field and mains power surges. Relay outputs to field valves ensures reliable operation under the most severe conditions
- Isolated logic board protected by additional transformer which diverts surges to earth

Communications/Software

- Windows based* Software for PC applications allows for easy central location programming and fault reporting
- RS232 and RS485 connections mounted on terminal strip
- RS232 and RS485 ports can operate concurrently
- Tipping rain bucket terminal (for use with central control)
- Radio Master ready

* Also compatible with Windows 98, 2000, ME, XP and Vista

Company policy is one of constant improvement and therefore changes in specifications may be made without notice and without incurring liability.Please refer to www.toro.com.au
Toro Australia Pty Ltd, 53 Howards Road, Beverly, South Australia, 5009. Phone 1300 130 898, fax (08)8243 2488. A.B.N 47 001 310 443

295

Micro-Master® 4500 and 4500 Plus Series Controllers

Electrical Specifications

- Input power: 240 volt 50 Hz, single phase or 12 volt DC

- Operating limits: 210 VAC to 265 VAC or 11 VDC to 16 VDC

- Quiescent 12 V input power:

15 mA at 12 VDC (55 mA with one output relay and pump start relay active), total current = solenoid current + 70 mA

- Output power:

Total station capacity: 24 VAC at 2.0 A max. or 12 VDC at 2.0 A max

- Superior lightning and surge protection:

Transformer primary: 275V, 2,500 amp/20 micro sec. Surge protection, A-E, N, E.
Transformer secondary, 24 VAC, 6,500 amp/20 micro sec.
Field wiring (32 stations and pump start), 6,500 amp/20 micro sec

- Large valve wiring terminals, detachable, do not need to remove valve wires for servicing

- Relay outputs to field valves ensures reliable operation in the most rugged conditions

- Permanent program memory maintains all saved programs if power fails. No standby battery is required

- 9 volt Alkaline battery (included) keeps correct time during power failure (150 hours nominal)

Operating Conditions

- Temperature: -10°C to 65°C
- Humidity: Max 95% non condensing
- Australian Approval Certificate

Liquid Crystal Display shows:	
Normal time	During irrigation cycle:
1. Time and day	1. Program cycle
2. Next program and start time	2. Operating station with run time remaining
3. Rain switch displayed, or power fail signal	3. Chemical injection status and run time
	4. Filter status and run time

Dimensions			
Description	Height (mm)	Width (mm)	Depth (mm)
Micro-Master® 4500 Series and 4500 Plus Series	270	295	140

Ordering Information	
Code	Description
MM4500P-16	4500 Plus Series 16 Station 240/24 VAC Controller c/w 12 VDC Power connection Kit
MM4500-25	4500 Plus Series 25 Station 240/24 VAC Controller c/w 12 VDC Power connection Kit
1013572	4500 Series 16 Station 240/24 VAC Controller c/w 12 VDC Power connection Kit
1013570	4500 Series 25 Station 240/24 VAC Controller c/w 12 VDC Power connection Kit
1013588	12 VDC to 24 VAC Inverter including Adaptor Cable, Regulator. Battery Isolator, 6 m cable, 2 x 4M8 Lugs and Terminals - requires 90 AH Battery.
1013580	Lightning Rod Kit - including Copper Rod (1.8 m), Clamp
1013581	GSM Modem suit Satellites to Telephone Communications
1013536	Landline Modem suits Satellites to Telephone Communications
1013575	Solar Panel for 24 VAC operation - c/w panel, Mounting Brackets and DC/AC Inverter
1013582	Solar Panel for 12 VDC operation - c/w Panel, Mounting Brackets
1013583	4500 Series Rain Tipping Bucket - Connects to Controller

Micro-Master® 4500 and 4500 Plus Series Central Software

Applications

The Micro-Master 4500 and 4500 Plus Software systems are add-on packages to allow the remote controlling and reporting of functions of the Micro-Master 4500 and 4500 Plus Controllers. Each system incorporates Windows user friendly; mouse-driven technology. It can control up to 999 separate controllers, linked to the central computer by a number of communication protocols. It offers the user added reporting and logging features, as well as rainfall response, over and above the features of the stand-alone Micro-Master 4500 and 4500 Plus field controller.

While the features of both software packages are virtually the same, the software for 4500 cannot be used with the 4500 Plus (and vice versa).

Features

- Windows 98, 2000, ME, XP or Vista driven, user friendly software system
- Operates on IBM compatible PC or laptop

See page 289 for minimum computer specification

- Central computer is able to operate up to 999 separate controllers
- Central to 4500 Plus satellite via RS232 direct cable (up to 30 metres), landline or digital GSM modem, RS485 (two wire screened sensor cable for distances up to 1000 metres), RadioMaster (low power VHF radio), UHF radio interface via the existing RS232 port
- Central to 4500 satellite connection via RS232 direct cable (up to 30 metres), landline or digital GSM modem, RS485 (two wire screened sensor cable for distances up to 1000 metres), RadioMaster (low power VHF radio)
- Global Override controls the Rain Switch and Water Budget functions (separate percentage for both programs). The changes can be sent to a single controller, a specified group of controllers, or all controllers
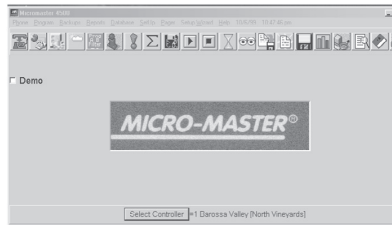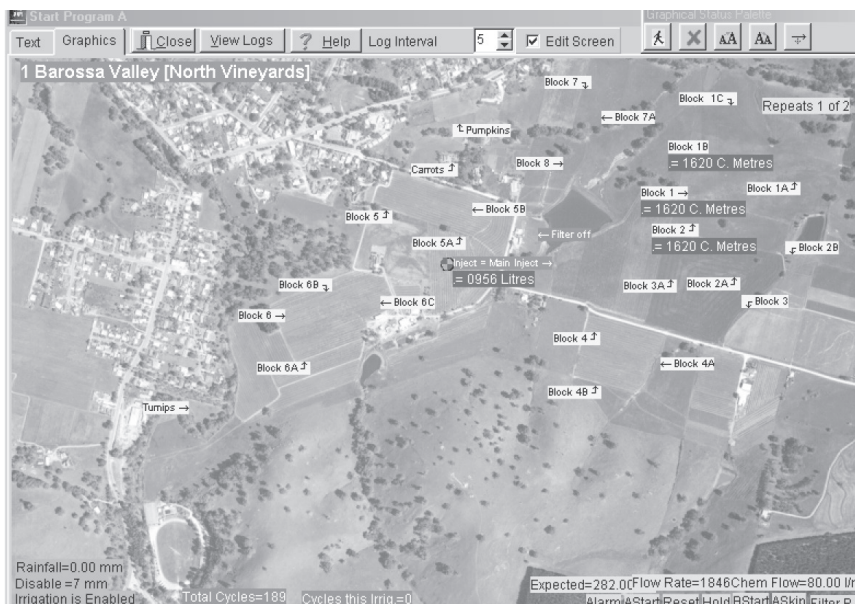

Micro-Master software screen grab
(select controller window)
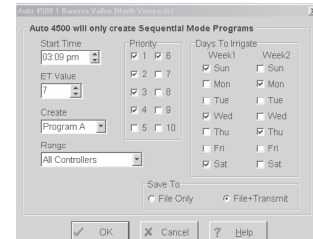
Micro-Master software screen grab
(program mode window)

- Program Set-up allows user to set up functions such as irrigation/fertiliser units, fertiliser mix pump percentage, group or sequential mode, various program delays, rainfall cancel thresholds, system telephone numbers, rain switch and time/day set
- Program Edit allows the input of program specific information. This includes daily irrigation actions, irrigation and fertigation run time values, time zone start/stop settings, number of cycles, start times and water budget settings
- Filter Program Edit adjusts filtration backflush times, filter cycle delays, PD delay, PD backup times, inter-station delay and shows number of filter backflush cycles that have occurred
- Reset controller run times allows for the remote resetting of controller run time logged information. Useful for gathering season by season operation information. Resets can be done on a single controller, a group of controllers, or all controllers

- Irrigation Reports show totalised irrigation and fertigation run times, and precipitation for each valve. All or individual totalised readings can be reset to zero at any time (does not effect controller logged run times). Also shows irrigation and fertigation meter readings, and expected irrigation flows that can also be reset to zero
- Manual Program Start and Stop allows for either Program A or B to be activated or terminated from the central computer
- Program Status (Text) shows current information of controller activity. Shows remaining run time, number of cycles run/remaining, inter-station delays, valve group details, status of fertigation and filtration programs, expected and actual flow rate information, details of rainfall, totalised flow information and status of various control inputs

- Program Status (Graphics) allows for aerial photograph or irrigation design layout (bitmap file) to be overlaid and information to be shown on screen

- Backups allow for information regarding programs, databases and field controller to be backed up to a central computer file

- Flow Control and Set Points Report shows expected versus actual valve/group flow rates, in graphical form, and allow for the reporting or skipping of high and low system flows. These high and low thresholds are user definable

- Rainfall Log shows daily rainfall events, accumulated rainfall totals and displays the user defined irrigation cancel set point. Rainfall figures are resettable to zero.

- Activity Log Files show all system activity in a printable day by day format. Information contained in the logs is gathered at a settable interval of 1-99 minutes

- Sprinkler/Emitter Database allows for the input and storage of information relating to each individual valve in the system/s, and is then used by the software to perform various functions. This information includes the valve number, valve location, emitter type, size, arc and flow, the number of emitters, emitter spacing, application efficiency, zone and order settings, total valve flow rate, precipitation rate, various agronomic information and recommended run times relative to ET and refill points

- Field Controller Activity report shows a summary of controller usage and status from current time back to the last activity report request. Information on the report, by controller, includes communication check, rain switch status, totalised rainfall, expected flow total calculated from run times and data base, actual flow meter flow, Fertigation meter total flow, number of filter cycles run, alarm status, number and type of faults occured, and the status of all sensor inputs. The report is saved to a file for printing or retrieval at a later time

Micro-Master software screen grab (aerial map of irrigation network)

Ordering Information	
Code	Description
MM4500P-CS	MicroMaster 4500 Plus Central Software and 1 comms. chip
MM4500PCHIP	MicroMaster 4500 Plus comms. chip
1013584	MicroMaster 4500 Central Software and 1 comms. chip
CMM4500301	MicroMaster 4500 comms. chip
CMM4000485	RS232 to RS485, 2 wire adaptor (for linking 2 wire cable to PC)
1013578	RS232 Single satellite communication cable x 15 metres
1013579	RS232 Single satellite communication cable x 30 metres
1013553	Screened 2 wire communication cable x 500 metres
1013554	Screened 2 wire communication cable x 1000 metres
101MMUSB	USB to RS232 Adaptor
101MMRPEAT	RS485 Signal Booster
MMFLO-ADR	Digital Flow Adder, calculates total flow from up to three flow meters and communicates with all Micro master controllers (includes 0.8Amp 24 VAC Power Pack)