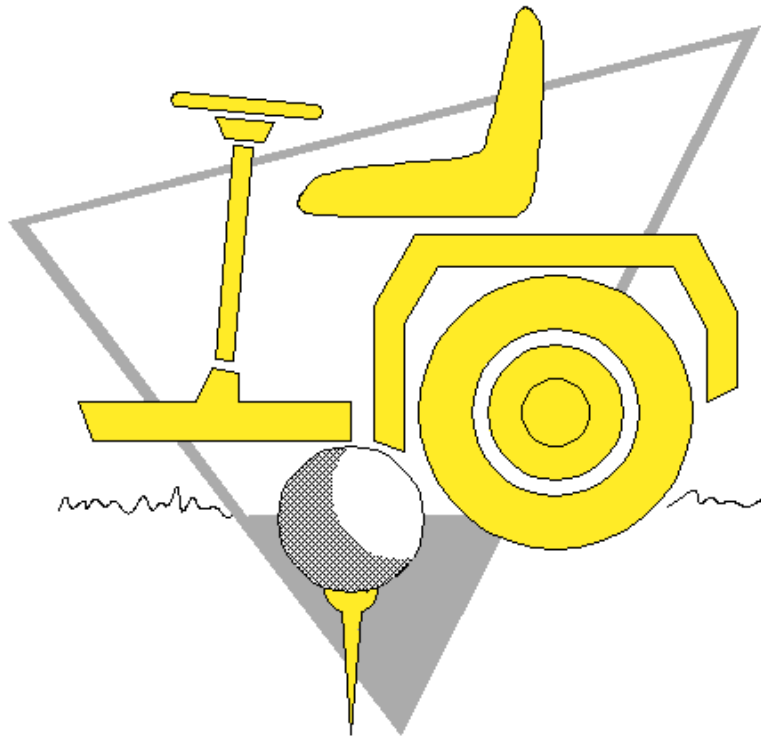# European Golf Machinery

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MODEL '073'

(TYPE-1 and TYPE-2)

BALL DISPENSER CONTROLLER

OPERATING INSTRUCTIONS

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1. GENERAL DESCRIPTION

The Model '073' ball dispenser controller incorporates a microprocessor-based system, whose features include dispensing mechanism control and monitoring, credit accumulation, data-logging and system fault-monitoring.

The controller is available in two variants: the type-1 variant has a simple 2-line X 16-character display, whereas the type-2 variant has a larger 5" diagonal display to which a range of optional user-interface devices, such as card-reader, key-pad, barcode scanner and change-hopper may be connected. Both variants are equipped with an infra-red remote-control handset to facilitate setting-up of various controller functions and machine parameters.

Additionally, the type-2 variant is designed to be interconnected (along with other similar controllers) to an EGM-Net computer system, if required. This networking ability enables computer-based credit control, transaction logging and sales analysis; furthermore, many controller and machine parameters may be adjusted at the computer. For full details of the operation of the EGM-Net system, reference should be made to the EGM-Net Operation Manual, ref. 077010.

Operation with up to four different sizes of delivery basket is possible, depending upon installation. Selection of normal or special rates for cash and token transactions may be made manually via the remote-control handset, automatically via a built-in 7-day programmable timer or (in the case of networked controllers) via the computer.

2. LOCATION OF CONTROLS AND INDICATORS

The following user controls and indicators are provided for adjusting the operation of the controller:

2.1. CONTROLLER

Two operational controls are provided on the controller itself; these are located in the top right-hand corner of the connector panel, as follows:

On/off switch (upper):	alternate pushes select 'power off' or 'power on';
'Start' switch (lower):	push and release to start when instructed, also used to initiate print-out of the activity log.

Located immediately above the two push-switches are two indicators:

'Power' indicator (green):	glows continuously when controller is powered;
'Fault' indicator (red):	flashes when a fault is detected.

2.2. DISPLAY

The two indicators located in the top left-hand corner of the display unit have the same meanings as those on the controller (as described above):

'Power' indicator (green):	glows continuously when controller is powered;
'Fault' indicator (red):	flashes when a fault is detected.

2.3. REMOTE-CONTROL HANDSET

The infra-red remote-control handset supplied with the controller is fitted with four push-button switches:

'Reset' switch (top-left):	push and hold for 5 seconds to reset controller;
'Start' switch (top-right):	push and release to start when instructed,

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	also used to cancel set-up mode and to initiate print-out of the activity log;
'Select' switch (bottom-left):	push and release to select menu item;
'Alter' switch (bottom-right):	push and release to alter displayed value.

The 'Select' and 'Alter' switches are used to adjust various controller and machine parameters, as described in the SET-UP section below.

The 'Start' switch replicates the switch of the same name located on the controller itself, and is used to initiate a print-out of the controller's activity log when a suitable printer has been connected to the controller (see PRINTING A REPORT section, below), to cancel set-up mode (see SET-UP section, below) or to continue operation after a fault condition has necessitated a reset (see FAULT REPORTING section, below).

The 'Reset' switch causes the controller to reset in the same way as turning the power off and on again would do. A reset is necessary when a fault condition (e.g., blockage in the dispensing mechanism) has been detected, or when it is desired to reset the tip-counter and activity log or any stored credits (see CLEARING THE TIP COUNTER AND LOG and CLEARING UNUSED CREDITS sections, below). Since it is possible to reset the controller in this way without actually turning the power off, it is therefore not usually necessary to gain access to the controller itself during any normal course of operation.

A small red indicator in the centre of the handset's control panel flashes whenever a switch is pressed; this indicates that an infra-red beam is being transmitted from the handset.

The red translucent front end of the remote-control handset should be aimed at the top of the display during use. The handset should be held approximately 12-24" away from the surface of the display for best results. Note that bright light (e.g., sunlight) shining on the display may prevent correct operation of the handset.

3. LOCATION OF CONNECTIONS

Connections from the controller to motors, power source, display and other devices are made via the bank of connectors located on the top panel of the controller. Each connector on the sub-panel is identified by a legend printed adjacent to it as follows:

PL1	Computer network link (type-2 only);
PL2	Display unit;
PL3	Additional acceptors and ball-hopper detectors (type-2 only);
PL4	Acceptors;
PL5	Remote status indicators (where fitted);
PL6	Basket size selector switches and indicators;
PL7	(Not used);
PL8	Change hopper (type-2 only);
PL9	Ball-hopper control (type-2 only);
PL10	Single-ball detector (where fitted);
PL11	Power and motor connections;
PL12	Printer;
PL13	Electronic coin acceptor.

4. POWER-UP

Assuming that the machine is connected to a power source, the controller is activated by pressing the On/off switch; the adjacent green 'Power' indicator should then light. Note that this switch serves to inhibit the action of the controller and hence the machine. It **DOES NOT** provide isolation from the power supply. The machine **MUST ALWAYS** be disconnected from the power source before maintenance is attempted.

At power-up, the controller performs a self-checking procedure, which is able to determine

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and indicate whether any of the its major components has failed. If no fault is apparent, a brief message appears on the display, which identifies the versions of software fitted to the controller itself. the display unit and any other intelligent peripheral devices, e.g., barcode scanner. Following this, the display will show the manufacturer's logo for a few seconds whilst the data-logging system is prepared.

When the power-up procedures are complete, the date and time are displayed at the top of the display. Type-2 controllers will also display the dispenser's network address (if set) in square brackets '[]' at the left-hand end of the top line. A special symbol '☺' appears at the right-hand end of the top line whenever special rates are selected. If the controller has been installed to operate with variable basket sizes, 'SELECT BASKET SIZE' will be displayed. Pressing and immediately releasing one of the basket selection buttons will result in the cost for that particular basket being displayed instead. If only one size of basket is used, the cash price for that basket will be shown.

If the dispenser is equipped with a type-2 controller which is connected to the computer network and the computer is communicating with the dispenser, 'CARDS & VOUCHERS ACCEPTED' will be shown on the display; if the computer is not currently communicating, 'NO CARDS OR VOUCHERS' will appear.

The green 'Power' indicator on the front of the display will be illuminated. At this point, the dispenser is ready either to accept coins/credits (together with cards and/or vouchers, if appropriate) and dispense balls, or to enter the set-up mode. These two states are explained fully in the following sections.

5. SET-UP

With the display indicating that the dispenser is ready, and with the dispenser's mechanism stationary, the set-up mode may be entered. When this mode is engaged, various parameters governing the dispenser's operation may be selected sequentially from a list, as follows:

Parameter:

(v)	Total number of tips and date of last reset;
	Today's date;
	Day of week;
	Time of day;
	Manual/automatic rate control;
(a)	Rate-selection 7-day timer set-up;
	Report-printing format;
(1)	Cash price per load (Normal Rate);
(1)	Number of tips per load (Normal Rate);
(1)	Cash price per load (Special Rate);
(1)	Number of tips per load (Special Rate);
(2)	Cash price Small (Normal Rate);
(2)	Number of tips for Small (Normal Rate);
(2)	Cash price Small (Special Rate);
(2)	Number of tips for Small (Special Rate);
(2)	Cash price Medium (Normal Rate);
(2)	Number of tips for Medium (Normal Rate);
(2)	Cash price Medium (Special Rate);
(2)	Number of tips for Medium (Special Rate);
(3)	Cash price Large (Normal Rate);
(3)	Number of tips for Large (Normal Rate);
(3)	Cash price Large (Special Rate);
(3)	Number of tips for Large (Special Rate);
(4)	Cash price Jumbo (Normal Rate);
(4)	Number of tips for Jumbo (Normal Rate);
(4)	Cash price Jumbo (Special Rate);
(4)	Number of tips for Jumbo (Special Rate);

Number of tips for 1-token (Normal rate);
Number of tips for 1-token (Special rate);
Number of tips for 2-token (Normal rate);
Number of tips for 2-token (Special rate);
Number of tips for 3-token (Normal rate);
Number of tips for 3-token (Special rate);
Number of tips for 4-token (Normal rate);
Number of tips for 4-token (Special rate);
Number of tips for 1 CCR card credit (Normal Rate);
Number of tips for 1 CCR card credit (Special Rate);
Number of tips for 1 key switch operation (Normal Rate);
Number of tips for 1 key switch operation (Special Rate).

NOTE: (a) = Only displayed if Manual/automatic rate-selection set to AUTOMATIC.
                       (1) = Only displayed if operating with a fixed size of basket.
                       (2) = Only displayed if operating with two or more selectable sizes of basket.
                       (3) = Only displayed if operating with three or more selectable sizes of basket.
                       (4) = Only displayed if operating with four selectable sizes of basket.
                       (v) = Can only be viewed, but not altered.

Display will show 'balls' in place of 'tips' if dispenser is configured to operate in single-ball delivery mode.

With the display indicating the time and date, credit (if any), and price information (as described in 'Power-up' above), the remote-control handset may be used to select and alter any of the parameters in the above list. Pressing the 'Select' switch will select the first parameter in the list. Successive presses will select successive parameters. When the last parameter in the list is displayed, the next press returns the system to its normal ready mode. The next press after that begins stepping through the list again.

Having selected (by means of the 'Select' switch) the parameter that is required to be altered, the 'Alter' switch is pressed one or more times. Each press of the 'Alter' switch selects a different digit of the parameter, starting at the left of the parameter and working towards the right. On type-1 displays, the selected digit will flash. On type-2 displays, the selected digit will appear against a black background, as opposed to the normal background. When the extreme rightmost digit has been selected, the next press of the 'Alter' switch will cause the parameter to be displayed normally, with no digit selected. The next press of the 'Alter' switch after that will start the process again, beginning at the leftmost digit.

With a particular digit selected by means of the 'Alter' switch, that digit may now be changed by pressing the 'Select' switch briefly. Each press of the 'Select' switch will cause the value of the selected digit to advance by one count, until the maximum allowed value for that digit has been reached. At this point, the next press of the 'Select' switch will cause the digit to be reset to its minimum allowed value. This cycle will repeat while the 'Select' switch is repeatedly pressed.

Having set the selected digit to its intended value, the 'Alter' switch is now pressed to step through the other digits. Each selected digit may either be changed in the way described, or else left at its current value. The 'Alter' switch is pressed a sufficient number of times to arrive at the situation where all digits are displayed normally, i.e., no digits selected.

With all digits of the currently-displayed parameter displayed normally, the 'Select' switch may now be pressed to select another parameter to be changed, or the 'Start' switch may be pressed to cancel set-up mode and return the controller to its normal mode.

When either the date, day-of-week or time parameters are selected and a digit is selected, the internal clock's seconds counter is reset to '00' and held at that value for as long as any digit in the parameter is selected for adjustment. Seconds counting resumes when all digits are displayed normally. Therefore, when setting the time or date, a digit should be left selected until the time indicated by an external reference indicates an exact minute. At this point, the 'Alter'

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switch should be pressed as many times as are necessary to leave all digits un-selected. In this way, exact time-keeping can be set.

It should be noted that, after the display has been left in set-up mode for a period of two minutes, without any other switch being pressed during that time, the display will automatically return to normal mode. Pressing the 'Start' switch while in set-up will have the same effect.

Dispensing and report-printing are inhibited whilst the display is in set-up mode. Any coins inserted are ignored. Conversely, set-up is inhibited whilst dispensing and/or agitation is in operation.

6. RATE SELECTION

Once the various price and tips parameters have been adjusted to the required values, normal or special rate selection operation is controlled either manually or automatically, according to the values selected in set-up. If rate control has been set to 'BY SWITCH', the remote 'Rate' switch (where fitted) may be used to select the applicable rate. If no switch is fitted, then 'Normal' rates are selected. If rate control has been set to 'SPECIAL RATE ON', then 'Special' rates are selected. If rate selection has been set to 'AUTOMATIC', the 7-day timer will select 'Normal' or 'Special' rate, according to the times programmed. The position of the remote 'Rate' switch (where fitted) is ignored in 'SPECIAL RATE ON' and 'AUTOMATIC' modes.

The 7-day timer can be set up in the same way as any other parameter once rate-selection has been set to AUTOMATIC. (See 'Set-up' above). When ON is selected, the time at which special rate is selected is displayed for the day indicated. When OFF is selected, the time at which normal rate is selected is similarly displayed for the day indicated. As the indicated day is changed, so the time display indicates the on or off time for that day. If the 'On' and 'Off' times for a day are set to be co-incident, normal rate will be selected for the whole of that day.

It should be noted that, after a power interruption or adjustment to the 7-day timer, it will take up to one minute before the display indicates that the correct rate has been chosen. Thereafter, the rate selected will change exactly at the programmed times.

7. NORMAL OPERATION

With the display indicating that the dispenser is ready, coins, tokens, cards or vouchers (as provided for) may be used. The cash function operates in two slightly different ways, depending upon whether fixed or variable-size baskets are provided for.

7.1. CASH AND TOKENS

For fixed basket-size operation, the display will indicate the total amount of cash inserted, until that total is sufficient for a delivery to take place. At this point, the cost of the tip will be deducted from the total displayed and delivery will commence. The display will show 'DISPENSING' in place of 'READY'. If there is any remaining credit after the load has been delivered, this will be shown. Subsequent cash inserted is added to this amount as before. If sufficient cash is inserted to pay for two or more deliveries, the second (and subsequent) deliveries will occur immediately following the first.

Where variable-basket sizes are available, the basket size required can be selected before cash is inserted. Selection is achieved by pressing and immediately releasing one of the selector buttons on the front panel. The display will then indicate the selected basket size and the selector button just operated will illuminate. A second press on the same button will de-select that size. If a basket size is currently selected and sufficient credit is displayed to purchase one delivery of the size selected, that price of that delivery will be deducted from the credit shown, whereupon any remaining credit will be displayed. When the last balls are dispensed for the delivery just purchased, the size selection will be cleared. This will also occur if neither coin insertion nor dispensing takes place within 30 seconds of pressing one of the selector buttons. Any credit already shown on the display is not affected either way. If there is sufficient credit

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remaining after a delivery, a basket size may again be selected and delivery will occur as just described. Only one delivery will occur per operation of a selector button. Therefore, sufficient cash may be inserted, for example, to pay for several deliveries for a group of users. One delivery will then take place (and its price deducted from the remaining credit) each time a member of the group operates a selector button.

Non-cash operation, i.e., using tokens or CCR-cards (as provided for) does not affect the credit total displayed.

7.2. CARDS (TYPE-2 CONTROLLERS ONLY)

If the dispenser is equipped with a type-2 controller connected to a computer and communication has been established, the message 'CARDS & VOUCHERS ACCEPTED' will appear on the display. This indicates that cards may be 'swiped' through the card-reader slot, or else vouchers may be similarly read or else offered up to the barcode scanner, according to what is fitted to the machine. When a card or voucher has been successfully read by the controller, a message will be displayed, informing the user that the information from the card or voucher has been relayed to the computer. The computer should eventually return a message to be displayed on the controller's display.

If the card swiped is a valid member card, the following options are available: if a basket size was selected before the card was swiped, the computer will assume that the card-user wishes to purchase the delivery using his member-card account. If he is authorised to do so and his credit is sufficient, delivery will commence when the acknowledgment message appears on the display. If no basket size was selected when the card was swiped, any cash credit showing on the display will be credited to the card-holder's account balance ('cash top-up'), provided that the card-holder has been authorised to make cash transfers in this way. If a receipt printer is fitted to the dispenser, a printed receipt will be issued whenever a cash top-up is performed. If no cash credit is showing and no basket size was selected when the card was swiped, a message showing the card-holder's name, card number and current credit balance is displayed. No other transactions take place. The 'cash top-up' function is NOT available when the dispenser has been configured for fixed-basket operation.

If the card swiped was a valid credit card, the following options are available: if a basket size was selected before the card was swiped, the computer will assume that the card-user wishes to purchase the delivery using his credit-card account. If he is authorised to do so, delivery will commence when the acknowledgment message appears on the display. If no basket size was selected when the card was swiped, the computer will assume that the card-holder wishes to make a credit transfer ('credit-card top-up') from his credit-card account to his member-card account and a message will appear on the display, inviting the card-holder to select the amount to transfer by using the basket selector buttons. When the card-holder is satisfied with his selection of transfer value, he must swipe his member-card so that the transfer may be completed. Alternatively, he may select cancellation of the transaction or do nothing; in the latter case, the transaction will automatically be cancelled after a delay. The 'credit-card top-up' function is NOT available when the dispenser has been configured for fixed-basket operation.

Should a card not have been read correctly by the dispenser, a message will be displayed to inform the card-holder to repeat the 'swipe'. Alternatively, if the card was read successfully, but the computer has subsequently become disconnected or inactive, a message is displayed to inform the user of this.

7.3. VOUCHERS (TYPE-2 CONTROLLERS ONLY)

If the dispenser system is configured to accept basket vouchers, a keypad and/or barcode reader are fitted to the user panel of the dispenser.

If the voucher is printed with a serial number, that number is entered at the key-pad by the user. As soon as the first digit is entered, a prompt is shown on the display to assist the user in completing the entry. As soon as the entry is complete, a message will be shown on the display to confirm that the barcode is being checked.

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If the voucher is printed with a barcode along its bottom edge, the voucher may be read automatically by the dispenser, which is fitted with either a barcode scanner or a barcode slot reader for the purpose. If a barcode scanner is in use, it will emit a short audible 'bleep' whenever it successfully reads a printed barcode. When a barcode has been read successfully by either means, a message will be shown on the display to confirm that the barcode is being checked.

Once the voucher has been either entered manually or read automatically, the computer will verify the validity of the voucher and, if the voucher is valid, ball delivery will commence very shortly afterwards. If the voucher is not valid, an appropriate error message will be shown on the display.

7.4. CHANGE HOPPER (TYPE-2 CONTROLLERS ONLY)

If a change-hopper is fitted to the dispenser, change is available if the cash credit shown on the display is equal to, or greater than, the denomination of coin issued by the change-hopper. While any cash credit is shown on the display, an accompanying message will indicate how change may be obtained, depending upon how the controller was configured at installation. If automatic change-giving has been enabled, change will be given as soon as the selected basket delivery has been completed and no user intervention is necessary. If user-requested change-giving has been enabled, change may be obtained by pressing and HOLDING any one of the basket selector buttons for a minimum of three seconds. It should be noted that, if a basket selector button is pressed and released before the three-second delay expires, a ball delivery may take place if the amount of cash credit shown on the display is equal to, or greater than, the price of the basket whose selector button was pressed. If the dispenser is configured not to use a change-hopper, the message 'No change given' is displayed.

Should the change-hopper become exhausted whilst giving change, any remaining credit that could not be issued as change will remain on the display and can still be used either to purchase further deliveries or for a cash top-up. A message will appear to indicate that the change-hopper requires replenishment. This message will remain until the dispenser power is interrupted; therefore it is necessary to reset the controller once the hopper has been replenished in order to enable change-giving once again.

7.5. BALL DELIVERY

When a ball delivery is due, pre-tip agitation takes place for approximately one second, followed by ball delivery. Where the dispensing mechanism is of the 'tipping tray' type, one or more tip cycles will take place to deliver the required quantity of balls. If further tips are due once the current tip has been completed, the tipping process will repeat after a delay of two seconds. For 'single-ball' dispensing mechanisms, the required number of balls will be counted out and dispensed. The agitator will stop shortly after the ball delivery has finished. The exact length of time for which post-tipping agitation takes place is set during installation.

It should be noted that coins, tokens or cards will be accepted by the dispenser at any point during the delivery process. It is not necessary to wait for a delivery to be completed before further funds are inserted; however, further operations of the basket selector buttons is inhibited until the delivery in progress has been completed.

7.6. RECORD-KEEPING (TYPE-2 CONTROLLERS ONLY)

The EGM-Net network system supplied for use with type-2 controllers is designed to have continuous communication between each controller and the host computer. However, to guard against occasional lapses in communication, all funds inserted, change given (where appropriate) and dispensing operations completed during a day's activity are stored in the controller where they may be retrieved by the computer at any time during that day. At midnight, a new record is begun for the new day and the computer no longer has access to the previous day's records stored in the controller. Therefore, if the communication between the dispensers and the host computer is interrupted, it MUST be restored before midnight to ensure that the computer is able to retrieve all of the day's transactions before they are lost. In the event that communication is not restored before midnight, leading to loss of transaction

information, then it <u>might</u> be possible to retrieve that information manually by following the procedure detailed in the PRINTING A REPORT section, below. However, this will yield only a paper copy of the information and the computer's records will still be incomplete.

Once the transaction information has been transferred from the controllers to the computer, it is stored there indefinitely and therefore always available for analysis and report-printing. For full details of the operation of the EGM-Net system, reference should be made to the EGM-Net Operation Manual, ref. 077010.

8. PRINTING A REPORT (TYPE-1 CONTROLLERS)

All funds inserted, change given (where appropriate) and dispensing operations completed during a day's activity are recorded in one 'page' of the activity log. One other such page holds the activities of the previous day, i.e., the previous day on which the dispenser was turned on. In addition to the two-day detailed records, a summary of daily activity is maintained for the last eight days.

Where the dispenser is equipped with a type-2 controller which is connected to an EGM-Net network system, the host computer reads the current activity-log page at frequent intervals throughout the day and uses this information to construct its own records of the site's activities. Therefore, for this type of installation, it is not normally necessary to attach a printer to the dispenser itself to obtain a record of the dispenser's transactions.

Where a type-1 controller is fitted, there exists no computer system to maintain a record of transactions; in this case, a printer can be connected to PL12 on the controller's connector panel. With a suitable printer connected, the controller can be instructed to print a record of all information stored in its activity log.

It should be noted that, where the dispenser has been recently installed, or the report stores have recently been cleared, information will not have been collected for a full eight days; the summary information will be shortened as a result. Additionally, summaries and detailed reports are obviously not available for days when the dispenser was not switched on.

The detailed and/or summary information may be printed out at any time whilst the dispenser is idle. Before printing, the format of the report should be set using the set-up procedure as described in the 'SET-UP' section above. This function allows the choice of just eight daily summaries; seven daily summaries and a detailed report for the current day; or six daily summaries and detailed reports for the current and previous days.

When detailed reporting has been selected, activity is detailed hour by hour; however, in order to conserve paper, hours in which no activity took place are not printed. Similarly, when summaries are printed, no information is printed for categories (e.g., token, card, different basket sizes, etc.) where there was no activity for that particular category.

To obtain a print-out of the log, the printer should be connected to its connector on the controller's connector panel. When the printer has been switched on and the paper adjusted, the 'Start' switch on the remote-control handset or on the controller should be pressed to start printing. The message 'PRINTING REPORT. PRESS START TO END' will be displayed. If it is desired to stop the print-out at any point, the 'Start' switch should be pressed and held until the 'PRINTER STOPPED' message appears in the display.

It should be noted that the 'PRINTER STOPPED' message will also appear during printing, or when the 'Start' switch is first pressed, if the printer becomes unable to accept information, is turned off or is not correctly connected to the controller.

No other operation of the dispenser is possible whilst printing is in progress.

At the end of each day, the log page holding that day's activities is internally re-labelled 'previous day'. The page holding what was the previous day's activities is cleared, ready to record the activities of the new day. This action occurs at midnight if the machine is powered up

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at that time. If the dispenser has been switched off during the night, the pages are changed as soon as power is restored the following day.

9. CLEARING THE TIP COUNTER AND LOG

The tip counter records the total number of tips made by the dispenser. The value of the tip counter may be read from the set-up mode; it is also printed at the end of every report.

From time to time, it may be desirable to reset the counter and clear all recorded activity information. This may be achieved at any time by using the remote-control handset. The 'Reset' switch should be pressed and held continuously for 5 seconds, at which time a message 'CONTROLLER RESET' will appear on the display. Immediately this message appears, the 'Reset' switch must be released and both the 'Select' AND 'Alter' switches pressed and held continuously until the message 'COUNTER & REPORT STORES CLEARED' appears on the display. All switches may then be released.

It should be noted that, once this action has been taken, summary information will only be printed from the current day onwards.

10. CLEARING UNUSED CREDITS

Unused credits displayed after ball delivery has taken place will continue to be displayed until finally used, even if the power has been removed during the intervening period. This allows a customer's claim of 'lost credit' to be substantiated or refuted following, for example, a power cut or necessary dispenser maintenance.

Unused credits may be cleared from memory by using the remote-control handset. The 'Reset' switch should be pressed and held continuously for 5 seconds, at which time a message 'CONTROLLER RESET' will appear on the display. Immediately this message appears, the 'Reset' switch must be released and the 'Alter' switch pressed and held continuously until the message 'CREDITS CLEARED' appears on the display. The 'Alter' switch may then be released. This procedure will also cancel any deliveries about to take place.

11. FAULT REPORTING

A comprehensive fault-reporting feature is incorporated into the controller. If any fault is detected, an appropriate message 'OUT OF ORDER. FAULT CODE: xx' is displayed and the red 'Fault' indicators on the display unit and controller both flash. When this happens, the dispenser is prevented from any further operation until reset, either by removing and re-connecting power or by means of the remote-control handset. This is a safety precaution, which ensures that possible intermittent faults will not be overlooked.

When the fault message is displayed, the indicated fault code can give an engineer invaluable assistance in tracing the cause of the fault, and MUST ALWAYS be quoted ACCURATELY, together with the operating conditions at the time of occurrence, in the event that a fault has to be reported.

It must be borne in mind that vague reports of faults or codes are as good as useless when requesting engineering assistance. A small amount of intelligent observation, however, will ensure speedy correction of any problems.

To reset the controller using the remote-control handset, the 'Reset' switch should be pressed and held continuously for 5 seconds, at which time a message 'CONTROLLER RESET' will appear on the display. Immediately this message appears, the 'Reset' switch must be released. The controller will then run through its power-up sequence (see POWER-UP section, above).

The occurrence of certain faults may interrupt the dispenser's dispensing action, As a safety

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precaution, to guard against unexpected operation of the mechanism, the system will remember that the dispensing operation was interrupted when power is next applied or after reset. In the case of 'tipping tray' dispensing mechanisms, this will result in the message 'PRESS START TO RESET TIPPER' being displayed and pressing the 'Start' switch (either on the remote-control handset or on the controller itself) will then cause the display to indicate 'TIPPER POSITION ADJUSTMENT' whilst the tipping mechanism moves to its usual starting position. For both 'tipping tray' ad 'single-ball' mechanisms, a message 'PRESS START TO RESUME DELIVERY' will then appear and, when the 'Start' switch is pressed, the ball delivery will continue from where it was interrupted before the occurrence of the fault.

If a type-2 controller is connected to a computer via EGM-Net, the fault codes in the following list are also displayed on the computer screen when the 'Display Network Status' function is selected.

The codes indicated for faults detected, together with possible causes, are as follows:

FAULT   **DESCRIPTION, CAUSE & POSSIBLE CURE**

10-19   System component failures:
               The controller detected a fault or abnormality in one of its internal components. Controller replacement is required.

20   Display fault:
               The controller detected a fault within the display unit or its wiring. The wiring between display and controller PL2 should be checked. If the wiring is sound, the display should be replaced.

30-31   Clock faults:
               The controller detected a problem with the internal time-keeping clock system. Controller replacement is required.

32,33,36   Log faults:
               The controller detected a problem with the activity logging system. Controller replacement is required.

37-38   Memory faults:
               The controller detected a problem whilst attempting to store data in its internal memory. Controller replacement is required.

50   General power supply fault:
               The controller detected a problem in its internal power supply system. Controller replacement is required.

51   Supply voltage fault:
               This indicates that the DC voltage supplied to the controller is below the 10V minimum required for correct operation. Checks should be made for loose or corroded connections between the power supply and the controller at PL11 pins 1, 2 and 3. The mains supply voltage to the power supply should also be verified. If these checks fail to reveal the cause, the power supply should be replaced. If this fault occurs only during ball-dispensing, the current drain of the dispensing and agitator motors should be checked, as excessive loading may cause the DC supply voltage to drop below acceptable limits. See also **fault code 88**.

52   Motor-control voltage fault:
               The controller detected a fault in the circuitry that controls the dispensing motors. Controller replacement is required.

53   Auxiliary supply voltage fault:
               This indicates that the auxiliary DC voltage supplied by the controller for the operation of coin acceptors, note acceptors, etc., is outside the allowable limits

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for correct operation. This voltage will not be correct if the supply voltage falls below its minimum; therefore, the supply voltage should be checked first. The auxiliary supply voltage is fed to pin 2 of each 12-way connector. Any external acceptors or other devices connected to this supply should be disconnected in turn to see whether they are the cause of the problem.

60   Change-hopper overrun fault:
The controller detected coins being released from the change hopper unintentionally. The outlet from the hopper should be examined carefully to ensure that no obstruction (e.g., piece of rag) is blocking the outlet. The wiring between the hopper and the controller PL8 pins 1, 2, 3 and 7 should be checked.

81 *S   No ball feed:
The controller was unable to detect balls being dispensed when the dispensing motor was set to run. This may be caused by an empty ball hopper, a broken (i.e., non-moving) dispensing belt, a failed motor, a mis-adjusted ball sensor or a wiring fault between the sensor and the controller PL10 pins 1, 2 and 4.

82   No ball-delivery motor current:
The controller detected no dispensing-motor current when the motor was set to run. This may be caused by a faulty motor (worn brushes, failed park-switch) or a broken or corroded connection in the wiring between the motor and the controller PL11 pins 4, 5 and 6.

84 *T   Ball-delivery cycle too brief:
The controller detected that the tipping motor had stopped before a full tipping cycle had completed. This may be caused by a faulty motor (worn brushes, failed park-switch) or a broken or corroded connection in the wiring between the motor and the controller PL11 pins 4, 5 and 6. If the motor moves only for about 0.3 second at the start of a dispensing cycle, this usually indicates a fault with the park-switch or its connection to the controller at PL11 pin 4.

86 *T   Ball-delivery cycle parking fault:
The controller detected that the tipping motor continued to run after the tipping cycle should have completed, possibly resulting in too many balls being dispensed. This may be caused by a faulty motor park-switch or by a short-circuit in the wiring between the motor and the controller PL11 pins 4 and 5.

88   Ball-delivery motor overload:
The controller detected excessive dispensing-motor current whilst the motor was set to run. This is usually the result of an obstruction in the dispensing mechanism, caused (for example) by a broken ball, stone or stick. It may also be caused by corroded or tight bearings or linkages, a faulty motor or a short-circuit in the wiring between the motor and the controller PL11 pins 4, 5 and 6. Note that this condition can also cause a **fault code 51** to be reported if the excessive current is sufficient to overload the power supply.

89 *S   Ball-delivery blockage:
The controller detected the continuous presence of an object in front of the ball sensor. This may be caused by an obstruction in front of the sensor or in the outlet, a broken (i.e., non-moving) dispensing belt, a failed motor, a mis-adjusted ball sensor or a wiring fault between the sensor and the controller PL10 pins 1, 2 and 4.

NOTE: *S = applicable to single-ball dispensing mode only;
*T = applicable to tipping-tray dispensing mode only.

Where the text states "Controller replacement is required", this indicates that the fault is an internal one that is not influenced by external connections or conditions and that cannot therefore be corrected on-site.

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12. TECHNICAL SPECIFICATION

System: Microprocessor-controlled, with clock, non-volatile memory storage and RS485 data-link to graphical liquid-crystal display.

Power supply: 10-18V D.C., controller+display 0.6A max., each motor 9A max.

Protection: Auto-reset cut-out devices will operate in the event of a fault and will reset after the fault has been cleared and the controller has been turned off for approximately 1 minute.

Ball mechanism: Tipping-tray or single-ball with optical ball sensor.

User interface: 2x16 character (type-1) or 5" (type-2) LCD,
Infra-red remote control handset,
Up to 4 basket size selectors.

Options (type-2): Magnetic (track 2) and/or barcode card reader,
Optical barcode scanner,
12-key keypad,
Receipt printer.

Printer: RS232 3-wire serial interface,
1200 Baud, 24 columns for report printing,
19200 baud for cash receipt printing (type-2 only).

Network (type-2): RS485 2-wire half-duplex, 1200 Baud,
Optional 2.4GHz radio-modem link is available.

WARNING: **There are NO user-serviceable fuses or other parts inside the controller.**

The power MUST be disconnected at the supply before opening the controller's cover. The controller's On/off switch DOES NOT remove power from the controller and wiring.

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