

RC32C / RC16C

ELECTRONIC CAM

incorporating

X112

OPERATOR MANUAL

D1011 Version 1.7
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Documentation

This product is available with one manual;

RC32C / RC16C Operators Manual.

This is the operator manual which has been written for an operator to refer to when using the electronic cam system in day - to - day operation.

Please note

The contents of this manual are designed to give the reader an understanding of how the **RC32C and RC16C** operates and assumes that he is familiar with the machine onto which the unit is connected. The particulars of the product, and its use are given by Goodwin Electronics in good faith. However, it is acknowledged that there may be errors and omissions in this document. We shall not be liable for the loss or damage whatsoever arising from the use of any information in, or any omissions from, this document.

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1. INTRODUCTION

The information enclosed in this manual is the basic information required to install and operate the Electronic Cam.

The device is ideally suited for the myriad applications where angular command positions are needed. The Electronic Cam has none of the financial handicaps of the multi-purpose PLC systems otherwise available.

Absolute programming simplicity is achieved using step by step command inputs in degrees, for prompt sequence preparation and alteration.

Feedback data from either a bi-directional incremental encoder or a gray code absolute encoder is required.

The keypad is sealed in a colour coded membrane facia to give complete protection against the ingress of dirt and moisture. The keys are positively activated by depressing and not just touch sensitive.

No ancillary software is required to complement or support the Electronic Cam. This complete and ready to connect unit provides a neat alternative to bulky hard wired panels or mechanical controls.

Data edits and updates may be interchanged with initial programmed values whilst the Cam is in the RUN mode. This provides enormous advantages to continuous production control applications. The ability to adjust interacting elements without the interruption of production is often essential.

Multi programme "batch" options allows up to nine individual output profiles to be selected at the touch of a button. Production variations or product changes can be instantly catered for without the need for further programming.

A passive RS232 interface is available to enable larger overseeing controls to interrogate and program the Electronic Cam (Factory option).

For voltage free contact output requirements a self-contained relay module is available, which can be powered by the 24 VDC supply sourced from the Cam. Relay modules handle up to eight outputs and simply link direct to the Cam.

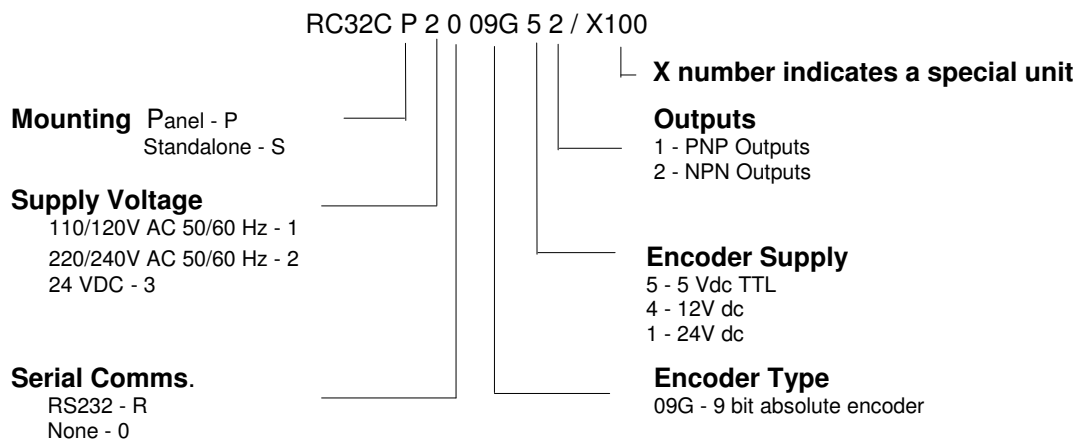
Two types of case styles are available for the cam unit which are suitable for either stand alone installation or for panel mounting with integral surround .

The Electronic Cam is available as standard with 220/240 or 110/120 (factory set) volt options for a 50 or 60 Hz supply but can be adapted for other voltages if required.

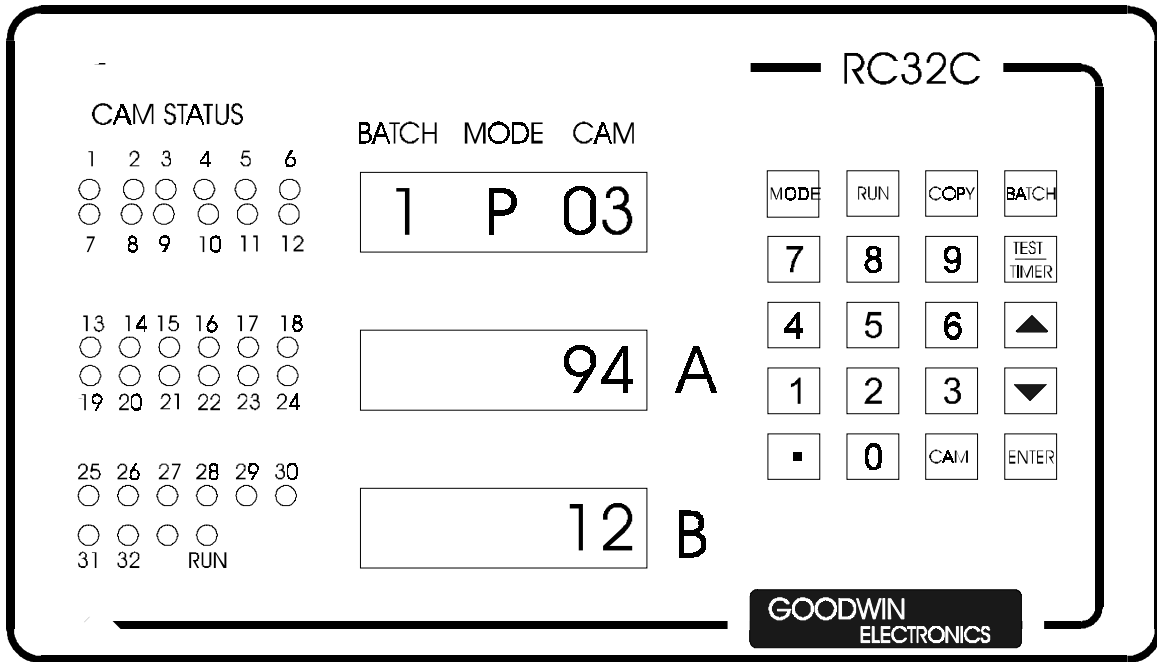
The Electronic Cam has RPM displayed as standard.

Goodwin Electronics have a policy of continual product improvement and we reserve the right to alter the information contained in this manual without prior notice.

1.1 MODEL NUMBER DESCRIPTION



2. FRONT PANEL AND DISPLAY LAYOUT



2.1 Figure 1

3. INSTALLATION

As with all microprocessor based products, special attention should be paid to protect against electrical noise. To eliminate potential noise problems and ensure a good installation, we suggest the following:

1. Connect the supply voltage according to the value marked on the rear facia. Ensure the supply is filtered.
2. Encoder Installation: **IMPORTANT!** Check that the encoder supply voltage from the unit conforms to the encoder specification, (refer to MODEL DESCRIPTION above for the encoder supply voltage). Install in accordance with the wiring diagram from the encoder manufacturer and the pin connection list given in section 12.2. Use good quality unbroken screened signal cable direct from the encoder to the Electronic Cam.

3.1.1 NOTE:

- 1 The encoder supplies angular information to the RC32C upon which it will react according to the programmed data. If the encoder installation is poor and false information is given to the CAM, the system will malfunction.
- 2 When routing the encoder cable back to the unit keep the cable away from electrically noisy cables and high voltage lines i.e. .motors etc.
3. If required, connect external inputs (STOP, START and RESET) to suitable momentary push button or other pulse generating devices. Pulses must stay high for a minimum of 4mS. see section 12.1 for wiring information. Ensure that all leads are properly screened and routed away from noisy electrical sources.
4. Connect the 37 way D connector in accordance with the output connection list given in section 12.3. Use screened cable and connect the screen to the earth stud on the rear of the unit. Avoiding noisy electrically sources is a wise precaution.
5. Relays and contactors switching heavy inductive loads located close to the system should be suppressed.
6. The RC32C electronic cam is now installed and ready for power up.
7. If powered up for the first time remember to set the configurable parameters required as outlined in sections 8 and 9.

3.2 POWER UP

On powering-up, the unit will display the installed software version number in the A window for approx. 5 sec. After this time, or if any key is pressed the Rc32c will enter its normal display mode with the encoder angle displayed in the A window and the RPM value in the B window. All outputs are disabled.

The software version number should be recorded along with the parameter records and referred to should any queries arise.

3.3 TEST / TIMER

In the normal mode this key will initiate an internal test program can be activated providing the unit is NOT in the **RUN MODE**. This activates a display sequence to test all the display segments and all the front panel leds. Pressing the **ENTER** key whilst in the test mode will freeze the display. Reprising the **ENTER** key will cause the test to continue. After completing the display test the routine will carry out a power up sequence.

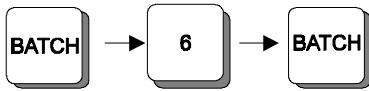
In the PROGRAM mode this key configures the cam to have a time dependent output. Further information on this topic can be found in section 3.11.

3.4 DATUMING

When using an absolute encoder the system can only be datummed using the external datumming facility, see section 4. When the datum command is detected the display angle is set to zero. This datum point will be stored internally and is preserved even when power is removed from the unit.

3.5 BATCH FACILITY

The RC32C can store upto 9 batches. This facility allows the user to program up to nine sets of 32 cam sequences which are then available for quick selection when reconfiguring a machine for a different product. To select a batch proceed as follows,



The new cam sequences associated with this batch will now be available for programming, editing or running.

The system is designed so that the batch number **cannot** be changed when in the **RUN** mode.

3.6 CHECK MODE

This mode can only be entered when the program inhibit line is active. This mode allows an operator to check the programmed values for any output whilst the program mode is inhibited. To select the check mode, press

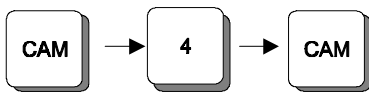


The displays will be of a similar nature to those seen in the **PROGRAM MODE** except no display will flash.

In this mode the letter “u” will be displayed in the mode window.

The **RUN** key is still active whilst in **CHECK MODE**.

To examine any cam ON and OFF data values select the cam number required. Thus if CAM 4 is required use the following key sequence,



The programmed angles of CAM 4 will now be displayed. To scan through the data for cam 4 upwards keep pressing the **ENTER** key.

To leave **CHECK MODE** press the **MODE** key again.

3.7 PROGRAM MODE

In this mode data can be entered for all the ON and OFF angles combinations for each of the cam outputs. In the RC32C there are 32 outputs available and in the RC16C there are 16 outputs available. A set of 32 or 16 ON/OFF angles is known as a BATCH PROGRAM or BATCH. The remainder of this manual will refer to the RC32C version.

All 9 batches can be programmed in this way.

Batches cannot be changed if the RC32C is in cycle, but the current batch can be programmed or the values of programmed data can be altered with the RC32C either in or out of cycle.

Note that if in cycle the newly entered data is only valid AFTER the OFF data has been entered.

To enter this mode press,



If the password facility has been activated (see parameter page 9) the unit will request the operator to enter a 4 digit PIN number. If the correct number is entered the unit will enter the program mode.

If the password facility is deactivated the unit will bypass the PIN request routine.

In this program mode the angles at which the 32 outputs switch on and off can be programmed and viewed. The mode window will display the letter “P” on left to indicate that program mode has been entered.

The **BATCH** display will show the currently selected BATCH NUMBER.

Select the batch to be programmed as outlined above.

On entering the program mode the cam number will be set to 1 with

window A showing the angle at which the output of cam 1 comes ON

window B showing the angle at which the output of cam 1 comes OFF

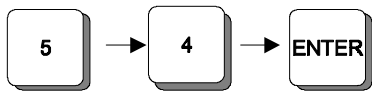
Window A will be flashing to indicate that the On angle can be changed if necessary.

If the window displays CCC then there is no programmed data for the output being viewed.

Enter a value using the number keys on the keypad or else use the JOG keys.

Values larger than 359 degrees will not be accepted and the display will default to zero awaiting re-entry of correct data.

Thus to enter an ON angle of 54 proceed as follows,



After pressing ENTER the data in window A will stop flashing and window B will start flashing.

The OFF angle can now be entered. If an OFF angle of 89 degrees is required then proceed as follows,



When the **ENTER** key is pressed with the B window flashing the CAM NO display will increment by one and window A will start flashing again. At this point the data for cam 1 is valid

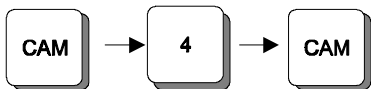
An OFF angle of 360 can be entered (see below).

Note: If both A and B angles are programmed to the same value then the output will stay off.

If a cam output is required to be On at all angles then enter the OFF angle as 360 degrees. In this case the On angle is ignored. A value of 360 degrees cannot be entered using the JOG keys.

Cams 2 to 32 can be programmed in exactly the same manner. In the limited program mode only cam numbers up to the value set on parameter page 4 can be programmed in this way.

To examine the programmed angles of any of the cam outputs, say CAM NO 4, the following sequence can be used,



Display A and B will now show the programmed angles for cam number 4.

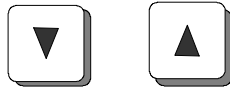
However if there are some outputs which have not been programmed (CCC) and one of these is selected using the above key sequence then the unit will select the lowest output which is unprogrammed.

For example if cams 1 to 12 have been programmed and an attempt is made to select cam number 16 cam 13 will be automatically selected since this is the next cam that can be programmed.

Pressing the **ENTER** key continuously allows the operator to scan through all of the programmed values.

Programming **can** be carried out whilst the machine is running, this enables fine tuning of a process. When operating in this manner, great care must be taken not to enter values which could cause damage to the machine. It is therefore recommended that this facility only be used when absolutely necessary.

There is a JOG up and a JOG down facility that can be used for fine tuning the ON and OFF angles. This can be used by simply selecting the cam output to be modified and then using the appropriate down or up key,



The entire program in a batch can be offset by 0 to +/- 359 degrees using the OFFSET facility see section 3.10.

3.8 CLEAR FACILITY.

Pressing the decimal point key twice in quick succession will clear all the programmed values. It is useful to do this at the start of programming. Only the batch program currently selected will be cleared.

Clear is only active when in PROGRAM MODE and not in the RUN mode.

3.9 COPY FACILITY

In the program mode any batch program can be copied into another batch by using the **COPY** key.

Select the batch to be copied, for example BATCH 1 and then press **COPY**. The display will indicate,

1 to 0

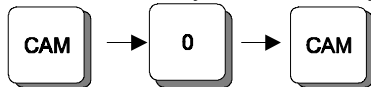
copy

with the 0 flashing. Enter the batch number to which batch 1 is to be copied and press **ENTER**.

Deselect the copy mode using the **COPY** key. The **ENTER** key must be pressed for copying to occur.

3.10 OFFSET FACILITY

The offset facility is activated by selecting CAM 0.



It cannot be used with the encoder simulation mode.

Using this facility an entire set of programmed values, (i.e., every On and OFF angle in a batch), can be incremented or decremented in steps of 1 degrees. The A axis will display **O.SET** and the B axis will display the offset that has been applied to the program data. Using the JOG keys this offset can be varied between + 359 and -359 degrees, unless the partial inhibit program mode is selected (see section 14), when the offset is limited to +/- 10 degrees.

NOTE: If there are any timers programmed in the batch being offset they will not be affected. The electronic cam operates by having all of the batch data in memory and when an operator selects a batch it transfers data of the selected batch to the WORKING BATCH DATA. The offsetting facility affects both the working batch data and the stored batch data and is saved as part of that batch data.

The stored offset is zeroed by using the CLEAR facility (section 3.8).

If limited program mode is set via the external input lines then the offsets are limited to +/- 10° for **ALL** cam outputs.

The offset mode can be exited by selecting cam 1.

3.11 TIMERS

If this facility is enabled (parameter 5, see sections 8 and 9) then cam outputs 1 to 8 can be configured as timers that are activated at a specified angle. In this mode the A display is the activation angle and the B display is the value of time for which that cam output will remain ON,

irrespective of the angle, once it has been triggered. Two time bases 0.1 and 1 sec, can be selected by configuring parameter page 5.

To select the timer mode press the **TIMER** key and the letter **t** will be displayed in the B axis display. The appropriate time can then be entered. Any 3 digit value can be entered. If a cam output is configured as a timer then it can be reset to the normal cam mode by pressing the **TIMER** key once more. This action will automatically set any programmed data in the B axis to zero.

The timer based cam output will be activated by the encoder reading passing the programmed angle **in either direction**. Depending on the parameter setting on page 5 value for the timer can be set in the range 0,01 to 99,9 sec or 1 to 999 sec.

The timers can be retriggerable or single shot timers by setting the appropriate options on parameter page 5 (see sections 8 and 9). Retriggerable timers are set to run EVERY time the encoder angle passes through the programmed ON angle.

Single shot timers can only be activated if the timer is NOT running, i.e., the output of the cam must be OFF before the timer can be set running.

NOTE: if any cam output is configured as a timers then the scan time of the RC32C is 2.0 ms.

3.12 DUAL SPEED CAMS

If required it is possible to introduce a "gearing ratio of 2 " on the first 16 cams. If selected this causes the angle presented by the encoder to be divided by 2. Thus for these cams one complete revolution occurs every 720 encoder degrees. the remaining cams (17 - 32) function normally

This function is selected by setting the H 16 option on parameter page 7.
The angle display will always indicate true encoder degrees.

if the lower left hand vertical bar is illuminated then cams 1 _16 are in the 0 -359 degree range.
if the upper left hand vertical bar is illuminated then cams 1 _16 are in the 360 _719 degree range.

The angular display is always the encoder angle plus any datum offset that has been set in the system. The same datum is applied to all cams even when the gear ratio of 1:2 has been selected.

Note that when programming cams 1 to 16 it is necessary to program the switching angle including the gearing ratio, thus if the following is programmed for a cam,

ON ANGLE 10 OFGF ANGLE 20

then the cam switches on when the displayed angle lies between 20 and 39 with the lower bar illuminated (if an absolute system) .

3.13 RECORD MODE

The RECORD mode can be selected by rapidly pressing the COPY key when in the default mode and out of cycle.

If JOG UP is pressed, data is uploaded to a remote unit via the RS232 serial link.

If JOG DOWN is pressed, data is downloaded from a remote unit via the RS232 serial link.

When the RS232 is active the B display will indicate]

rc for downloading (ie., data is coming from a remote terminal to the cam)

tr for uploading (ie., data is going from the cam to a remote terminal)

A time stamped record of certain events is stored in the cam and can be viewed in this mode.

The A display indicates the code number of the event (see list below) and the B display gives the time stamp of when the event occurred in minutes (displayed as a hexadecimal number).

The batch window displays F to indicate the RECORD mode and the next digit will have a bar that toggles every minute to indicate that the internal clock is functioning.

CODE NUMBERS

- 01 Power up.
- 02 RS232 upload has occurred.
- 03 RS232 download has occurred.
- 04 RS232 failed.
- 05 RUN mode deselected via keyboard RUN key.
- 06 RUN mode selected via keyboard RUN key.
- 05, 08 External RUN deselect request from digital input line.
- 06, 09 External RUN select request from digital input line
- 0A External DATUM request from digital input line.
- 01, 0B System has had an NMI signal.
- 0C Reserved.

The record and incremental time clock can be cleared by rapidly pressing the decimal point key twice in quick succession.

To view back through the record file press ENTER. Note that the latest record has the lowest number, ie., 1.

To exit this mode press the COPY key twice in quick succession, or press the MODE key.

4. EXTERNAL INPUTS

EXTERNAL PARTIAL PROGRAM INHIBIT - (Terminal 2)

This external line allows the use of a key lock to inhibit **part** of the programming facility.

If activated then no cam outputs above the value set on page 4 of the parameter mode can be programmed. Also offsets are limited to $\pm 10^0$ of the programmed values for **ALL** cam outputs. All other keyboard functions remain unaltered.

EXTERNAL START (Terminal 5)

External **START** will set the unit in cycle providing the TEST sequence is not activated.

This input must stay closed for a minimum of 4ms.

EXTERNAL STOP (Terminal 4)

External **STOP** will take the unit out of cycle This input must stay closed for a minimum of 4ms.

EXTERNAL DATUM (Terminal 3)

This external function zeroes the angular display and may be employed as a manual operation, or as an automatic function of an alignment sequence employing a sensor or microswitch. The line should be closed for a minimum of 4ms.

SIMULATION ENABLE (Terminal 9)

This external function will simulate an encoder moving in order to test run a machine. Care must be taken to ensure that no obstructions are in place since the cam outputs will be active if the unit is placed incycle.

The JOG UP and JOG down keys will speedup or slow down the software simulation.

EXTERNAL PROGRAM INHIBIT (Terminal 6)

This external function allows the use of a key lock to completely inhibit the program mode and batch change facilities. All other keyboard functions remain operational. In particular the unit can be switched in and out of the run mode. The program values can be inspected by selecting the VIEW mode using the MODE key.

5. OPERATION

When programming has been completed and the machine is ready to run, press **RUN** on the keyboard, or use the external **START** line. The CAM NO display will show the letter "r".

The **RUN** led will illuminate and the 32 outputs will switch according to the programmed values and the angle of the machine. The CAM OUTPUT STATUS leds on the front of the unit will illuminate when the corresponding cam output is switched on.

If a non zero creep feed value has been set on parameter page 3 and the unit is placed incycle then if the encoder does not exceed the specified number of degrees/sec an error code will be generated. The nature of the error will depend upon the setting on parameter page 10.

To inhibit all cam outputs press the **RUN** key again, or use the external **STOP** line.

5.1 ENCODER SIMULATION

The internal encoder can be set in motion by using the external simulation line. When this has been done the external encoder channel is ignored and an internal software encoder is set in motion. The speed of this encoder can be increased and decreased by using the JOG UP and JOG down keys.

6. ENCODER COUNT REVERSAL

The direction of counting of the encoder signals can be set by altering the sign indicated on parameter page 1.

7. SERIAL COMMUNICATIONS

The models RC32C and RC16C have a serial communication protocol compatible with Trans PG IN via the 25way D type connector on the rear of the unit. Connection is via a simple 4 wire V24 interface, (transmit data receive data, CTS and ground). Table 7.1 shows the standard pin out connection.

When the RS232 is active the B display will show **tr**. if the cam is uploading data and **rc** if the cam is having data downloaded to it. The A display will indicate the number of bytes received or transmitted. There is a time-out of approx. 30 sec which will be activated if there is an error detected in the RS232 transmission. This will also produce an error code 7. Pressing any key will clear the error message. Under some conditions this time-out can be defeated and thus if the display is not responding to the incoming/outgoing data for a period of time greater than 30 sec, switch off the power and then restart the unit 60 sec later.

TABLE 7.1	RS232 CONNECTION 25 WAY D TYPE			
PIN	CAM	connect to	PIN	PC
7	GROUND		7	GROUND
2	TRANSMIT DATA		3	RECIEVE DATA
3	RECIEVE DATA		2	TRANSMIT DATA

In all communications the cam will be the master of the two units, i.e., the cam will initiate all communications.

7.1 TRANS PG IN COMMUNICATIONS

Trans PG IN is a simple program to dump and upload data.

Connect the 25 way D type connector as indicated by table 7.1.

Select the RECORD mode and press the JOG UP key, the B display will show tr and the A display will indicate the number of bytes sent by the RC32C. Data of all the switching points in all batches will be sent to the serial port in ASCII form. When this has been completed the unit will return to the default mode.

If the JOG DOWN key is pressed, the B display will show rc and the A display will indicate the number of bytes received by the RC32C. Data of all the switching points in all batches will be downloaded via to the serial port in ASCII form. When this has been completed the unit will return to the default mode.

If any transmission fault should occur in the serial link (in either direction) then error code 7 will be displayed.

Note the communication RS232 configuration is

9600 baud, 8 data bits, even parity and 1 stop bit.

8. PARAMETER MODE

The electronic cam is fitted with a PARAMETER set-up mode which consists of 9 pages in which are stored the following parameters which are normally set only on installation of the machine.

A record of the parameters set should be kept on the form provided at the rear of this manual.

PAGE 1. Count direction and encoder type (absolute only).

PAGE 2. Not available

PAGE 3. Minimum encoder creep speed. If the unit is in the run mode and the encoder is rotating below the set speed an error will be generated and the unit will exit the RUN mode if n is selected on page 10. If F is selected on page 10 then output 16 is assigned to monitor the state of this test, thus if the encoder speed is above the value set on this page output 16 will be ON. Note that if F is selected cam 16 cannot be programmed.

PAGE 4. If it is desired to limit access to certain cams outputs then by using the external limit program line it is possible to restrict access to cam outputs above the number specified on this page. Any value between 1 and 32 can be set.

PAGE 5. The time base for any timers set in cam outputs 1 to 8 is set on this page. Values with 0.1 or 1 sec resolution can be selected. The time base selected applies to all cams that are configured as timers.

PAGE 6. This page allows the user to either ,

1. Enable the OFFSET facility.
2. Disable the OFFSET facility.

PAGE 7. This page allows the user to either, (RC32C only)

1. Select a gearing ratio of 1:1 for all cams.
2. Select a gearing ratio of 1:2 for cams 1 -16 and a ratio of 1:1 for cams 17- 32..

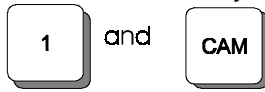
PAGE 8. This page allows the user to set the RS232 baud rate. The following baud rates are available, 9600, 7200, 4800, 3600, 2400, 1200, 600, 300, 150, 110, 75 and 57.

PAGE 9. This page allows the user to enter a 4 digit PIN number that must be entered before entry into the program and configure modes is allowed. If the number is set to 0 then direct access to these modes is allowed. The factory set pin number is 7171.

PAGE 10. This page can assign output 16 as an indication that the encoder is rotating at or above the minimum expected speed.

9. SETTING PARAMETERS

The parameter mode can only be accessed at power with the 2 keys held down,



The message **1.con** will appear indicating that in the A display the parameters for page 1 are being displayed..

PARAMETER PAGE 1

This page sets the encoder type, the count direction and display resolution.

It should be set according to the encoder selected ,

A Absolute - 1 degree resolution

The sign indicates the count direction. Note that no sign is indicated for clockwise rotation (the + sign is assumed). To change the sign press the UP arrow key, (the display will flash) and then press the decimal point key. The sign will change. Press the UP arrow key once more to stop the flashing.

To exit this parameter page press the **ENTER** key with A deselected. This will take you to page 3 of the parameter mode.

PARAMETER PAGE 2

This page is not available on absolute cam units.

PARAMETER PAGE 3

This page allows the user to set a minimum rotational speed for the cam which must be exceeded for the unit to operate. This can be used to ensure that the encoder is rotating. The creep speed value can be entered by selecting the parameter (UP arrow) entering the value using the numeric keys and then deselecting the parameter (use the UP arrow once more). A value of 0 disables this test. The switching accuracy of this test is ~10%

The value entered is the minimum (**number of encoder counts per sec / 5**) that must be received by the electronic cam.

- If the number of counts fall below this value and n has been set on parameter page 10, then if the unit is in RUN it will switch itself out of RUN and generate an ERROR 2 signal.

This error code can be reset by pressing any key.

- If however F has been set on parameter page 10 then output 16 is used to indicate the state of the creep speed test. If the number of counts received is above that programmed on this page then output 16 will be ON. If the counts fall below the programmed value then output 16 will be OFF. The unit does NOT drop out of run mode.

Example: output 16 is to trip off at 300 rpm.

No revs/ sec = 5; no of degrees/sec = 5 * 360

no of degrees in 1/5 sec = 5 * 360 / 5 = 360 - this is the creep speed value required.

To exit from page 3 to page 4 press the **ENTER** key with the A display not flashing (not selected).

PARAMETER PAGE 4

This page allows the user to prohibit programming of certain cam outputs. This feature can only be used in conjunction with the External Partial Inhibit line. If this line is active then no cam outputs above the configured value can be altered. To change this value set select the A display by pressing the UP arrow key and press **ENTER**. This will increment the number displayed by 1 up to the maximum value of 32. If the value is 32 then the next press of enter will reset the value to 1.

To exit from page 4 to page 5 press the **ENTER** key with the A display not flashing (not selected).

PARAMETER PAGE 5

This page allows the user to set the time base that will be used if any timers are activated in cams 1 to 8. Two values of 0.1 and 1 sec are selectable. To change this value set select the A display by pressing the UP arrow key and press **ENTER**. This will toggle the number displayed between 1 and 0.1..

To exit from page 5 to page 6 press the **ENTER** key with the A display not flashing (not flashing).

PARAMETER PAGE 6

This page allows the user to enable or disable the OFFSET facility.

If the window is selected and ENTER is pressed the display will toggle between O.Set and OFF. When the required mode is displayed deselect the window.

To exit from page 6 to page 7 press the **ENTER** key with the A display not flashing (not selected).

PARAMETER PAGE 7

This page allows the user to enable either a gearing ratio of 1:1 for all cams **(n 32)**

or a gearing ratio of 2 for cams 1_16 and a gearing ratio of 1:1 for cams 17-32. **(H 16)**

If the window is selected and ENTER is pressed the display will toggle between n 32 and H 16. When the required mode is displayed deselect the window.

Select n only if parameter page 10 is going to be set to F.

To exit from page 7 to page 8 press the **ENTER** key with the A display not flashing (not selected).

PARAMETER PAGE 8

This page allows the user to set the RS232 baud rate.

If the window is selected and ENTER is pressed the display will toggle around the allowed baud rate values When the required mode is displayed deselect the window.

To exit from page 8 to page 9 press the **ENTER** key with the A display not flashing (not selected).

PARAMETER PAGE 9

This page allows the user to enter a PIN number that allows the user to enter the PROGRAM and PARAMETER modes.

With the window selected enter the required number. If a pin number of 0 is entered then the PIN test is disabled allowing free access to both the protected modes.

To exit from page 9 to page 10 press the **ENTER** key with the A display not flashing (not flashing).

PARAMETER PAGE 10 (shown as A)

This page allows the user to use output 16 as an indication if the encoder is responding as expected. By setting the creep speed value in page 3 to an appropriate value output 16 can be used to indicate if the encoder is rotating above or below an expected speed. If the speed of rotation is above that set on parameter page 3 then output 16 is on. If it is below the value set then output 16 is off. Note that the cam remains in cycle at all times when F is selected and error 2 is not displayed. If the speed of the encoder recovers then output 16 is automatically reinstated.

No cam gearing is allowed if this option is selected.

If the window is selected and ENTER is pressed the display will toggle between **n** and **F**. When the required mode is displayed deselect the window.

To exit the parameter mode press the **ENTER** key with the A display not flashing (not selected).

10. TYPICAL PARAMETER RECORD

Page 1	A	count direction and encoder
Page 2	N/A	N/A
Page 3	10	creep speed
Page 4	30	
Page 5	1	
Page 6	OFF	
Page 7	n32	
Page 8	9600	
Page 9	1456	
Page 10 seen as A	n	

10.1 CAM PARAMETER RECORD

Date		Machine No
Software checksum		Initials
Page 1	A	count direction and encoder
Page 2		N/A
Page 3		creep speed
Page 4		
Page 5		
Page 6		
Page 7		
Page 8		
Page 9		
Page 10 seen as A		

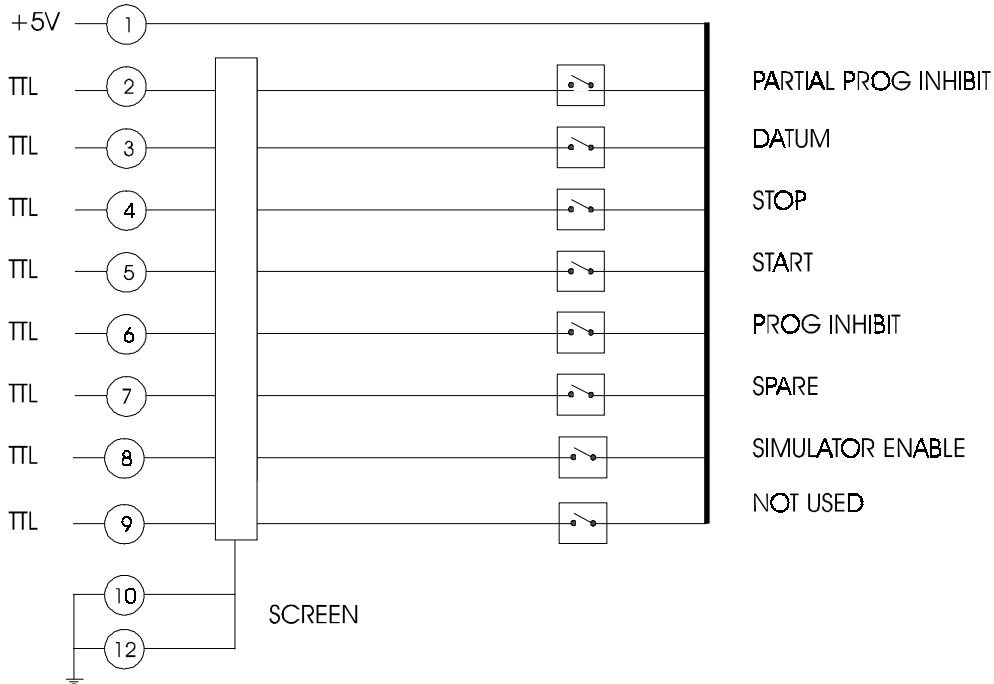
11. ERROR MESSAGES

The following error messages can be displayed. Error messages cannot be ignored, warnings can.

<u>Error Messages</u>	<u>Cause</u>
Error 1	Stored data corrupted. The parameter pages MUST be reconfigured and new program data entered.
Error 2	Creep speed error. The encoder is not rotating or rotating too slowly. The encoder may be faulty.
Error 4	Battery low warning. Replace as soon as possible.
Error 5	Entry into parameter pages not allowed
Error 7	RS 232 error.

12. CONNECTIONS

12.1 EXTERNAL INPUTS



CAUTION: VOLT FREE CONTACTS MUST BE USED

12.2 ENCODER CONNECTIONS

Absolute encoder * (12 way connector)

PIN NO	FUNCTION
1	+ve Supply **
2	LSB
3	bit 2
4	bit 3
5	bit 4
6	bit 5
7	bit 6
8	bit 7
9	bit 8
10	0 Volts
11	Nc
12	MSB

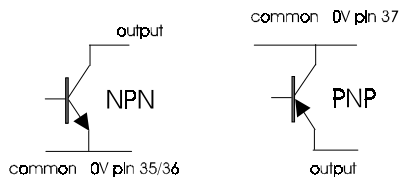
*Uses 360 excess 76 GRAY code

** Check your cam system to identify if you require a + 5 volt or + 24 volt encoder

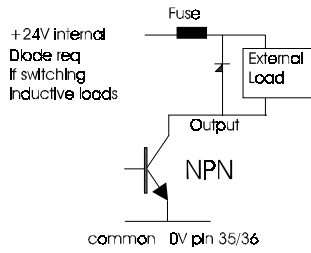
12.3 OUTPUT CONNECTIONS - 37 D-TYPE CONNECTOR

PIN NO	NPN OUTPUT	PIN NO	PNP OUTPUT
1	OUTPUT 1	1	OUTPUT 1
2	OUTPUT 2	2	OUTPUT 2
3	OUTPUT 3	3	OUTPUT 3
4	OUTPUT 4	4	OUTPUT 4
5	OUTPUT 5	5	OUTPUT 5
6	OUTPUT 6	6	OUTPUT 6
7	OUTPUT 7	7	OUTPUT 7
8	OUTPUT 8	8	OUTPUT 8
9	OUTPUT 9	9	OUTPUT 9
10	OUTPUT 10	10	OUTPUT 10
11	OUTPUT 11	11	OUTPUT 11
12	OUTPUT 12	12	OUTPUT 12
13	OUTPUT 13	13	OUTPUT 13
14	OUTPUT 14	14	OUTPUT 14
15	OUTPUT 15	15	OUTPUT 15
16	OUTPUT 16	16	OUTPUT 16
17	OUTPUT 17	17	OUTPUT 17
18	OUTPUT 18	18	OUTPUT 18
19	OUTPUT 19	19	OUTPUT 19
20	OUTPUT 20	20	OUTPUT 20
21	OUTPUT 21	21	OUTPUT 21
22	OUTPUT 22	22	OUTPUT 22
23	OUTPUT 23	23	OUTPUT 23
24	OUTPUT 24	24	OUTPUT 24
25	OUTPUT 25	25	OUTPUT 25
26	OUTPUT 26	26	OUTPUT 26
27	OUTPUT 27	27	OUTPUT 27
28	OUTPUT 28	28	OUTPUT 28
29	OUTPUT 29	29	OUTPUT 29
30	OUTPUT 30	30	OUTPUT 30
31	OUTPUT 31	31	OUTPUT 31
32	OUTPUT 32	32	OUTPUT 32
33	RUN	33	RUN
34	+24Vdc (internal supply @0.75A)	34	+24Vdc (internal supply @0.75A)
35	0V	35	0V
36	0V	36	0V
37	internal connection	37	Vss (link to pin 34 to use internal supply)

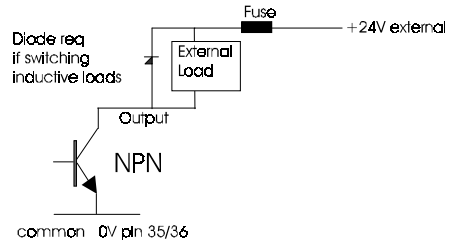
Typical output stage



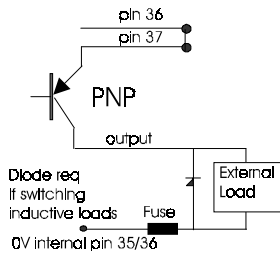
12.4 TYPICAL OUTPUT CONNECTIONS



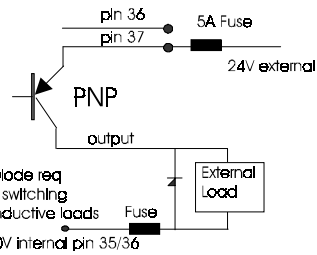
Typical NPN connection using internal 24V supply.
Max current 40 mA/load output (3A fuse).



Typical NPN connection using external 24V supply.
Max current 40 mA/load output.



Typical PNP connection using internal 24V supply.
Max current 40 mA/load output (3A fuse).



Typical PNP connection using external 24V supply.
Max current 100 mA/load output (3A fuse).
When using this method ensure that the 0V line is clean
and filtered as it connects to the Internal 0V line.

13. TECHNICAL SPECIFICATION

SUPPLY	110 -120V AC, 220 -240 V AC or 24V DC (factory set)
POWER CONSUMPTION	30VA
OUTPUTS	16 or 32 PNP or NPN- to be specified with order
ENCODER SUPPLY	24V or 5V DC to be specified with order
ENCODER TYPE	Absolute encoder 9 bits
EXTERNAL INPUTS	ext. start, external stop, datum, prog inhibit, partial inhibit lines. No external voltage required Signals are opto isolated.
SCAN TIME	0.5 ms if no timers programmed 2.0ms if any cam programmed as a timer
MEMORY AT POWER OFF	Lithium battery with 10year life. Low battery warning via external input
DATUM METHOD	1 degree
DISPLAY RESOLUTION	RS 232 interface
COMMUNICATIONS	One piece membrane incorporating all keys
FACIA	stand alone or panel mounting
INSTALLATION	~ 4 Kgm
WEIGHT	0 to +55 degree C
WORKING TEMPERATURE	305 w * 180 H * 140 D
DIMENSIONS	5 messages for fault finding
ERROR MESSAGES	9 (programs) batches
NO OF BATCHES	

14. ABSOLUTE ENCODER TYPES.


Some encoders count up in the clockwise direction and some count down. In order to synchronise the internal software encoder with the real encoder switch 1 on DILA on the main PCB can be used.

switch 1 OFF software encoder and external encoder synchronised i.e. both count in same direction.

switch 1 ON software encoder and external encoder count in opposite directions.

Note: the direction of counting can still be set on page 1 of the parameter mode and DILA only serves to synchronise the internal software counter with the external encoder.

15. POWER CONNECTIONS.

1. 110/120 V or 220/240 V AC supply is via a standard European IEC 320 connector
2. 24V dc supply is via a 4 pin HARTING connector,
 - pin 1 +24 V DC
 - pin 2
 - pin 3 0 V
 -  ground